Merry Christmas, Mr. President

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – If things go the way Carl Calo hopes they will, President Carter and his staff may get a present next Christmas that could prove an interesting contrast to the antiques in the White House.

Calo, who heads DP operations for the Executive Office of the President (EOP), is getting ready to shop for computer power. He would like to see on the desks of his users – except in the Oval Office itself – multifunction terminals that would handle electronic mail, word processing and a variety of other applications.

The applications shopping list is long and includes such items as a scheduling and time management system for the President and Vice President, a correspondence generating and tracking system, a data base of Presidential statements and formal policy positions, access to agency program data and economic models, on-line information for use in crisis situations and control and tracking of assignments and requests by senior White House officials.

The system that would serve the EOP, comprised of 12 separate offices, must be flexible enough to adjust to changing administrations. Those served by the system include senior Presidential advisors, the Professional Policy and Planning Staff and the administrative aides, secretaries and special assistants who populate the EOP.

Officially the assistant director of the Information Systems Division in the EOP's Office of Administration, Calo will issue preliminary specifications this month for the information system he hopes to design.

"Capability-oriented" rather than hardware-oriented, these specifications will leave it to industry to come up with the best equipment and configuration for the total system the EOP seeks, he said.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Gains in New Job Salaries Best for Systems Analysts

By Ann Dooley
CW Staff

NEW YORK – Starting salaries for systems analysts have risen significantly in the last year, outpacing the percentage increases experienced in other DP job categories, according to a report by Robert Half Personnel Agencies, Inc.

The yearly report is based on an analysis of position requests received by the agency's 55 offices in the U.S. and not on a random sampling of salaries presently being paid in DP installations.

Results showed that a systems analyst working in a large installation can earn $18,000 to $23,000 – a 13.9% increase over the salaries being offered to new recruits last year.

In a medium-sized installation, an analyst can also expect a significant rise in the pay scale to between $18,000 and $22,000, a 14.3% hike over last year, Half said.

Only in the small installations were gains more modest. There, an entering analyst can expect to earn between $16,000 and $18,500 for a percentage increase of 7.8%, the

(Continued on Page 4)

IBM Adds 3033 MP – But It's Not a Bargain

By Ronald A. Frank
CW Staff

WHITE PLAINS, N.Y. – IBM has lashed together two of its most powerful mainframes into a multiprocessor (MP) configuration that can provide up to 16 million characters of storage.

The 3033 MP provides 1.6 to 1.8 times the instruction rate of a single 3033 processor when running similar programs under OS/VS2 MVS, IBM said.

Users who want the MP version will actually be paying more than the cost of having two free-standing 3033 systems. On a purchase basis, an MP system will cost $400,000 more than two CPUs, IBM said.

The MP configuration is available with a combined total of 8 million to 16 million characters of storage, expandable in increments of 2 million characters, and each CPU memory can be accessed by both processors. A switching function permits program control of channel communications within the MP configuration.

Either processor can use the other's channels if one of the processors needs service or is not operational, a spokesman noted.

A communications unit, the Model 3038, connects the two CPUs and controls switching between the systems.

Two groups of six channels are standard on each CPU and an optional group of four channels per CPU is available for a total of 16 channels per processor or 32 channels for a full MP configuration.

One CPU can support major por-

(Continued on Page 5)

Congress Unit Set to Ponder:

DP Giving Incumbents an Edge?

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – Are computers and computer services – financed with tax dollars to help congressmen maintain constituent mailing lists and handle other official administrative duties – giving those incumbents an unfair advantage over their political opponents?

Congressional use of computers and franked (free) mail to manipulate the voters back home and to make incumbency an even more invulnerable position has become a troublesome issue in recent months, according to a staff member of the House Administration Committee's Policy Group on Information and Computers.

The committee will meet soon to spell out the official uses to which a legislator's computer system may be put. The question is a matter of ethics rather than legality, a congressional spokesman noted.

Recent publicity has made the public more aware that its tax monies are providing members of Congress with a powerful tool to assist their return to the legislature. This public pressure makes some resolution of the ethical questions involved in computer use by congressmen a high priority, congressional sources indicated here last week.

A recent study on expenditures by congressmen reported that 263 members of the 435 member House are spending a total of more than $2 million annually from their congressional allowances for office computer services.

Constantly under pressure to be well informed about an increasing variety

(Continued on Page 4)

IN DEPTH
IN DEPTH

Are you spending long hours on the job but never getting everything done? There may be an alternative. See 'Structuring Your Workstyle,' beginning on Page 11.

Service Bureau Moves Itself From Path of Flood Waters

By Tim Scannell
CW Staff

PHOENIX – In a scene reminiscent of a Hollywood movie, a service bureau here was rescued from the path of flood waters produced by torrential rainfall, a swollen river and overburdened dams.

The threatened service firm – Automatic Data Processing, Inc. (ADP) – moved its entire operation "from computer hardware to warehouse forms" from its industrial park location to the safety of a temporary facility set up in a downtown Phoenix bank, according to Dave Hagan, manager of ADP's Commercial Services Center.

Center personnel received the warning of an imminent flood at noon on March 2 from police, who had been monitoring the rising waters of the nearby Salt River. State officials decided to unleash water from five overburdened dams in northeast Arizona to eliminate the danger of a dam burst in any one or all of the man-made retainers.

"Obviously an option was exercised by someone in authority for a smaller flood in lieu of a full blown catastrophe," Hagan stated.

(Continued on Page 6)

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HIS Vice-President Fighting Tardiness By Giving 'Turkey of the Month' Award

By Don Leaviff
CW Staff

PHOENIX — Sometimes it takes a touch of humor to bring common sense — and the desired action — to a deteriorating situation. At least that's what C. Walter Dix thought when he initiated the "Turkey of the Month" competition now under way at Honeywell Information Systems Inc.'s Large Systems Engineering Operations (LSEO) here.

The competition was triggered by a memo written last December by Dix, the mainframer's vice-president for engineering, who was concerned by early morning tardiness of LSEO employees.

Dix wasn't really worried about the few minutes lost from each tardy worker's day, he explained last week, he was worried about the morale of those who started work on time and then saw the latecomers drift in, apparently without penalty.

The "Turkey" contest — which "rewards" the LSEO section with the worst on-time record each month — has been quite successful. Although the vice-president declined to give the figures for on-time attendance in the HIS plant overall, he said LSEO's record has improved "significantly" and now stands at about 98%.

In the December memo in which he decried the development of a "don't care" syndrome in the face of unchecked tardiness, Dix set up the rules for the contest, with phrasing that mocked the language of many typical management pronouncements and captured the imagination of the managers and workers he was trying to reach.

The memo provided an elaborate formula for calculating the on-time performance of each LSEO unit. The logic of the calculation was sound but — important to Dix — it did not threaten any of the tardy workers personally. The formula was also structured so the tardiest unit "earned" the highest score.

Dix's second rule specified the highest ranked unit would win the Turkey of the Month Award, a good-looking plaque suitably inscribed with the "winning" manager's name, the vice-president said.

But the LSEO unit with the best on-time record for the month — the one with the lowest score according to Dix's formula — also gained special recognition. Workers in that unit were rewarded with privileged parking spaces instead of having to go through the usual scramble for whatever was available in the general parking lot.

January was a "shakedown" period for the competition, so no "Turkey" award was given that month, but the Multics Software Engineering Group "won" the award for February. Perhaps that's to be expected, according to one engineer who noted that software everywhere has a reputation for being late.

State Hearing Officer Gives 'Promis' Nod to Burroughs

By Brad Schultz
CW Staff

BOSTON — Burroughs Corp.'s hardware proposal to implement the first statewide Prosecutor's Management Information System (Promis) here meets the needs of the state, and the company won the contract in "open and free" competition, a bid protest hearing officer decided here last week.

Barbara Clurman's decision refuted claims by Honeywell Information Systems, Inc. and John L. Tobin, general counsel for the Massachusetts Committee on Criminal Justice (CCJ), that bids for the hardware were improperly evaluated and that Burroughs' proposal was not responsive to the Massachusetts Supreme Judicial Court's (SJC) stated requirements [CW, March 20].

Clurman's decision is only a recommendation — the CCJ Proposal Review Board will make its own decision, according to attorney Robert Bigelow.

Clurman presided over a two-day hearing last month to consider the two issues raised by Tobin and HIS and debated by a battery of lawyers: offensively, Tobin for the CCJ and Donna Sherry for HIS, defensively, Bigelow for the SJC and William McCormac for Burroughs.

HIS was the runner-up in the bidding competition that began last August and ended with the announcement in November of an $815,000 Burroughs award. The $1.2 million HIS proposal was rejected with those of eight others.

The money that may yet buy Burroughs' equipment and establish Promis comes from the U.S. Justice Department's Law Enforcement Assistance Administration (LEAA) and is administered by the CCJ, which suspended the procurement process pending its review of the bid award.

Bigelow expects the Proposal Review Board to rule in accord with Clurman's findings, but pointed out this type of protest review is unprecedented in the CCJ's experience and an overruling is possible.

In addition, he noted, HIS may take this matter further, appealing to the LEAA.

"Obviously, we are very pleased by the decision," Burroughs marketing manager Paul Connelly said. He added that Burroughs is anxious to get on with the job, which he called the first statewide judicial computerization.

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"Now we are executing over 45 programs under RTS covering every aspect of highway engineering. We are saving engineer's time and getting better studies."

"Under batch, there was usually a day's delay before all calculations were checked and the run made," added Staff Engineer, Bryce Clodfelter. "With RTS, we go from rough notes directly to terminal input. The run is completed in seconds. And if a mistake is made, we can correct it on-the-spot."

"We're doing a lot of work in four hours that would have taken a week before," emphasized Engineer Wayne Robey. "That's not just the calculations—that's the complete job."

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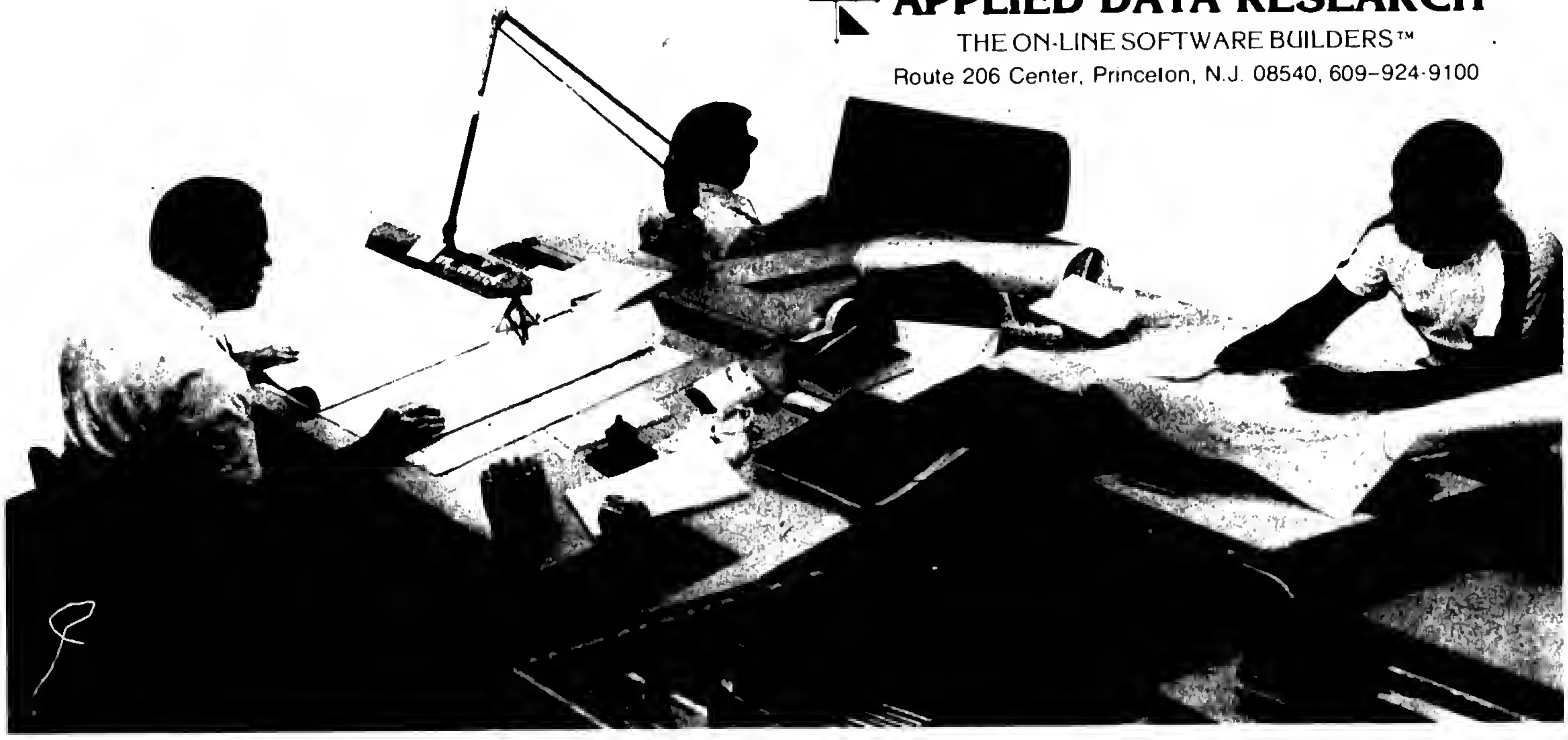

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Congressional Unit to Ponder 'Official' DP Use

(Continued from Page 1)

of issues and barraged by sophisticated mass mailing techniques, particularly by the far left and right, congressmen can put automation to good use in keeping up with the task of representing their districts. Computer systems and services can help generate return mail, tell the congressmen's constituents the federal grants for which their towns and counties qualify, track bills and legislation and find out what's happening on the House floor,

Computer systems and services can also build a data bank of the names, addresses, occupations and political views of taxpayers who write to their congressmen. And, at election time, a congressman's campaign committee need only spend a few hundred dollars to extract mailing lists of constituents broken down by county, by occupation, by viewpoint on a particular issue or by any other category the system has been programmed to track.

There is nothing illegal about this double use of congressional systems. The Federal Election Commission (FEC) said in a 1976 opinion that it is permissible for congressmen to use campaign funds to extract information from their office computers.

But there is doubt inside and outside Congress whether some members' easy, inexpensive access to such computerized information is fair to their campaign opponents. There is fear that it could get overpowering.

Amendments Introduced

One of the most advanced computer users in the House, with his own mini tucked away in an office closet, Rep. David Stockman (D-Mich.) is sufficiently concerned that he recently introduced two amendments to the Campaign Reform Act to alleviate the potential for misuse.

The Campaign Reform Act was not permitted to reach the House floor just over a week ago, but will be brought up again, a spokesman said.

One of Stockman's amendments would dictate that mailing lists compiled in campaigns at campaign expense can't be used by representatives for office business. The other amendment would not permit computerized, mailing lists generated at taxpayer expense to be used for anything other than "official" purposes, a spokesman for the congressman said.

Stockman withdrew this second amendment from the Elections Act in favor of a final decision on the matter by the House Administration Committee.

The problem facing the committee will be the definition of "official," the spokesman for the policy group said. A change to the rules governing the members of Congress along the lines suggested by Stockman's amendment will be the goal of the next meeting, he stated.

The House, with some members far ahead of the Senate in computerization, will have more trouble policing its members than will the other half of Congress, congressional sources agreed. Unlike members of the House, Senators aren't permitted to lease computer services from private vendors. All their terminals are linked to the Senate system, which has rules about its use for clearly political purposes.

On the House side, however, FEC campaign finance reports show that several congressmen's political campaign committees buy computer services from the firms that sell their abilities to the congressmen's offices.

Some recent news reports have pointed out the belief of congressional sources that some legislators use computers for campaign purposes but never charge anything to their campaign committees. The activity, therefore, does not show up in FEC records.

Jeffords' Case

When questioned about the use of his office computer for campaign reasons, Rep. James Jeffords (R-Vt.) said, "If I had been dishonest, I could have had the mailing labels run off quietly, at pubic expense, and nobody would have ever noticed."

Public records indicate Jeffords took $3,111 from his congressional allowance during the first six months of 1976 to purchase computer services from Wang Laboratories, Inc. In July of that year, the Jeffords for Congress Committee paid $200 to the same company for two sets of mailing labels with the name and address of every Vermont resident who wrote to Jeffords during his first 18 months in office.

"There is no question the opportunity for abuse exists," Jeffords said. "Like many other aspects of a congressional office, computer [services] could be used for blatantly political purposes by an unscrupulous member of Congress."

Other congressman who have employed their office computer services for campaign purposes include Rep. Phil Sharp (D-Ind.), who paid $9,000 to Computer Data Services, Inc. in the 10 months before the November 1976 election and whose campaign committee paid $341 to the same firm for mailing labels; Rep. James Blanchard (D-Mich.), who took $2,370 from his allowance during the first six months of 1977 to buy time from Dialcom, Inc. and whose campaign committee spent $472 with the same company last June for computer services; and Rep. Floyd Fithian (D-Ind.), who paid $4,923 from his allowance to Digital Management Corp. for services in 1976 and whose 1976 campaign committee, the Friends of Floyd Fithian, received a mailing list from the same firm in return for $153.

One suggestion made to curb potential excesses is to control the amount of franked mail that members of Congress can send. But many congressmen object that they need the computer and the franking privilege to keep up with the demands of their job.

Rather than limit congressional privileges, Congress shoud give some financial help to political opponents, according to Rep. David Obev (D-Wis.).

A section in the Campaign Reform Act promises public financing for opponents of particularly entrenched incumbents. As a result of a recent Houses Rules Committee meeting, however, public financing will be removed from the version of the bill that finally goes to the House floor, a congressional spokesman said.

Analysts' Gain Biggest

(Continued from Page 1)

firm reported.

Starting salaries for the industry as a whole, meanwhile, increased 6.3% over 1977 figures, according to the analysis.

The study also indicated that large companies usually pay higher starting salaries than medium and small companies but that medium and small firms often have more rapid advancement for selected employees.

Half also pointed out that medium and small firms requiring experience with large systems must pay competitive salaries with the large users.

Installation size is determined on an individual basis for each company and is based primarily on the size of the DP staff, a spokesman explained. If the installation includes a DP manager, it is placed in the medium or large category. An installation is "large" if it hires a manager, programmers and systems analysts, the spokesman said.

The study showed that a computer operator in a large installation can expect a starting salary of $10,500 to $14,000 (a 2.1% increase from 1977). An operator in a medium installation may earn between $10,500 and $14,000 (an 8.9% change) and an operator in a small installation may earn from $9,000 to $12,500 (a 4.9% increase), Half said.

A programmer with up to one year experience can start at $12,000 to $14,500 in a large installation, a figure unchanged from last year, according to the study. In a medium installation, the programmer may earn between $12,500 and $13,500 (up 4%) and the new programmer in a small installation can earn from $10,000 to $13,000 (up 2.2%).

For programmer analysts, increases were larger. A programmer analyst in a large installation can earn between $16,000 and $22,000 (a 5.6% rise in starting salary from the year before). In a medium installation, a programmer analyst can earn from $15,500 to $20,000 (a 4.4% increase) and a programmer analyst in a small installation can earn between $13,500 and $16,500 (a 5.3% increase), Half said.

According to the study, lead programmers in large installations are doing still better. A lead programmer can start at $18,000 to $22,000 annually, 8.1% more than in 1977. In medium-sized installations, starting salaries were found to be between $17,500 and $20,000, or 4.2% more. Lead programmers were not found very frequently in small installations.

A project manager in a large installation can expect to earn between $21,000 and $26,000 — a 4.4% increase from 1977. In a medium-sized installation, the same position pays between $19,500 and $23,000 — a 6.3% increase — and again the project manager position was not filled in the small installation category, the survey noted.

A director of DP in a large installation can expect to earn between $26,000 and $40,000 — a 1.5% increase. A DP director in a medium installation can earn between $23,000 and $28,000 — an 8.5% increase, and a DP manager in a small installation can earn from $19,000 to $25,000 — a 10% increase, the survey reported.

All of the salary figures cited represented a national average and salaries would probably be 15% to 20% lower in the Midwest and 10% higher in New York, the spokesman claimed.

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In World Cup Competition

Mini Tallies Skiers' Standings

By Tim Scannell
CW Staff

AROSA, Switzerland — The World Cup Skiing Competition, a grueling contest that spans three months and is held in five countries, recently ended here for both the contestants and a participating minicomputer.

During the competition, which began in late December, an Olivetti Corp. P6060 was used to keep track of the final times in each trial, calculate the marks and supply a final general classification among the skiers, a spokesman stated.

The P6060 was programmed to operate in each phase of the ski tour, or "white circus," as participants call the competition. In all, there are 23 events for both men and women consisting of a series of downhill races, slaloms and giant slaloms as well as a final head-to-head parallel race, the spokesman explained.

Timekeepers used the Olivetti machine to record skier's times, down to the hundredth of a second, and process each one's standings according to the latest results. Times and standings were printed by an integrated printer and also stored automatically on a resident floppy disk, the spokesman continued.

The minicomputer was also linked to the various television networks filming the events to provide accurate and up-to-the-minute results to them as they broadcast the World Cup activities, the spokesman added.

Overall winners in the competition were Ingemar Stenmark of Sweden in the men's division, who captured a win for the third season in a row, and Hanni Wenzel of Liechtenstein in the women's.

Two World Cups, or Trophie Avions, are awarded each year, one to a man and one to a woman, on the basis of points accrued in the 23 events. Skiers are given 25 points for a first place finish, 20 for a second, 15 for a third, 11 for a fourth and so on down to one point for a 10th place, the spokesman continued. Standings are computed by adding the skier's three best results in each category of competition.

Shaggy Dog Story?

WASHINGTON, D.C. — Walter Greenberg became dog-tired of receiving junk mail and sales calls after his name was mysteriously placed in a computerized data bank.

In fact, Walter started going around the house with a hang-dog look on his face — something not really unusual since Walter is a member of that species commonly referred to as "man's best friend."

When solicitors inquire for Walter, his family usually responds that "he's tied up." But one offer was too good to miss, Daniel Greenberg, Walter's owner, said in a recent *Washington Post* article.

The publishers of an annual directory of distinguished Americans selected Walter as an entry for the next edition. The family filled out the forms listing Walter's occupation as dog breeder and are now eagerly awaiting their volume.

IBM Brings Out 3033 MP Unit

(Continued from Page 1)

tions" of the MP workload during off-peak hours and while the other CPU is out of service. In addition the two processors can function as independent systems.

The MP configuration does provide some operating benefits, such as needing only a single system control program that can be shared and reduces storage overhead, the spokesman pointed out.

Despite these operating advantages, the 3033 MP provides no features not previously available on a single 3033, he said.

The System/370 Extended Facility, which is supported and used by IBM's MVS/Systems Extensions program product, is standard on the 3033 MP. This software offers increased performance by simplifying certain control programming tasks, IBM said.

Programs that operate on a single 3033 also will run on the MP CPUs when they are run as individual systems.

Single-processor 3033 systems can be upgraded to MP configurations at the user's site, IBM said.

Under terms of a 48-month Term Lease Plan (TLP) contract, a 3033 MP including two CPUs with a shared main memory of 8 million characters, a 3038 communications unit, two consoles and two power and cooling units can be leased for $154,130/mo. Under the same terms, an MP system with the maximum memory capacity of 16 million characters can be leased for $182,130.

These configurations also are available for a monthly rental charge of $169,520 and $200,280, respectively, or can be purchased for $7,160,000 and $8,050,000.

The MP system on a monthly rental basis costs $14,660 more than two comparable systems. On a TLP lease, it costs $13,330 more, IBM said.

Customer shipments of the 3033 multiprocessor are scheduled to begin in the third quarter of 1979.

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White House Shopping for Computing Power

(Continued from Page 1)

The system EOP eventually winds up with will replace an IBM 370/155 and could be based on another large central system, multiple minicomputers or some form of distributed processing, Calo said. He has had conversations with more than 40 interested vendors.

In addition to providing as many as 100 specific EOP applications, electronic mail and word processing, the ultimate EOP information system must include a data base management system (DBMS) capability and must be able to access the outside world, whether that world is composed of commercial data bases or congressional or federal agency systems and networks, Calo stated.

The White House DP head wants constructive comments from industry, hence the preliminary specifications. A formal request for proposal will be sent out in July, with a target delivery date for the system of December. "It will be a Christmas present for the President and his office," Calo chuckled.

Communication Lacking

That Christmas present will represent something of a revolution in information handling and data processing in the EOP. The President's reorganization project most recently identified a persistent lack of communication between the advisory units at the top of the executive branch.

In its report to Carter last June, the reorganization team pointed to the lack of coordination that resulted in "no common inventory of languages, application systems, equipment, staff or available expertise." The Reorganization Plan No. 1 of 1977 accordingly recommended that there be "one place within EOP to get computer applications developed and to obtain consultation and advice."

The reorganization project suggested further that a central administrative support unit be set up to integrate and coordinate the computer operations of the 12 separate EOP offices.

The Office of Administration was created when Congress gave the go-ahead to the reorganization plan last October. That go-ahead represented Congress' official approval of activity under way since June to do something about the information and communications problems in the EOP, according to Richard Harden, now director of the Office of Administration and the President's special assistant for information management. Harden has a staff of 150 and a budget of $8 million.

Outside Data Bases

While the primary computer operation and all control will reside with Calo and his internal staff of 50 systems analysts and programmers and 50 outside individuals, the information system will rely on and benefit from a number of outside data bases and networks, according to Edward K. Zimmerman, special assistant to Harden and the person in charge of long-range vision for the system. Twenty data bases are available to the EOP now.

"Except for the Office of Management and Budget's budget preparation," there is no need for a huge central computer center to serve the White House," Zimmerman said. "We will stress communication rather than computation."

The White House continues to have access to the congressional bill tracking system, known as Legis, the Justice Department's legal search system — Juris — and such commercial data bases as the New York Times Information Bank.

Eventually, the EOP hopes the flow of information from Capitol Hill may be returned in the form of better budget data for Congress and better statistical data on how the federal government actually spends taxpayer dollars — "After all, Pennsylvania Avenue is a two-way street," Zimmerman pointed out.

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WANG

Bureau Leaves Flood Path

(Continued from Page 1)

But "we were prepared for the eventuality beforehand. We rented and had standing by two large moving vans and two other covered trucks. About 10 o'clock that morning I had made a decision to add another truck just to make sure we had enough because there were a lot of people being flooded out," he recalled. "Police helicopters, circling overhead, notified us when it was time to evacuate the building.

"With the help of our 35 employees and three willing and helpful hardware vendors, we loaded up our IBM 360/40 system and peripherals and headed for high ground," Hagan said.

The three trucks and two vans, containing the bulk of ADP's equipment, were parked in a lot beside the bank. "Everything was under lock and key, under guard, in the guarded parking lot," Hagan said.

Hagan then set up two "command centers" to coordinate his company's activities. ADP's customer service people worked out of the bank's operation center and "our payroll manager set up the second command center at his house to keep track of our employees and the flood situation," he said.

The flooded river crested out at one o'clock in the morning on March 3, just short of the industrial park site. "We actually received no flood damage whatsoever to the building," Hagan said. "There was water in the street just a few hundred feet from us and the utility company had powered off the entire industrial park area because the flood was taking out a lot of the power poles."

Things could have been much worse, he remarked. If all five dams had ruptured at once, Hagan was informed, the City of Phoenix would have been under 12 feet of water.

Nevertheless, flood waters were still high enough to make all of the 20-plus causeways that traverse the Salt River bed impassable to regular traffic.

After the danger had passed, Hagan put into motion a plan to get his center back into operation. The equipment-filled trucks were driven back to the industrial center, the computers were unloaded and "by seven that evening we were back in business at our permanent location."

Not a single record or storage tape was lost or damaged before, during or after the evacuation — a fact especially notable, Hagan pointed out, because the ADP center itself had been established only three weeks prior to the crisis and the entire evacuation procedure had been improvised.

"This is a brand new office," Hagan observed. "We never had time to develop any type of standard backup plan — I just called the shots as I saw them."

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In Handling People Problems

Be Aware of Changing Attitudes, Attendees Told

By Don Leavitt
CW Staff

SAN FRANCISCO — Every single person is a unique configuration of talents, capabilities and attitudes and the "configuration" may change from day to day in the face of both internal and external factors.

That is why the management of people is such a complex function, according to management consultant Ira Gottfreid, who told a Computer Expo '78 audience here last week that "people problems" are "tough to diagnose and even tougher to fix."

But recognizing problems "before they explode" and handling them when they occur should leave the good manager with more time to do the real work of the organization for whom he works, the consultant said.

The process must start, Gottfried noted, with the manager's recognition of his own, perhaps limited, viewpoint. "Do you, for example, have the same view of life you had when you started in business? Have you ever taken time to think about life? What are your goals?" he asked, adding that if a manager doesn't have goals, it's unfair to expect his employees to have any.

Probing Introspection

But the manager has to be more probing in his introspection, Gottfried continued. "Ask yourself, honestly, are you open to ideas from others?' Are you willing to train your subordinates to do your job? Are you, in fact, a 'management snob' remembering that 'rank has its privileges' and, for example, always using your office for meetings? When was the last time you went to a subordinate's work area to talk over a problem?

"When was the last time you stood back and measured your strengths and weaknesses as a people management?" he persisted, "And when did you last recognize that you are *dependent* on those who work for you?"

But even the manager who has analyzed his or her own "configuration" may have trouble relating to today's new employees, Gottfried warned. "They are different than we were, even five years ago."

Early DPers came out of other departments of a company and knew the company's reason for being. Newer technicians are coming from school and they know technical details but not much about business life, he said.

Beyond that, he reminded his audience, the new employees in particular are products of the upheavals of the 1960s. They are not prepared to be patient with the way things are. They are extremely conscious of employee rights.

The Human Connection

The tend to put their own interests first. After that, DPers especially tend to rank their profession second and their company's interests third.

"If you don't believe that, try a little test. Ask a DPer where he works: The answer will be in data processing. Ask an accountant or a bank teller or a welder the same question and the answer will be at XYZ company."

DPers tend to see others in their own companies as "them," Gottfried said. And with their self-interest, job content and career planning are more important than they once were. "Overtime is no longer a way of life. Outside interest and concerns — shared family responsibilities, for example — have their priorities."

Managers must be salesmen; they cannot be insensitive to the makeup of their employees, he said.

Those differences make it tougher to be a manager, but the person who can cope with the changes is a better manager because of them.

MIT to Offer Systems Course In Mid-June

CAMBRIDGE, Mass. — The Center for Information Systems Research at MIT has announced this summer's seminar.

The seminar, offered every year, will concentrate this year on research and practice aimed at improving the effectiveness of information processing tools and techniques in different types of organizational settings. Other topics to be discussed include problem diagnosis, data base management systems, distributed processing, research on end-user need assessment and decision support systems, according to a spokesman.

The seminar, which is scheduled for June 19-23 on the MIT campus, is said to be especially relevant for managers with responsibility for designing, implementing and evaluating application systems. Tuition is $750, with announcements available from the center at 50 Memorial Drive, Cambridge, Mass. 02139.

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DPers Get Hearing Date With California Tax Board

SACRAMENTO, Calif. — The Sales Tax Action Group (Stag) of California has arranged a day-long public hearing before the California State Board of Equalization on May 4 at 10 a.m. in Room 102, 1020 N St. here.

The hearing will deal with the Board of Equalization Regulation 1502, which dictates the taxation of software and services, a spokesman said.

Stag is an unincorporated association of representatives from approximately 150 DP companies based in or with business activities in California. The present purposes of the organization are to question and contest both the validity of the provisions of Regulation 1502 and the propriety of the enforcement of those provisions.

He said it is the position of Stag that the Board of Equalization:

- Does not fully understand the workings of the DP industry and therefore is not in a position to impose equitable sales and use taxes on the industry.
- Unfairly treats advisory services in the DP industry as fabrication labor so as to include the value of those services in the measure of sales and use tax of any incidental tangible by-product of those services.
- Improperly taxes intangible computer programs through contrived logic.
- Is inconsistent in its application of the provisions of Regulation 1502 to particular situations, resulting in selective, discriminatory and inequitable taxation.

Call for Papers

SYMPOSIUM IFAC/IFORS: COMPARISON OF AUTOMATICS AND OPERATION RESEARCH TECHNIQUES APPLIED TO LARGE SYSTEMS ANALYSIS AND CONTROL, Toulouse, France, March 1979.

Topics in the area of methodology and general tools include decomposition and coordination, decentralization and hierarchization, data analysis in process control, modeling, simulation techniques and specialized languages and diagnosis and correction of failure modes. In the area of actual applications, topics include production control, transportation network management and control, communications network control and economical system management and control.

Submit five copies of a two-page summary in English and French by April 15 to M. Palegrin, Comite du Programme du Symposium, Cert — B.P. 4025, 31055 Toulouse Cedex, France.

MUMPS USERS GROUPS, San Francisco, Calif., June 7-9, 1978.

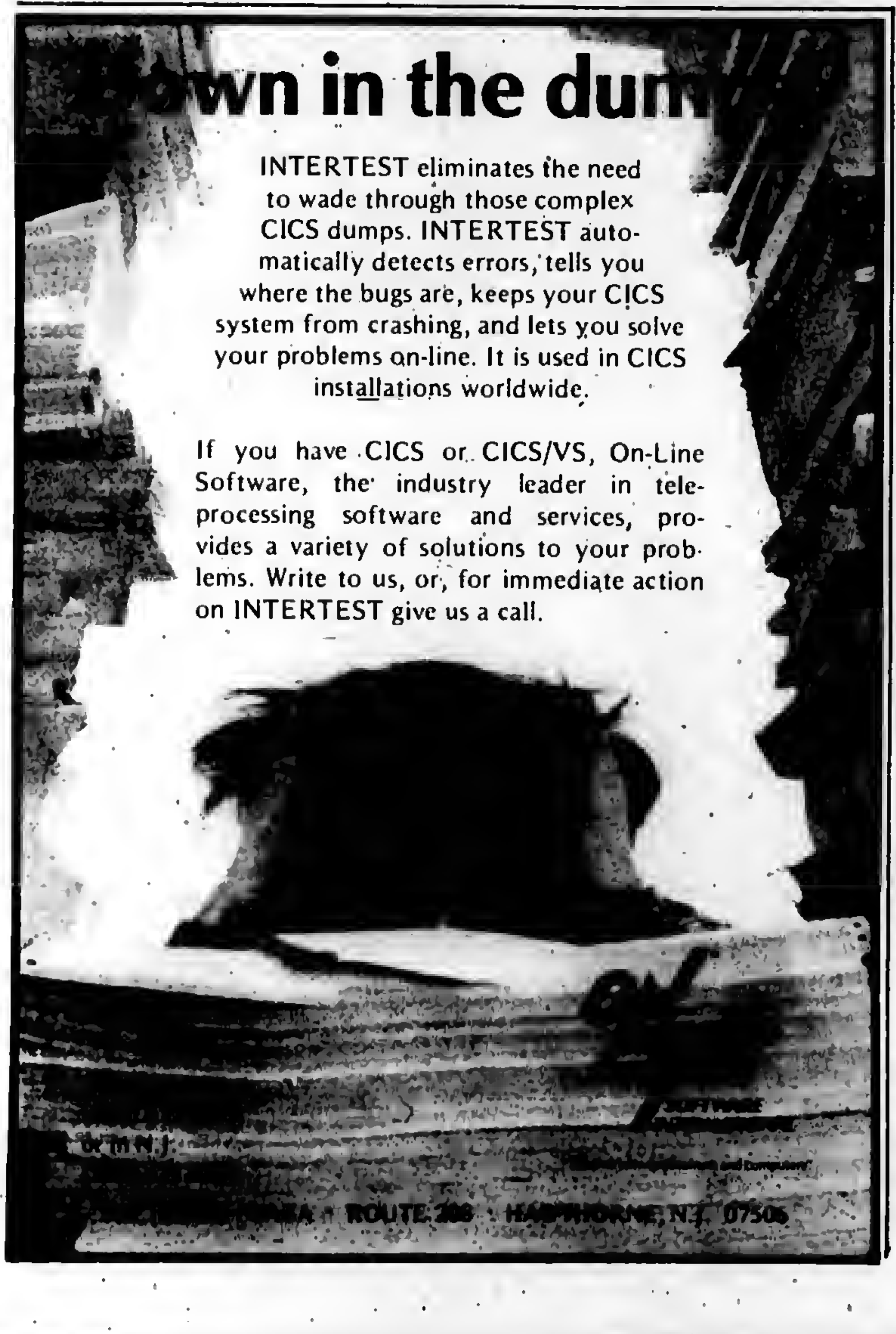
Tutorials include beginning and intermediate programming, Mumps for managers, converting to standard Mumps and Costar. Two-star panels on portability and data base management systems are planned.

One-page abstracts may be sent until April 17 to Pet Zimmerman, University Hospitals, Department of Biometry, Cleveland, Ohio 44106.

1978 FALL INDUSTRIAL ENGINEERING CONFERENCE, Atlanta, Dec. 4-6, 1978.

Topics include conservation, engineering economy, banking, office automation, work measurement, ergonomics and distributive computer processing.

Send two copies of an abstract no longer than 500 words by June 15 to 1978 Fall Industrial Engineering Conference, Conference Department, American Institute of Industrial Engineers, Inc., 25 Technology Park/Atlanta, Norcross, Ga. 30092.



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Calendar

May 1-2, Boston — **Pro-Test Users Group Conference,** sponsored by Synergetics Corp. Contact: Alexander R. DeVito, President Synergetics, One DeAngelo Drive, Bedford, Mass. 01730.

May 1, Anaheim, Calif. — **Microprocessor Project Management,** sponsored by Integrated Computer Systems, Inc. (CICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 2, Anaheim, Calif.— **Microprocessors and Microcomputers: A Comprehensive Technical Introduction and Survey,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 2, Mobile, Ala. — **Data Processing Management Association/Association for Computing Machinery (DPMA/ACM) Joint Area Seminar and Trade Show.** Contact: Cheryl McNeil, Seminar Coordinator, Mobile County Data Processing, P.O. Box 1443, Mobile, Ala. 36601.

May 2-5, Los Angeles — **Distributed Processing and Computer Networks,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held May 9-12 in Washington, D.C., June 13-16 in Toronto, June 20-23 in Boston and July 11-14 in Aspen, Colo.

May 2-5, Los Angeles — **Modern Methods of Digital Signal Processing,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held May 9-12 in Washington, D.C., June 6-9 in Toronto and June 20-23 in Boston.

May 2-3, Boston — **Seminar on Zero Base Budgeting,** sponsored by Advanced Management Research (AMR). Contact: AMR International, Inc., 1370 Ave. of the Americas, New York, N.Y. 10019.

May 3-5, Anaheim, Calif. — **Hands-On Microcomputer Programming and Interfacing Workshop,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 3-5, St. Charles, Ill. — **Successful Project Management of Micro and Minicomputer Systems,** sponsored by National Engineering Consortium, Inc. Contact: National Engineering Consortium, 1211 W. 22nd St., Oak Brook, Ill. 60521.

May 3-5, St. Charles, Ill. — **Microcomputer Architecture Interfaces, Testing, Reliability and System Design,** sponsored by National Engineering Consortium, Inc. Contact: National Engineering Consortium, 1211 W. 22nd St., Oak Brook, Ill. 60521.

May 5-6, Rocklin, Calif. — **Northern California Community College Computing Consortium NC 5 Spring Conference.** Contact: Perry Edwards, Sierra College, 5000 Rocklin Road, Rocklin, Calif. 95677.

May 6, Poughkeepsie, N.Y. — **Teaching Computing in Two- and Four-Year Colleges,** sponsored by the College Interest Group of the New York State Association for Educational Data Systems. Contact: Prof. Robert Melter, Southampton College, Southampton, N.Y. 11968.

May 8-9, New York — **Conference on Data Communications,** sponsored by the American Institute of Industrial Engineerings (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

May 8-10, Atlanta — **Forum/5 Spring Conference,** sponsored by Forum International. Contact: Forum International, 4902 Tollview Drive, Rolling Meadows, Ill. 60008.

May 8-10, New York — **Computer Data Security Using Commercial Cryptographic Technology.** Contact: Charlene Woolard, Ketron, No.10 Valley Forge Executive Mall, 530 E. Swedesford Road, Wayne, Pa. 19087. Also being held May 22-24 in Washington, D.C.

May 8-10, Los Angeles — **Data Processing Management: 1978,** sponsored by American Institute of Industrial Engineers (AIIE). Contact: Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403. Also being held Sept. 20-22 in Chicago and Nov. 15-17 in New York.

May 8-10, New York — **How To Protect Your Computer Data From Theft,** sponsored by Ketron, Inc. Contact: Ketron, No. 10 Valley Forge Executive Mall, 530 E. Swedesford Road, Wayne, Pa. 19087. Also being held May 22-24 in Washington, D.C., June 18-20, Barcelona, Spain, and July 24-26 in Denver.

May 8-10, Palo Alto, Calif. — **Digital Modulation and Coding,** sponsored by Martin E. Hellman Associates. Contact: Hellman Associates, 730 Alvarado Court, Stanford, Calif. 94305.

May 8-10, Chicago — **32nd Annual Technical Conference of the American Society for Quality Control (ASQC).** Contact: Darlene C. Schmidt, ASQC, 161 W. Wisconsin Ave., Milwaukee, Wis. 53203.

May 8-11, Chicago — **Structured Design and Programming Workshop,** sponsored by QED Information Sciences, Inc. Contact: Marlies Stueart, QED Information Sciences, 141 Linden St., Wellesley, Mass. 02181. Also being held May 22-25 in Washington, D.C. and June 19-22 in Toronto.

May 9-10, Dayton, Ohio — **Computer/Terminal Farm** sponsored by the University of Dayton Office for Computing Activities. Contact: Ronald L. McAdams, University of Dayton, Office for Computing Activities, Dayton, Ohio 45469.

May 9-11, Uxbridge, England — **Eurocomp 78,** sponsored by Online Conferences Ltd. Contact: Online Conferences, Cleveland Road, Uxbridge, England UB8 2DD.

May 9-12, Atlanta — **Third International Conference on Software Engineering,** sponsored by the Institute of Electrical and Electronics Engineers, Association for Computing Machinery, and the National Bureau of Standards. Contact: Software Engineering, P.O. Box 639, Silver Spring, Md. 20901.

May 9-12, Wellesley, Mass. — **Leadership — Managing and Motivating DP People,** sponsored by Babson College and QED Information Sciences, Inc. Contact: Phyllis Tibbetts, Continuing Management Education, Babson College, Wellesley, Mass. 02157.

May 9-12, Boston — **1978 National Micrographics Association (NMA) Exposition.** Contact: NMA, 8728 Colesville Road, Silver Spring, Md. 20910.

Expo Speaker Stresses Involvement

Managers Called Crucial to DPer's Career Plans

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Managers of DP personnel must become deeply involved in charting their subordinates' career paths if they want to help staffers realize their full occupational potential and avoid on-the-job dissatisfaction, according to Robert Showalter, an information technologist with Lockheed-California Co.

Showalter made his remarks as one of the speakers at a workshop entitled "Managing People Problems," held here during the first of this year's series of traveling Computer Expo '78 conferences.

Speaking on the subject of career pathing, Showalter outlined a series of general steps for corporate managers to take when helping their staff members plan professional futures.

Executives should first outline for their employees the management structure of the company and the structure of the computer profession as a whole. Some companies offer more avenues for advancement as DP professionals than others,. and managers should not try to conceal any shortcomings in a firm's career opportunities from subordinates, Showalter said.

If an executive tries to placate a discontented employee by encouraging the individual to pursue a nonexistent career path, he will only heighten the staffer's dissatisfaction, the information technologist added.

Second, managers must help staff members establish realistic career goals. In this regard, executives can prove particularly helpful to an employee because they frequently see limitations in an employee that the employee cannot see, Showalter explained.

Managers should then analyze each employee's job skills and determine whether the person has the qualifications to achieve his carrer goals, the Lockheed California executive continued.

In the next step, managers should develop a preliminary timetable for employee advancement and establish a method for evaluating that progress at regular intervals, Showalter said.

Traumatic Regression

Finally, managers must be willing to work closely with their staff when, as sometimes happens, their career planning efforts go awry, he explained. In fact, at times managers must start again at the first step and help disaffected employees radically rechart their career courses.

"You must remember regressing to square one is sometimes very traumatic experience, both for the person and his supervisor or manager," Showalter advised his listeners. "But it's often the only way to get things back on track."

If DP personnel fail to progress in their chosen fields and become apathetic in their jobs, their managers should bear at least part of the blame, he said.

To try to prevent this waste of corporate manpower from occurring at Lockheed California, Showalter and his colleagues provide resources to help talented and ambitious DP personnel advance, he said.

The company offers in-house instruction that helps employees perfect current skills and acquire the skills they will need in their next jobs.

"Training to expand the horizons of those who have chosen to remain at the senior programmer/analyst level is a continuing process," he explained. "This training is largely conducted during working hours."

The company also offers a broad range of compensation for DP specialists who wish to remain in their current positions. This policy allows the truly talented specialists to be rewarded for superior performance, Showalter said.

Elaborating on Lockheed-California's personnel management philosophy and techniques, Showalter described some of the career paths open to DP professionals in his organization.

The Human Connection

Computer operators at the company can advance into the support group, which prepares production runs for execution, or into the firm's JCL documentation group. In fact, most of the personnel in these two groups started as operators, where they gained the knowledge of operating systems, JCL and scheduling necessary for advancement, Showalter noted.

Also, computer operators at the company can move into programming or software services or become staff specialists. Movement into these positions, however, requires professional preparation, most of which the candidates must initiate themselves and obtain in their spare time, he said.

Programmers, meanwhile, can advance into software services or the integrated data base (IDB) function or become senior programmers/analysts, project leaders, staff specialists, IDB specialists or even managers, Showalter added.

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Programmer
East Hartford, Conn.

3) These books are organized by function. A complete subset of BAL is presented in the first three chapters of the book, and later chapters cover such functions as debugging, table handling, subprogram linkage, and file handling. When material is organized in this way, you learn more quickly because you always see purpose.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. As a result, you will have many models of professional coding techniques upon which to build.

"As I read through the book and began formulating questions, I found that every question was answered shortly afterwards. I have never felt so comfortable with a subject that has always made me a little uneasy."

Programmer
Indianapolis, Ind.

Content

The intent of these books is to develop a basic programming skill in assembler language. As a result, the initial emphasis of each book is on a professional subset of BAL along with the related debugging skills. If you did nothing more than master this material (chapters 1-5), I think you would justify the cost of the book several times over.

Beyond this, table handling, subroutine and subprogram linkage, and sequential and ISAM file handling are given primary emphasis. Since these are common programming functions, this material is valuable background regardless of the language you normally use.

"Your book has been a tremendous help to me. I would recommend it to anyone."

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Finally, these books show you how to write macro definitions (great background for working with software packages), how to code bit manipulation and translation routines, how to isolate the fields in free-form input data (a common function in teleprocessing programs), and how to work with direct files. This type of material starts you on your way to the more sophisticated tasks required in a computer installation.

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Rent or Buy? Look at Fiscal Profile, Users Told

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — How should you acquire your next computer system — through purchase or rental? Which financing scheme will cost less in the long run?

The answers to these nagging financial questions defy easy formulation, according to Lance Wayman, head of Wayman and Associates, a management consulting firm in nearby Redondo Beach.

Speaking on the subject of "Evaluating Systems Financing" Wayman told about a dozen attendees of the Computer Expo '78 conference here recently that the terms under which a computer system is aquired should be based on the prospective user's financial profile.

No two users have exactly the same fiscal characteristics, and an acquisition plan that suits one company to a tee could prove extremely unsatisfactory for another, Wayman noted.

Working Capital

If a company has large sums of working capital at its disposal, it would probably do well to buy a computer, Wayman advised.

Unfortunately, purchasing "ties up" funds that otherwise could be applied toward alternative corporate investments. If a firm's business lies outside the computer field, it should probably invest its capital in resources more directly related to its corporate needs and thus opt for a rental rather than a purchase agreement, Wayman urged.

A second factor users should keep in mind when deciding whether to buy or rent a computer involves taxable income. Unless users boast a large taxable income, they probably will not benefit much from the depreciation credit for which they can qualify under a purchase agreement, he said.

Thus, most users with relatively small taxable incomes should probably choose a rented over a purchased computer system, Wayman added.

Investment Tax Credit

A third criterion concerns investment tax credit, which, though variable from year to year, currently averages about 10%. If high operating overhead temporarily cuts a firm's taxable income and thus the amount of its tax liability, the organization might want to consider renting a system during the high-cost period and then buying the machine later when income increases and the advantages of tax credit become more attractive, he said. A fourth factor users should consider when formulating their financing plans is hardware life cycles, Wayman advised, adding that on the average, a CPU remains operational for about eight years.

If a firm is contemplating acquiring a system introduced several years earlier, company officials should at least consider renting the equipment for the duration of its expected life span and then buying a replacement when the succeeding generation appears, Wayman recommended.

Neither buying nor renting is a perfect financing arrangement, even when users make their decisions intelligently. Both methods carry liabilities as well as advantages, he said.

Among its advantage, buying allows companies with the right financial profile to capitalize on tax depreciations and tax credits. It also gives users almost unlimited applications flexibility. "Users who purchase their systems can do with them what they will," Wayman explained.

On the other hand, purchasing also can force users into compromising obligations. If a system fails to perform as expected, users may find themselves "stuck" with an unwanted and useless piece of equipment. Fortunately, a strong market for used computers has emerged in recent years, and such systems are fetching 50% to 60% of their original purchase price, Wayman said.

Double-Edged Sword

Renting, meanwhile, is also a double-edged sword. It imposes few risks; if a customer decides after signing a rental agreement that he dislikes his new system, he can easily replace it.

Renting also minimizes the dangers of hardware obsolescence, Wayman continued.

On the other hand, he explained, it is the most expensive of all financing schemes, and users who rent their machines for long periods stand the risk of paying more than if they had bought the equipment outright.

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IN DEPTH
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IN DEPTH

Structuring Your Workstyle

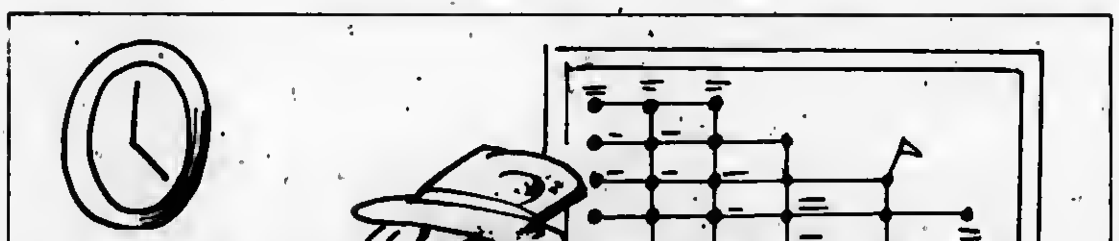
By Joan Knutson And Marie Scotto

Alvin Toffler said in his book *Future Shock*, "The computer burst upon the scene around 1950. With its unprecedented power for analysis and dissemination of extremely varied kinds of data in unbelievable quantities and at mind-staggering speeds, it has become a major force behind the latest acceleration in knowledge acquisition.

"Francis Bacon told us that 'knowledge . . . is power.' This can now be translated into contemporary terms. In our social setting, 'knowledge is change' — and accelerating knowledge acquisition, fueling the great engine of technology, means accelerating change."

We as systems people are not only being forced to cope with this acelerated pace of development, we have on our shoulders the responsiblity of spearheading the design of these computer systems of change. Let's take a look at what is happening to our everyday jobs and making us search for a way to control and manage our time:

- Our jobs are becoming more and more complex (the understatement of the year).
- Our jobs are often integrating a service:
  - — For many areas, many people in the organization.
  - — Complying with several company objectives.
  - — Juggling ever-changing priorities.
- Our jobs require decisions that depend on knowledge of a technology that is doubling every five years (or less).
- Our jobs require more and more a corporate payback in efficiency and money in a shorter period of time.
- Our jobs are deemed unsuccessful because of time slippages and cost overruns which may be substantially out of our control.
- Our jobs are being conducted in diverse organizational structures that present operational problems (see Figure A).



Structured design is not just a programming concept — it's also a technique that can enable us to use our workday more efficiently and effectively. The authors explain why and show how to begin.

These are just some of the pressures that are being exerted on the systems person. It's not hard to see why he never has enough time during the day or why he keeps taking work home in his attache case.

Isn't it appropriate that he start using some of his analytical skills to regain control of his personal time?

General Concept

Many of the business management techniques that help us cope in this environment of change are based on one premise. That premise is: Break "it" (whatever "it" may be) down into manageable pieces.

We call this "cascading analysis." Take the entire "it" and keep dissecting into lower and lower levels of detail until you feel in control and, in most cases, until you can quantify that level of breakdown.

Let's take a look at some examples already in existence:

- *Project Management* is taking the entire job, called the project, and breaking down the work effort into small, manageable segments such as activities and tasks. This is called developing a work breakdown structure (WBS).

These smaller, controllable segments of work then can be assigned a time estimate, can be graphed into a network analyzing the interrelationships of these tasks and can be used to develop a schedule, a human resource loading plan, a budget.

These are then used as status reporting tools. From this initial concept of breakdown of work effort comes a

(Continued on Page 12)

IN DEPTH

(Continued from Page 11)

whole multitude of planning and controlling techniques.

- *Management by Objectives* is taking a person's job and isolating the major responsibilities, then breaking those responsibilities into lower and lower levels of detail until a quantifiable goal can be placed on each responsibility.

These goals or objectives then become the development guidelines from which the employee works and the performance guidelines by which the employee is reviewed at appraisal time.

Again, before the technique can be implemented, it is necessary to break the job down into manageable, controllable pieces.

- *Structured Program Design* is taking a program and breaking it down into controllable modules or subroutines. First the "mainline" is constructed; this merely forms the foundation from which many different modules can be hung.

Much time and thought is spent in the structure of the program before any time is spent in techniques of coding the routines. Thought is put into what each module is meant to do; further, consideration is given to whether each module should be broken down into submodules to make the design more manageable.

> *'Sometimes when we are very "up," we seem to be able to do many things simultaneously. However, aren't those things usually trivial?'*

Once again the concept of cascading analysis or the breaking down of a larger entity into smaller pieces is used to make it easier to cope with the work effort.

If we can accept the basic premise of dissecting the "whole" into its pieces in order to make the "whole" more manageable, more within our control, then we can look at cascading analysis in our personal time and how structued design may be the technique to use to isolate our own WBS.

Personal Management

Even Ed Yourdon in one of his many books on structured design, *Techniques of Program Structure and Design*, warns us away from multitasking and multiprogramming. He says they are "potentially dangerous" and "make testing (implementing) much more difficult," Yourdon is, of course, talking about a computer systems design; but doesn't what he says also apply to the management of our personal time? Juggling several tasks at one time is also potentially dangerous and can en-

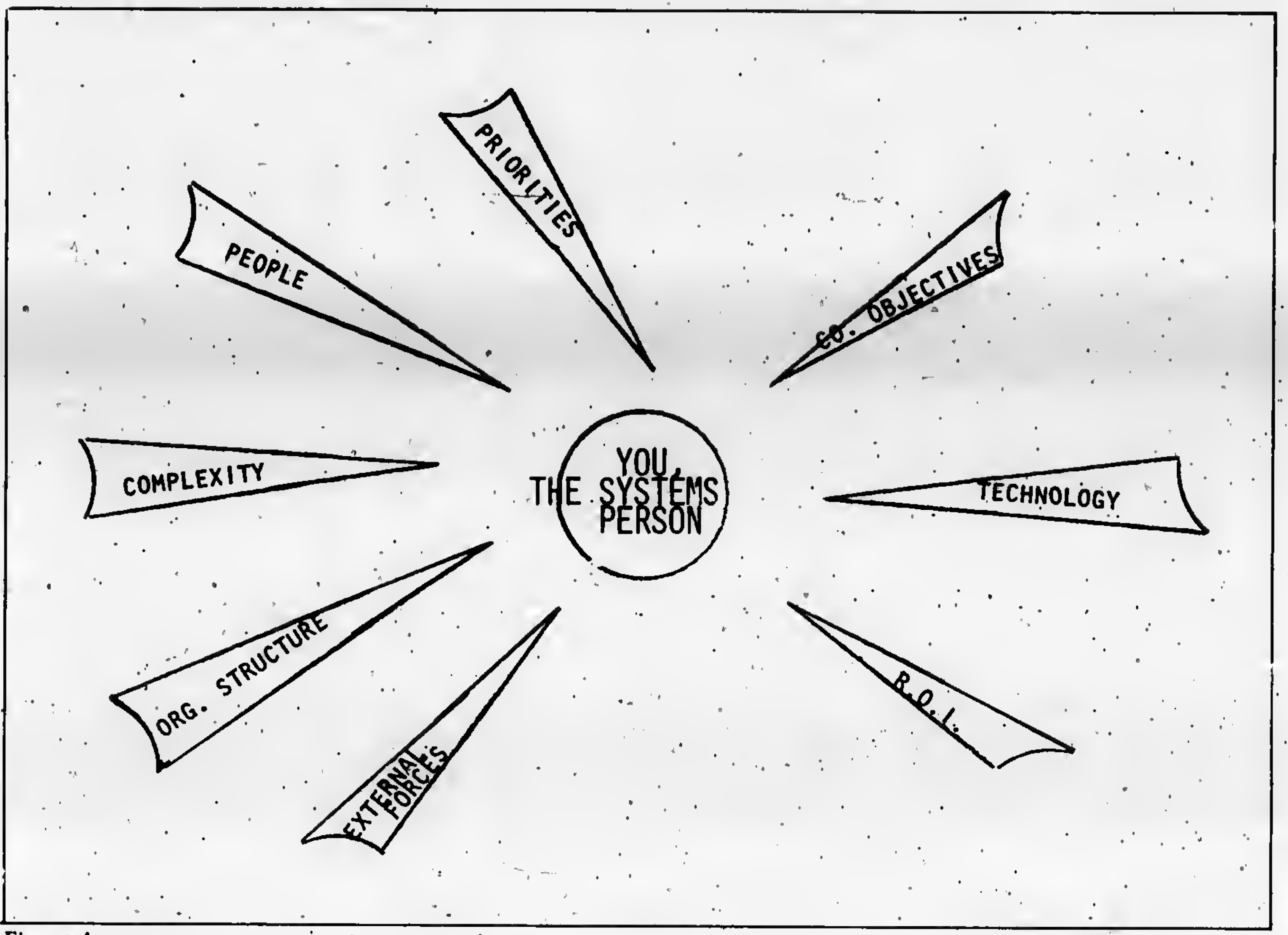


Figure A

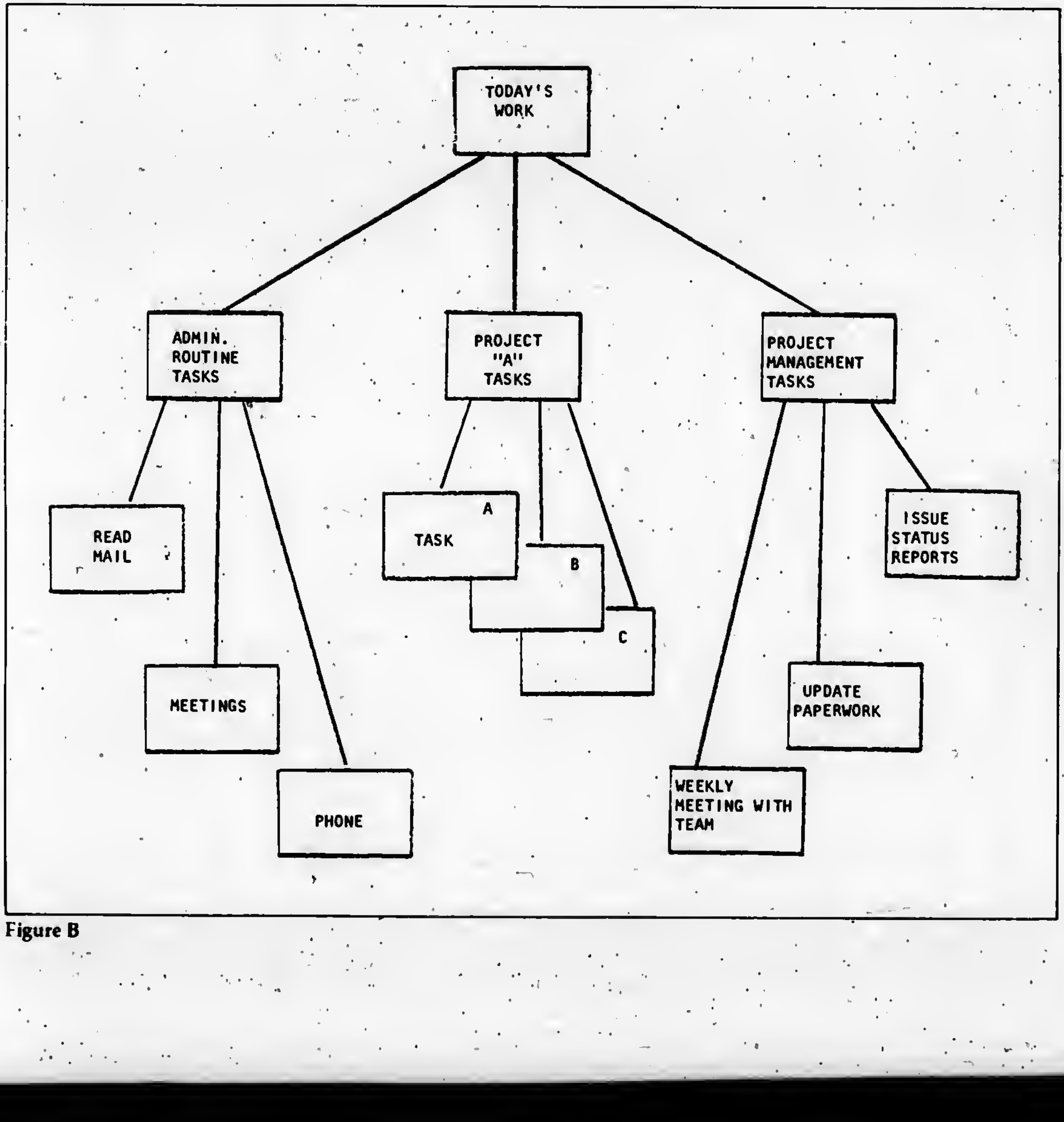


Figure B

IN DEPTH

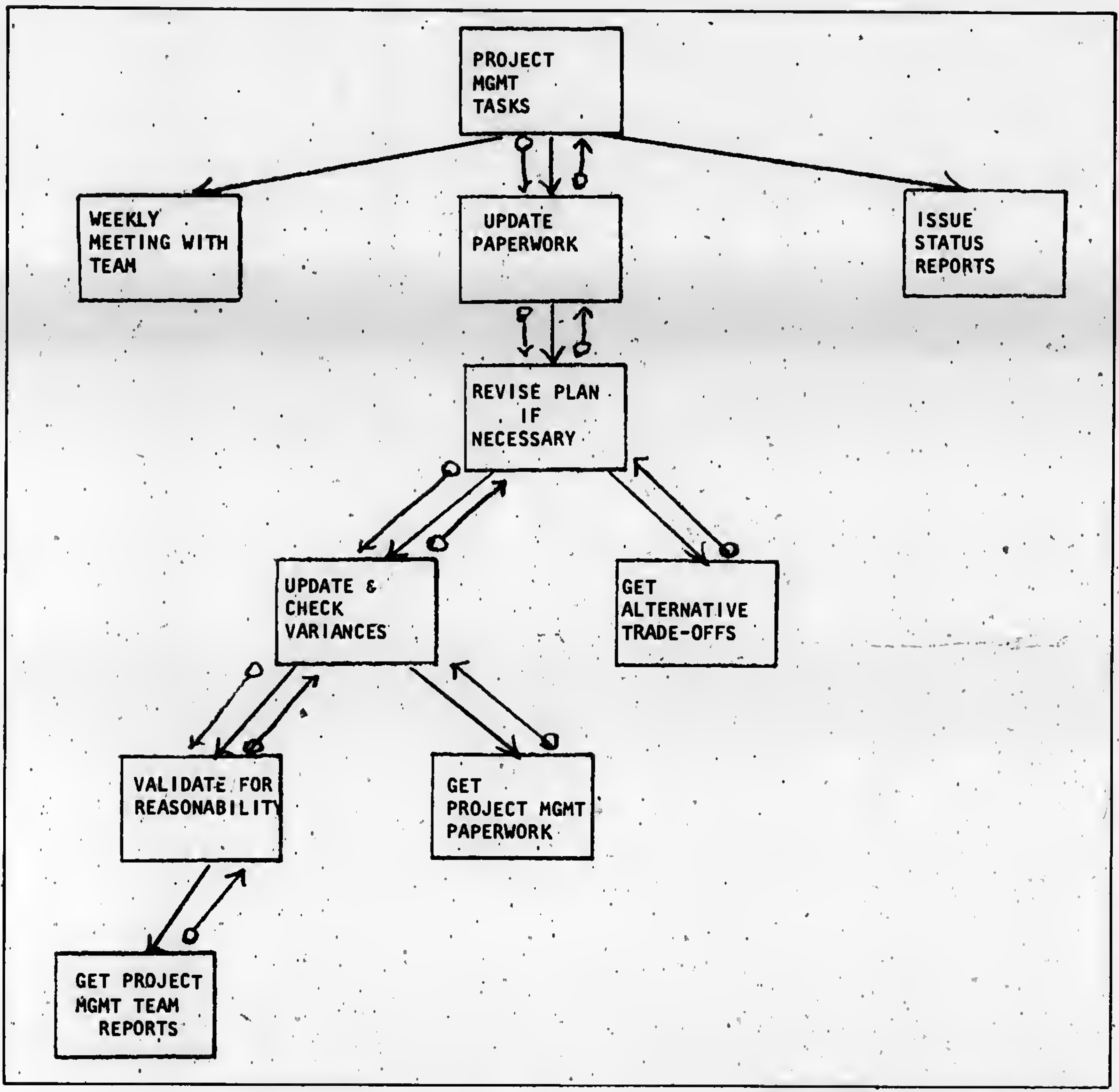
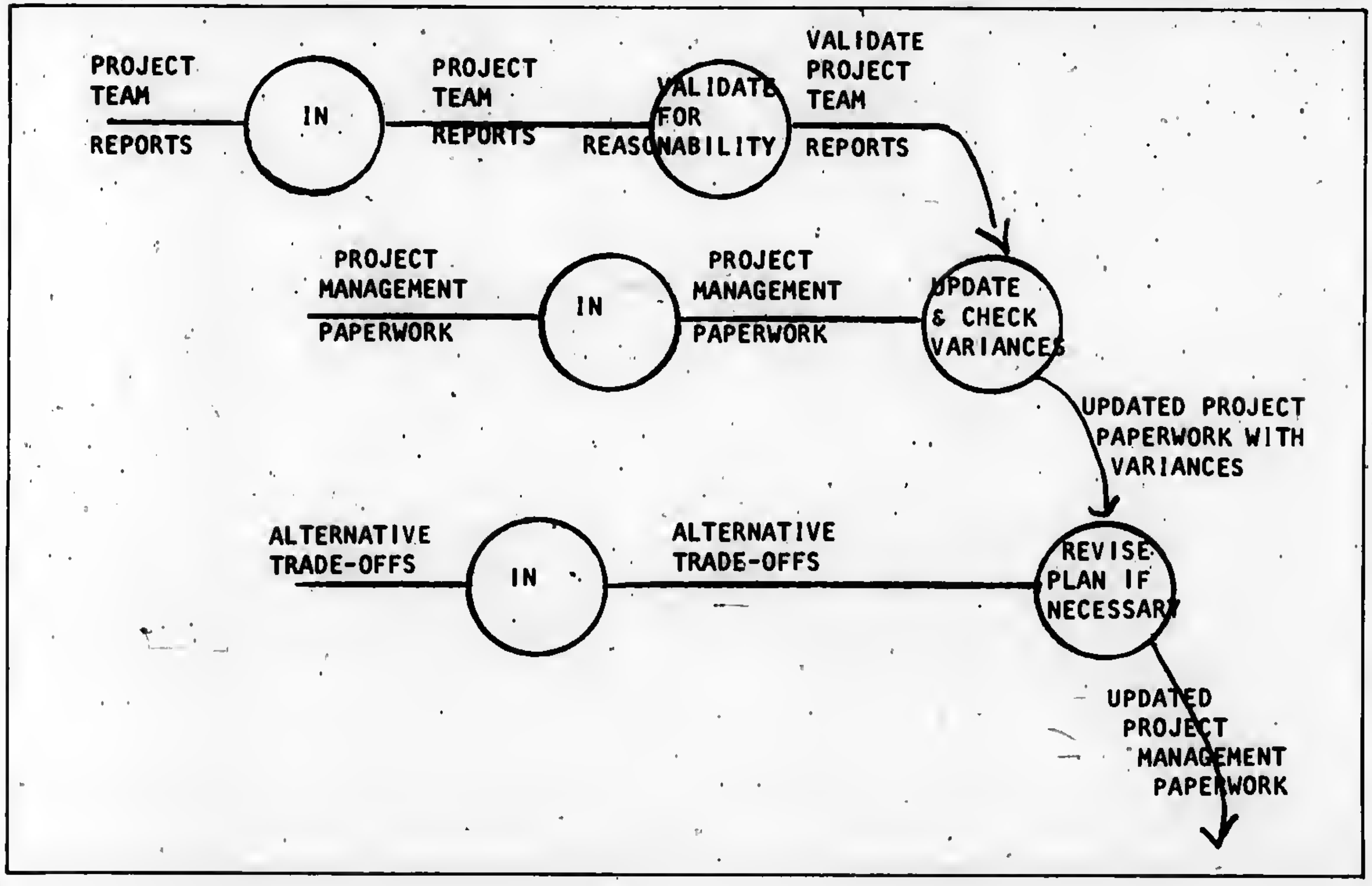


Figure C (above) and Figure D (below)


PROJECT TEAM REPORTS
IN
PROJECT TEAM REPORTS
VALIDATE FOR REASONABILITY
VALIDATE PROJECT TEAM REPORTS
PROJECT MANAGEMENT PAPERWORK
IN
PROJECT MANAGEMENT PAPERWORK
UPDATE & CHECK VARIANCES
UPDATED PROJECT PAPERWORK WITH VARIANCES
ALTERNATIVE TRADE-OFFS
IN
ALTERNATIVE TRADE-OFFS
REVISE PLAN IF NECESSARY
UPDATED PROJECT MANAGEMENT PAPERWORK

courage mistakes.

Sometimes when we are very "up," we seem to be able to do many things simultaneously. However, aren't those things usually trivial? The major assignments keep getting put off until later.

In fact, it becomes so much easier to deal with the interruptions and paper pushing that we can't get into the mood to really concentrate on any substantial work effort. And what is worse, when we come down, everything starts going wrong.

What we need to do is to isolate those modules in our personal time to a level low enough that we are in control. We can then set time estimates, determine priorities and create a schedule. Then we must concentrate on one work effort at a time, "pushing" to meet the time estimate we have set.

In other words, there is a mission which can be broken down into several purposes. These purposes can be isolated to a set of objectives, each of which must have definable goals with a predetermined output at the end of an estimated period of time.

Using the Theory

In his book on time management called *The Time Trap: How to Get More Done in Less Time*, R. Alec MacKenzie said "Only one in a hundred supervisors has enough time." That definitely is not me; I assume that it is not you either. So we will be forced to consider personal time management.

MacKenzie also said, "One does not manage time but oneself in relation to the clock."

The first thing we must do is to utilize our cascading analysis theory, which is beaking our day's work effort into controllable modules. To do that, we must do some homework.

For the next couple of weeks, keep a time inventory log. Write down everything you do, when you started it, when you finished it.

This will serve two purposes — to isolate similar work efforts that will make up your work modules and to isolate your time wasters, which must be done away with by a smart structuring of your work modules.

Did you find these as some of your time wasters?

	Yes	No
Procrastination	☐	☐
Lack of Self-Discipline	☐	☐
Visitors	☐	☐
Telephone	☐	☐
No Priorities	☐	☐
Lack of Delegation	☐	☐
Trash Mail	☐	☐
Unscheduled Meetings	☐	☐
Training New Personnel	☐	☐

The structuring of your everyday work effort will eliminate many of

(Continued on Page 14)

IN DEPTH

(Continued from Page 13)

these by:

- Predefining work modules.
- Setting priorities.
- Creating schedules.
- Psychologically committing yourself to this disciplined regime of getting the job done.

Now what have you isolated as your work modules? They could be such efforts as:

- Reading mail.
- Technical reading.
- Scheduled meetings.
- Unscheduled meetings.
- Scheduled phone calls.
- Unscheduled phone calls.
- Meetings with staff.
- Project variable "A."
- Project management paperwork update.
- Schedule preparation for the next day.

There are probably many more. Try not to develop more than you can control, but develop the work modules so they are small enough to put a time estimate on.

> *'What we need to do is to isolate those modules in our personal time to a level low enough that we are in control.'*

Now you have put structured design into your everyday lifestyle. Modules/routines exist that are performed in the order of priority which you determine and upon which you concentrate your efforts to complete in the most efficient time possible.

Graphic Display

As systems people, we feel more comfortable when we can "flow" or graph something. There are several structured design alternatives to pictorialize the management of your personal time.

"Structured design" as developed by Larry Constantine and Ed Yourdon looks to the flow of the inputs into the job to create outputs (see figures B, C and D).

"Hipo Methodology," or hierarchical input processing output, contends that the inputs and the outputs are basic concepts (see Figure E).

The "Jackson Methodology" requires that our output structure be parallel to the structure of our input (see Figure F).

The "logical construction of programs," which is more popular outside the U.S., would have us use "Warnier diagrams" adding sequencing procedures (see Figure G).

It would not be practical to diagram 99% of the everyday tasks you do; this analysis you do in your head. However, the 1% that is a new work effort might be helpful to chart.

But it does show that the same concepts that are being used in structured

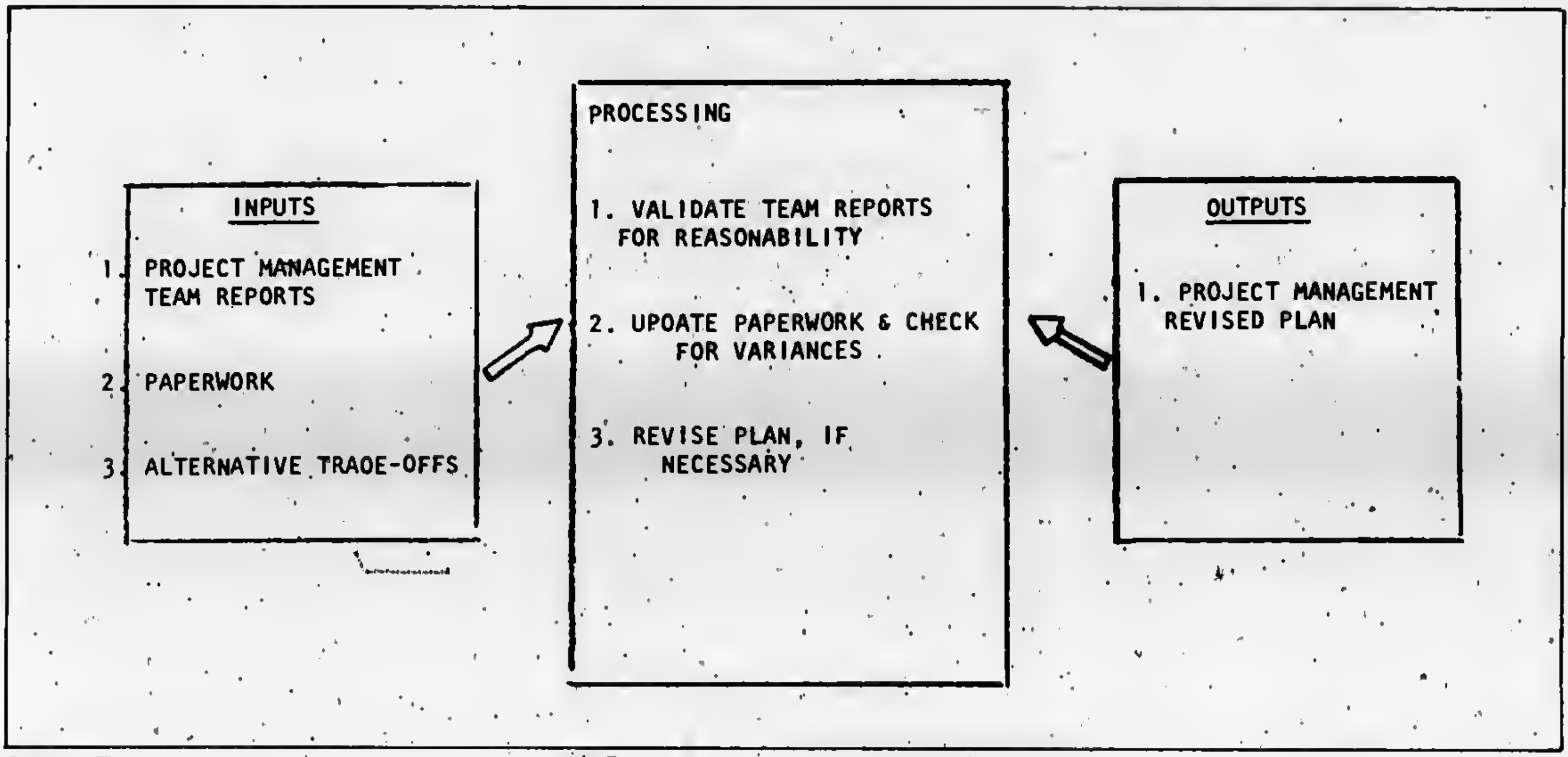

INPUTS
1. PROJECT MANAGEMENT TEAM REPORTS
2. PAPERWORK
3. ALTERNATIVE TRADE-OFFS
PROCESSING
1. VALIDATE TEAM REPORTS FOR REASONABILITY
2. UPDATE PAPERWORK & CHECK FOR VARIANCES
3. REVISE PLAN, IF NECESSARY
OUTPUTS
1. PROJECT MANAGEMENT REVISED PLAN

Figure E

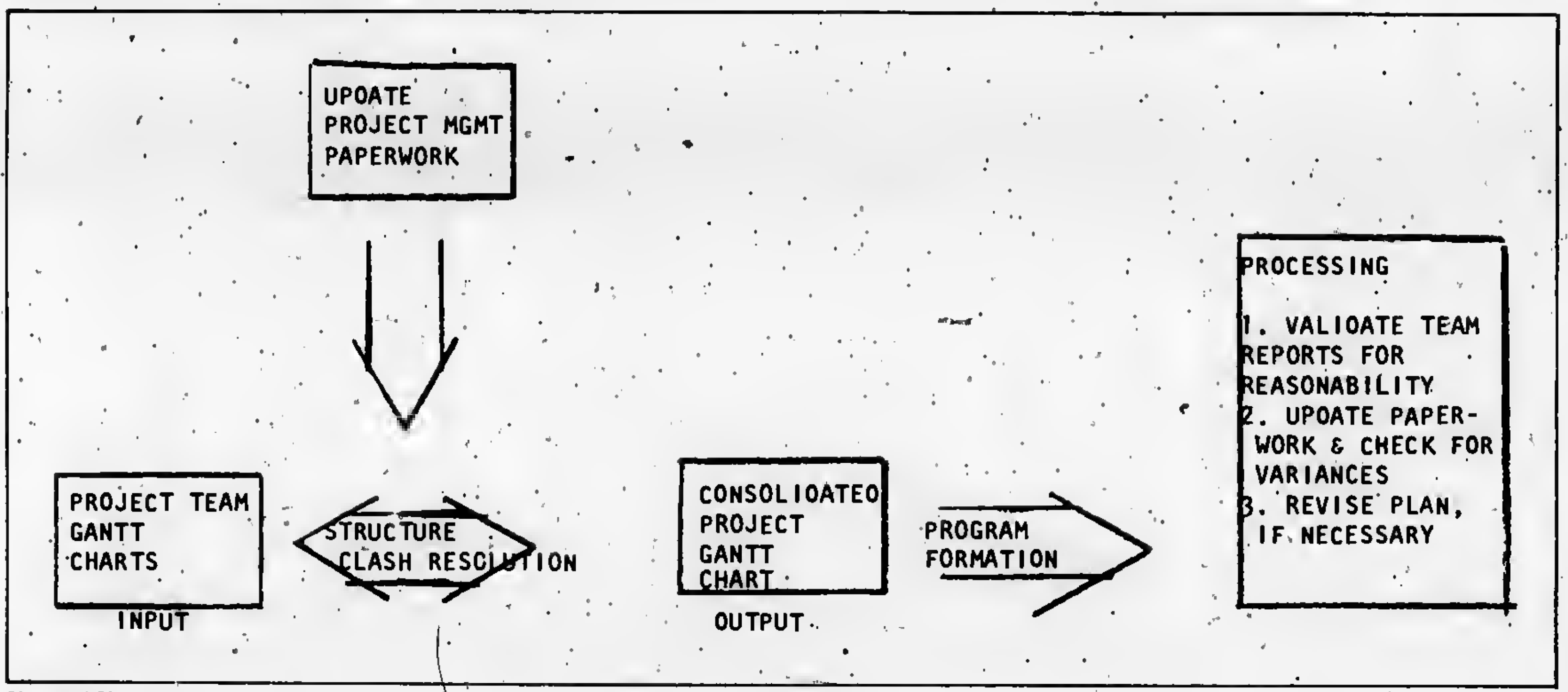

UPDATE PROJECT MGMT PAPERWORK
PROJECT TEAM GANTT CHARTS
INPUT
STRUCTURE CLASH RESOLUTION
CONSOLIDATED PROJECT GANTT CHART
OUTPUT
PROGRAM FORMATION
PROCESSING
1. VALIDATE TEAM REPORTS FOR REASONABILITY
2. UPDATE PAPERWORK & CHECK FOR VARIANCES
3. REVISE PLAN, IF NECESSARY

Figure F

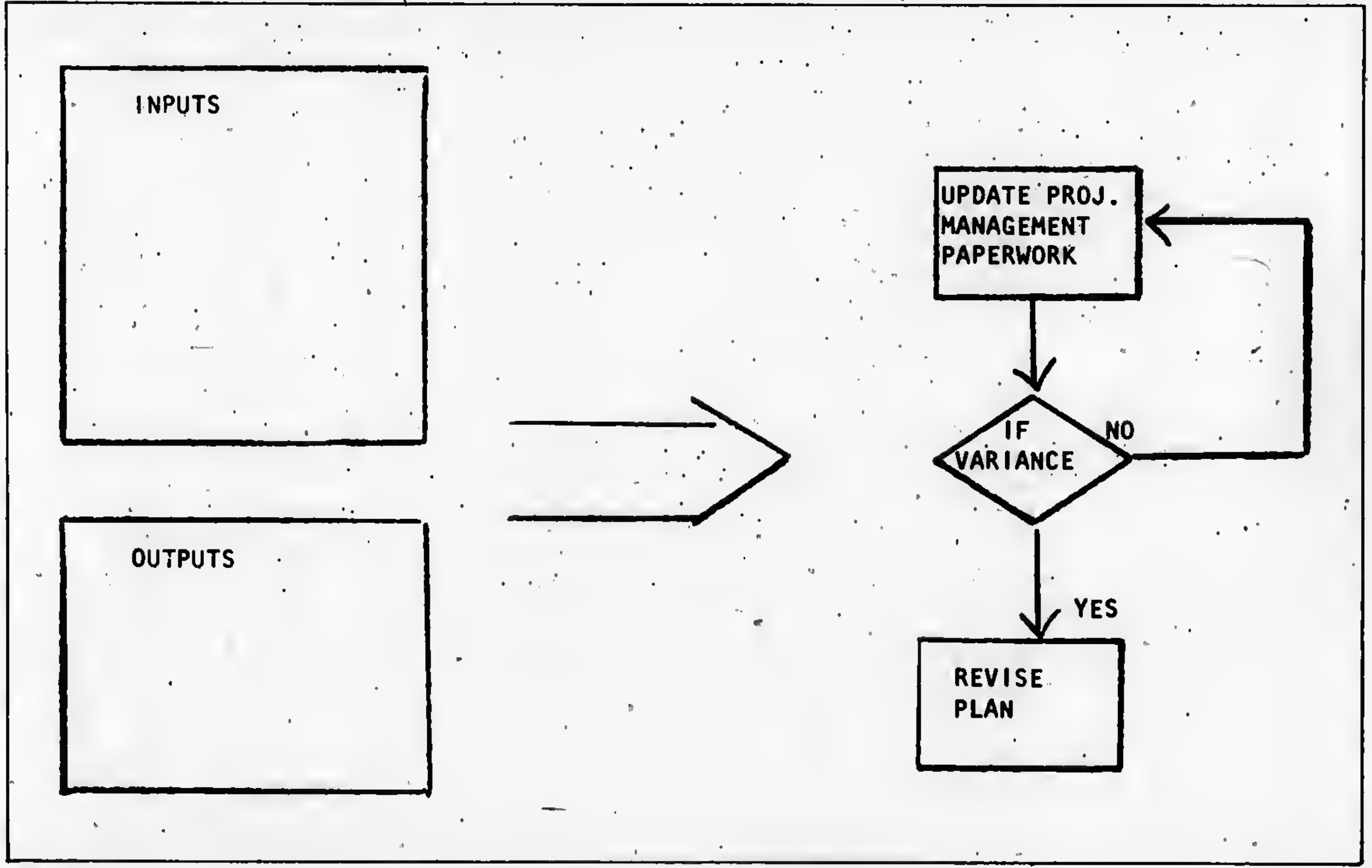


Figure G

design can be used in your management of your personal time:

- Breaking down the effort into manageable modules.
- Putting priority on the most important modules.
- Assigning a time estimate and "pushing" like mad to meet your time estimates.
- Trying not to allow anything to interrupt the processing of your work module.
- Stressing efficiency and discipline in everything you do.

Good luck!

Knutson and Scotto are co-authoring a systems-related book for Amacom, the publishing arm of the American Management Associations (AMA). The two are principals in Associates for Human Resource Development, Inc. (AHRD), a New York-based consulting firm offering both manual and computer systems analysis and design support as well as systems/project management training packages and tailored courses.

Prior to forming AHRD with Scotto, Knutson worked for a major New York department store as a systems manager for all merchandising report systems. She was involved in the installation of various systems, including computer output microfilm and an accounts receivable billing system, and was also responsible for the technical and training aspects of an optical scanning system.

Knutson, who received her B.S. degree from Ohio State University, has spent eight years as an analyst, project leader, assistant DP manager and systems manager heading teams of various sizes in cost evaluation and development and implementation of management information systems.

She is a former chairman of the Metropolitan Chapter of the Association for Systems Management (ASM) and has just been elected international treasurer of that organization..

Scotto worked as corporate training director of Alexander's department store, where she was responsible for planning and implementing training programs in merchandising, operations and finance as well as supervising all of the store's training personnel..

As a DP analyst, she has worked on point-of-sale, warehousing, financial and merchandising systems.

In the systems field, Scotto has functioned as a manual systems analyst and was responsible for Alexander's corporate procedures and systems manuals.

She is past secretary and treasurer of ASM, a member of the NRMA Merchandise Information Research Committee and chairman of the committee's task force on the use of data base in the retail industry.

Scotto has attended Nassau Community College and New York University.

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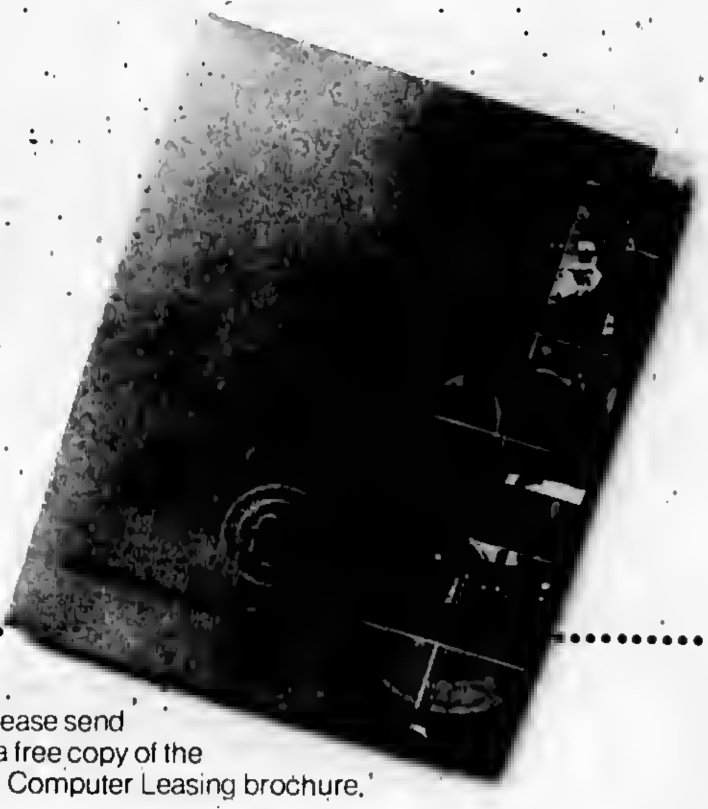

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Look ITT Up in the CW Index

Editorial

Breach of Users' Trust

Honeywell Information Systems, Inc., apparently plagued by problems in developing circuitry, has withdrawn its 66/85 computer from the market — more than a year after it was announced.

If IBM had made such a move, industry pundits would be calling it an anticompetitive act and accusing IBM of announcing a "paper" machine it knew it could not deliver.

Of course, HIS, as much as it would like to, does not hold IBM's position in the industry. Nevertheless, announcing equipment, taking orders and then withdrawing It is still a very serious breach of users' trust.

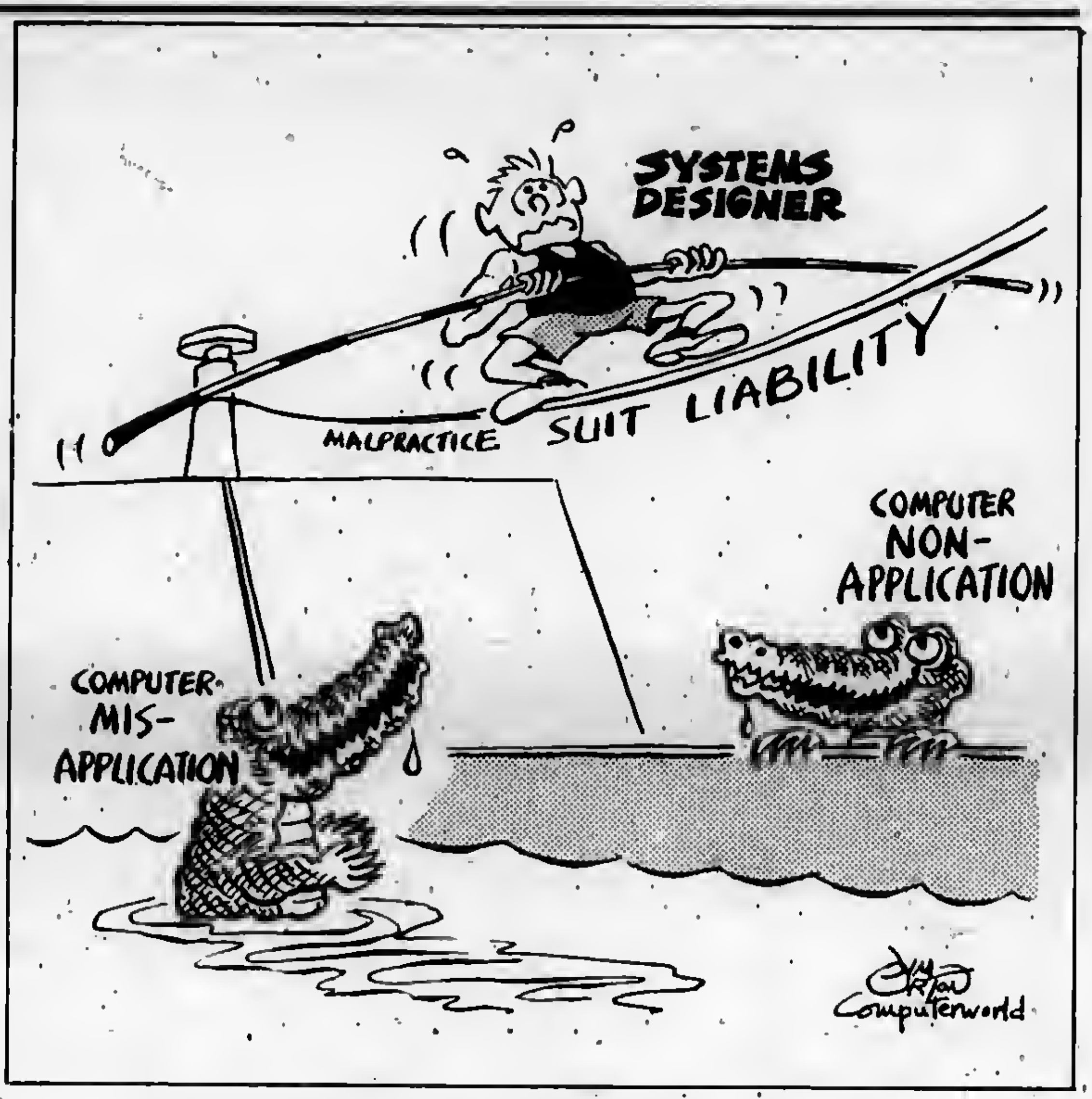
Computer systems are tremendously complex development projects, and announcement often has to come fairly far in advance of delivery in order to let users know what to expect in the way of future offerings from a firm. Unforeseen problems do crop up that can delay or force cancellation of such projects.

However, computer manufacturers have a responsibility — abdicated in this case by HIS — to be sure they can deliver what they promise.

No system should ever be marketed to users until the firm knows it will actually be able to produce the product. Without specifically preannouncing products, which is illegal, companies could let users know that they plan to continue to pursue certain market areas without announcing the specs of what turn out to be "paper" machines.

In the specific case of the 66/85, HIS has forfeited what credibility it had with the user community. How can users believe any future HIS product announcemnts until they actually see a working system?

Users should adopt a wait and see attitude with HIS from now on. After all, no one wants to get caught holding the bag for a firm that cannot produce what it promises.



Amazing Growth

In seven years, the independent software industry has come a long way — from 29 packages that achieved sales of over $1 million to 302 that have reached that status [CW, March 27].

This is an impressive gain and clearly shows user acceptance of such packages.

Slowly but surely, users appear to be losing their "not invented here" syndrome and this is a good sign.

There is little reason for computer users to spend time developing software that can be purchased on the outside for a lower total cost. By purchasing basic packages, they are freed to spend their time and scarce programming resources tackling programs that offer a greater potential payoff for their firms.

Instead of spending man-years developing a payroll package that is relatively standard, for example, they can spend the time developing programs that help their management run their particular businesses better.

So while the software industry should be congratulating itself for its rapid growth and new stature, it should always remember the users who made it possible and continue to provide them with constantly improved ways of doing their jobs.

Data Past

Five Years Ago
April 4, 1973

NEW YORK — An intensive investigation was launched here to try to determine how both computer and manual records were manipulated to produce what was one of the largest embezzlements in history from a savings bank. Union Dime Savings Bank teller Roswell Steffen was arrested and charged with embezzling approximately $1.5 million from the bank in a scheme allegedly carried out over a three-year period. Bank officials noted that Steffen never had direct access to the computer room and that the scheme was never caught by the bank's computer system or by its manual checks.

— — —

MAYNARD, Mass. — Fortran IV came to PDP-8 minicomputers, and the way Digital Equipment Corp. implemented the language processor, the user had the option of how fast he wanted it to run. The Fortran IV ran under OS/8 on any PDP-8 with at least 8K words of core and a mass storage device.

Eight Years Ago
April 8, 1970

WASHINGTON, D.C. — The Federal Communications Commission (FCC) decided that regulated common carriers should be prohibited from providing DP services unless they establish separate and independently competing corporate entities.

— — —

NEW YORK — A display terminal that used photochromic glass to eliminate the need for image refreshing and to provide truly flicker-free images was described here in a paper presented by G.K. Megla of the Corning Glass Works, Raleigh, N.C., at the annual show of the Institute of Electrical and Electronics Engineers. The terminal, scheduled to be shown for the first time this week and to be available for delivery in the near future, would be produced by a Corning subsidiary, Corning Data Systems.

Letters to the Editor

Less Wasted Time, Expense

Concerning the dialogue between Alan Taylor and Matthew Mitchell on choosing legal counsel ["DP Too Specialized for Regular Lawyers?" CW, March 27], it's true that some exceptionally brilliant lawyers have the ability to rapidly absord the esoterics of the computer industry. However, it makes more sense to hire a lawyer who can concentrate on your problems rather than learn, at your expense, the difference between hardware and software.

The wise computer user or supplier will seek legal advice well in advance of the thought of litigation. Ironically, one true test of a DP lawyer's effectiveness is the obsence of the need for litigation.

Edward C. Saltzberg
Boston, Mass.

Needs Professional Advice

With regard to Robert S. Yount's article "Small Systems Vendors Better Learn English" [CW, March 13], he had better learn the difference between a microcomputer and a minicomputer, a hobby store and a computer vendor, and system software and applications software.

The reason the people to whom he spoke in the "small system stores" could not tell him what size system he needed for his applications is that the stores are really small computer hardware stores. They offer the raw hardware, a rudimentary operating system and not much else. They do not offer "turnkey" systems.

Yount indicated that he and his accountant did not plan to do programming. If this remains the case, unless he plans to hire a programmer, he should probably go to one of the major vendors of minicomputers, planning to contract his programming to independent third parties, or go to a major mainframe vendor who supports minicomputers and contract with the vendor.

An all-important point to consider is cost. One can purchase a microcomputer configured with peripherals as he appears to need them for from $4,000 to $7,000 and can try to find someone to write the software for as much as $10,000. Or, one can go to a vendor who has much of the software already written for standard systems it supplies and plan to spend from $10,000 to $50,000.

L. Edward Reich
Arlington, Va.

Get your Universes Straight

When I read "Users Award Xerox, Amdahl Top Grades," [CW, Jan. 32] I promised myself I would not write this letter. But your subsequent publication of two letters from R.E. Kaufman [Feb. 6, March 6] prompted me to do it anyway.

In spite of the fact that Kaufman was right in his criticism and comments on sampling, he, like CW, failed to come to grips with a major flaw in the study methodology.

Although there is ample empirical evidence to prove it, just plain common sense should tell one that there is a difference between people who return mail questionnaires and those who don't. Since the article presented findings based on returned questionnaires, we must assume there was no attempt to contact those who failed to respond, to learn their answers.

If this kind of "research" and presentation of findings must be done, then such findings should be preceded by a note indicating that the analyses and responses represent the views only of those who responded and should not be interpreted as reflective of the universe with the same characteristics.

John J. Cabouch
Randallstown, Md.

Views of Responsibility

Ethics Issues Prompt Thoughtful Responses

By Jack Stone
Special to CW

Adam Begonah, that unlucky paragon-of-virtue DP manager who suffered the inquisition of the pseudo-Ethics Council in my recent column [CW, Nov. 28] created quite a stir among Computerworld readers.

I have selected excerpts from two of the eloquent letters I received on the subject.

The first suggests that the DPer's organization can clear away any misconceptions on ethical questions by a written agreement prior to employment. The second states that the ultimate responsibility falls on the individual DPer who can be guided by the eternal Golden Rule.

Dear Jack:

I read with pleasure, both as to content and expression, your article "Ethics-Council . . ." I not only agree with your assessment of the Redskins' play, but have shared your convictions (or those of Begonah) for so long that it has been a mystery to me why there is all this constant and contentless debate over ethics regarding software development.

I once worked for a small electronics company employing a single engineer who possessed traits similar to those of a good software person. This man invented a reduction gear that was a model of ingenuity; it was cheap and effective. He came in evenings and drew it on our drafting boards, paid for the prototypes himself and then felt that the idea belonged to him even though it was applicable to a product in our business line.

Another engineer, who had previously held the same position, but separated from us to form his own business — buying from us technology he had developed while in our employ to do so — felt quite strongly that this was so unethical he would have fired the man.

The solution to the ethics question seems to me to be simple and straightforward. Where law or the commercial code is muddy on a moral issue and individuals could hold differing views, it is up to the company to clarify the matter. Most high-technology companies require, as part of an employment agreement, the signing of disclosure and patent assignment clauses by the employee.

I see no reason why the same practice should not be used by employers of DP personnel. It would then be up to the company to determine whether it wanted to hire anyone who did not want to sign the agreement.

Professional society codes of ethics are all well and good, but a wealth of examples from the medical, legal and technical professions should warn us about their effectiveness. They look great as plaques on the wall.

Bruce Berry
Information Resources Manager
Bowles Farming Co.
Los Banos, Calif.

The Human Connection

Dear Jack:

I just finished reading your article on professional ethics and enjoyed it very much.

If I may, I would like to add my thoughts on the subject, because it is, indeed, a problem that won't go away and will intensify as time goes on.

Setting up or establishing ethical standards may be all well and good; however, if anyone wishes to evade, ignore or frustrate those standards it is a very easy thing to do.

Ethical standards of behavior without some sort of enforcement are as useless as a law that is ignored by both the police and the public. In fact, it is worse than useless. It is counterproductive because it results in a general attitude of disrespect for all laws or standards.

Ethical standards are a good thing to put down for all to see (like the Ten Commandments) and for all to try to live up to, but they won't be observed except on an individual, one-by-one basis.

The most recent vogue is "group" ethics or morality (practiced much like the tribunal in your article where a group of people get together and vote on what is ethical and what is not. The euphemism is "situational ethics." This concept implies that right and wrong are simply the results of the situation in which one finds himself. What is "right" today may be wrong tomorrow, depending on the situation or how the ethics committee chooses to vote at the time. (Remember Watergate?)

When we meet our Maker, we will not have a cheering section or ethics committee on hand to advise Him on whether or not we get into heaven. We will face Him alone and pass or fail on our own merits.

To me, ethical behavior is a very simple thing. It's embodied in the expression, "Do unto others as you would have them do unto you. It's not the currently faddish thought, "Do unto others before they get a chance to do unto you." No group can settle this for you. It is up to each of us to decide what we do and how we want to work.

William A. Delany
President
Analysis & Computer Systems, Inc.
Burlington, Mass.

Legal System at Fault

Rip-Offs Recognized, But Not Prosecuted

The Taylor Report
By Alan Taylor CDP

As readers know, the handling of the Saks Fifth Avenue H3 accounts reported in this column [CW, Dec. 26-Jan. 2] attracted the attention of the Federal Trade Commission (FTC) staff as well as that of many readers with their own knowledge as to what happens to consumers who leave credit balances in inactive accounts — the balances have a tendency to disappear without a trace.

As a result of the FTC interest, I paid a visit to Justin Dingfelder in Washington ["Consent Order Violation?", CW, Feb. 27] and talked with various other FTC officials in both the prosecution and compliance areas. It was an interesting visit in many ways, but the main, professionally important result was that I now think the systems-efficiency resource-allocation characteristics of our legal procedures tend to get programmers, system designers and operators off the hook — and that was something none of the readers who wrote in had pointed out. It does not, of course, get managers who ignore the law off the hook.

The history of the credit balance investigation apparently started when some "little old lady" wrote the FTC about her particular case. On investigating, the FTC found only one firm (Sears Roebuck & Co., Inc.) had a policy of refunding credit balances of more than one dollar within a few months after an account becomes inactive. The other firms across the country acknowledged, when pressed, that they were hanging on to the money.

The FTC thought that hanging on to credit balances was not right, but ran into a problem. Some of the courts believe the FTC cannot order a firm to return money to consumers, only to cease and desist from taking any more from them.

Because of this doubt as to what the FTC can do, a compromise was worked out and the FTC arranged to have millions of dollars returned.

What is important is that now the vanishing of credit balances and other equivalent items — such as using the 10 rip-off techniques reported here last month [CW, Feb. 27] — are generally known.

Common and Notorious Theft

A simple reading of the law indicates these rip-off procedures are theft — "common and notorious theft" to put a label on it. They are against the criminal law of the states, and anyone knowingly acting to help such thefts — even though he does not pocket a penny — is guilty of "conspiracy."

So far, so good. Most Computerworld readers got the idea that the systems analysts designing such procedures would have a hard job claiming they did not know, or should not have known, the purposes of those procedures. And, if we left the matter there, then our profession is full of "common and notorious thieves" and conspirators.

But then comes the problem. A person is not a criminal unless convicted of a crime, and only certain officials in the various states can charge people with crimes. By selecting not to bring charges — although knowing through the FTC investigations, to which they certainly had access, that these rip-offs were going on — state officials are exempting the conduct from being considered as criminal! In fact, if there were a charge of conspiracy in aid of common and notorious theft brought now, after years of having the matter ignored by the states, then perhaps the defense would be able to claim that the attorney general, or whoever was prosecuting, was also a conspirator.

The reason for this legal restriction on prosecution is of course to prevent the courts from being overloaded or bothering people with unfounded charges. The effect on modern-day computer people, however, is that whole areas of potentially criminal conduct, not having been prosecuted although being noticed, must be regarded as noncriminal, no matter what the law says. (Try that for a May 1 speech on the Rule of the Law.) And there can, as I see it, be nothing wrong in the actions of the coders, operators, systems analysts and others in helping their employers.

It all adds up to the position everything is in now: Programs that rip off consumers are standard tasks to be written and used with little or no protest. But the rationale is different. It is not all right just "because everyone does it" but because the "conspirators'" conduct is not criminal at all when the officers of law use their legal discretion and choose not to deem it criminal and enforce the law.

This may be a bit disheartening for many idealists. However, it is a lot nearer the reality and legality of the situation than we ever got before. Computers and computer professionals are not to blame for the results.

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Calls Concept Easy to Sell

Vendor Expects Codasyl DBMS From IBM

Reader Commentary

By John J. Cullinane
Special to CW

I have been interested in the exchange of reader commentaries in *Computerworld* between L.B. Towner [CW, Feb. 6] and those who took exception to his strong position in support of Codasyl data base management systems (DBMS).

What is interesting in these articles is that IBM's IMS-DL/I is categorized as a nonstandard DBMS. This in itself is reasonable; however, I believe IBM requires a lot more attention than these relatively modest mentions of its presence in the DBMS arena.

What are IBM's plans relative to a Codasyl DBMS? Will IBM introduce a Codasyl DBMS? I think so. The answer comes in understanding IBM and its motives properly.

First, one has to believe that IBM is really in the business of selling computer hardware. It always amazes me how many people think of IBM other than as a seller of hardware. They somehow believe IBM is really something like YMCA — an altruistic institution with their best interests at heart.

IBM is a business, and it has to protect its customer base from erosion by competitors. Standardization makes it easier for competitors of IBM to build competing hardware and software products and attack this customer base in a systematic, cost-effective way.

Consequently, I believe IBM has been against standardization in the past until such things as Cobol were forced upon it. Lack of standardization protects IBM's customer base from competitors.

After all, the more difficult it is to convert from an IBM computer to, say, a Honeywell or Univac system, the less likely it is to occur.

A very significant point in computer hardware is that IBM has the biggest single share of the computer market. The key factor in data base management is that IBM does not have the biggest share of the data base management market.

Independent vendors of DBMS and hardware vendors outsell IBM and in the aggregate have a very substantial share of DBMS market, perhaps two to one. Thus, we have in the DBMS market a set of circumstances opposite to that in the hardware market, where standardization does indeed have potential benefits for IBM; particularly if one agrees that IMS has pretty much run its course and that it ultimately will have to be replaced.

The question then is what type of DBMS will give the greatest benefits to IBM and still be the least burden on existing IMS-DL/I users. By coming out with a Codasyl DBMS, IBM can position itself beautifully against the majority of "nonstandard" DBMS suppliers; and, since Codasyl can accomodate any IMS-DL/I data structure, the conversion would be a manageahle one — one that IBM could sell to its customers without too much difficulty, all in the name of standardization.

In addition — and here is the rub — IBM can easily convince users of Codasyl systems on non-IBM computers to convert to IBM's computers. Also, IBM might he able to convince an IBM mainframe user with an independent vendor's Codasyl DBMS to convert to IBM's Codasyl DBMS.

In the past, I have seen IBM unofficially promote a Codasyl DBMS when it was in its best interests to do so. Specifically, I am referring to situations where a non-IBM computer user was using a Codasyl DBMS and was interested in converting to IBM hardware but did not want to use IMS or DL/I.

The independent vendor's Codasyl DBMS was subtly introduced as a possible alternative in these situations, clinching the deal for IBM.

End to Problems

The announcement of a Codasyl system from IBM will have the traditional effect of delaying many DBMS decisions normally granted to independent vendors until such time as users have an opportunity to evaluate IBM's offering.

Nevertheless, how good an implementation of Codasyl specifications it is will determine the ultimate degree of its success and the impact it will have on independent DBMS supplies. But, by the single stroke of announcing a Codasyl DBMS, IBM will solve a number of major problems, namely:

- Getting out from under IMS-DL/I.
- Positioning a number of major independent DBMS vendors as vendors of nonstandard DBMS and thus possibly undesirable.
- Capturing a greater share of the DBMS market, perhaps more consistent with its hardware share.
- Making it easier to convert users of Codasyl DBMS on other vendors' hardware to IBM.

After all, nothing is really a standard in the computer industry unless IBM says it is. Since IBM has already shown a dramatic change in its position vis-a-vis Codasyl via its positive votes on recent Codasyl questions, I think this is an indication that something is cooking.

In other words, IBM may have finally decided that a Codasyl DBMS will be good for IBM's business. Since IBM has at least three of everything under development, including a Codasyl DBMS, it is relatively easy for it to "announce" on short notice a system that exists to some degree. I think it will.

Cullinane is president of Cullinane Corp., producer of data management software in Wellesley, Mass.

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But Teacher/Staff Ratio Low

DP Training Budgets Rising, BSI Finds

By Don Leavitt
CW Staff

BETHESDA, Md. — Most DP organizations with large staffs expect to have training budgets equal to or larger than those they have had in the past and these budgets tend to fare as well as any others in the organization in the event of a cutback.

During the past year, average dollars spent for DP management and programmer training increased "significantly" while support for operations and for systems analysis and design "remained about the same," according to a report on the 1977-78 DP training survey conducted late last year by Brandon Systems Institute, Inc. (BSI).

More disturbing to institute personnel was the finding that on the average, the reporting organizations had only one full-time trainer for every 100 DP staff members. On an average, staffs included 273 people each.

Dollars budgeted for training bear the same relationship to total DP budget as the head count, BSI reported. Of the organizations answering this part of the survey, the average DP budget was $7.6 million while $113,400 was allocated to training.

The overall DP budgets ranged from $1,400 to $35 million and 10 out of the 71 organizations reporting said they had budgets of less than $1 million. The training budgets swung from $1,000 to $800,000 but on the average amounted to an "incredibly low" 1.5% of the reported average DP budget, a spokesman commented.

Most of the respondents said they send people to public vendor training courses and a substantial number indicated they also use outside vendors to teach their courses in the user's offices. Detailed rankings of courses actually utilized indicated considerable support for multimedia training provided by vendors such as Deltak and ASI.

When asked what they used as the primary consideration in making a decision whether to make or buy a training course, the organizations pointed first to the number of students to be trained, then to the uniqueness of the course, followed by the vendor's reputation, and finally, cost of vendor's training.

In questions related to who gets the training, rather than where it comes from, BSI gained solid evidence that user department personnel, and not just the DP technicians, are being offered courses. Only 27 out of the 97 respondents had no training for users.

More than half the organizations offered users introductory DP courses. Other subject areas mentioned included how to use application systems, project management and systems analysis, the report showed.

Systems analysts themselves are provided a formal training program in more than half the organizations covered by the survey. The program typically was a combination of internally developed and presented courses, audio-visual training and support from outside vendors.

Even more of the organizations said they had implemented structured design and programming and use a mix of methods to train the majority of their people in the new techniques.

Complete results — including user ratings of training vendors — and interpretations of the responses are available free from BSI as a service to the DP community, the spokesman noted from 4720 Montgomery Lane, Bethesda, Md. 20014.

'Speed' Programming Utility Runs on Wang Minicomputers

SEATTLE — Described as a programming utility developed to simplify system design, "dramatically" increase programmer productivity and "virtually eliminate debugging, documentation and maintenance problems," the Speed package for users of Wang Laboratories, Inc. minicomputers is available from The Office Manager, Inc.

The software is said to include a range of subroutines and programs that handle all file access, record blocking, master file maintenance, transaction entry and edit, inquiry, sorting and remote printing. With these tools, applications can be developed and installed quickly, a spokesman said.

Speed simplifies system design by providing a highly generalized framework that can be adapted to a specific application. Design is further simplified by allowing the use of fixed-length records of any size, he added.

The utility reduces programming time by as much as 80%, the spokesman claimed, noting that master file maintenance and transaction entry/edit programs are created without the user writing a single line of code. Report programs can be generated with "little more than a PRINT statement."

Although they are easy to create, the report programs can detect control breaks and print subtotals, manage page feeds, headings and subheadings. Subtotals and grand totals are accumulated and printed without further programmer effort, he added.

Speed is available on an initial-fee-plus-use basis. The one-time fee is $7,500. Coupled with use charges, that will bring the cost of the system to between $30,000 and $100,000 over a three-year period, the spokesman estimated.

The Office Manager is at 550 Industry Drive, P.O. Box 88067, Seattle, Wash. 98188.

Rider College Converts 'Pay-II' For Decsystem-10, 20 CPUs

LAWRENCEVILLE, N.J. — Personnel at the computer center of Rider College here have adapted the Pay-II payroll system from Wang Laboratories, Inc. to run on a Digital Equipment Corp. Decsystem-10. Since the Decsystem-20 is compatible with the larger "10," the converted package should run on the Decsystem-20 as well, a college spokesman acknowledged.

The converted code is said to make "complete use" of DEC's 6-bit Ascii and computational items, which run more efficiently on the Decsystem-10 than the original Wang coding, which used Ebcdic characters and "Comp-3" items.

Many data alignment problems had to be solved to complete this portion of the conversion, according to programmer Martin Katz; who worked on the project. The conversion also involved other problems such as record sizes too large for the Decsystem and tables too large for the DEC Cobol compiler, he added.

With the converted system, Rider can work with 15 earnings categories, 54 deductions, 499 miscellaneous fields and 100 user-defined codes, Katz said. It also supports a 48 character sort key, user-defined mnemonics, a labor cost file and "many other" Wang payroll options, he claimed.

A control file has been written to run the payroll system under the Decsystem-10 batch environment, Katz added.

Marketing of the Rider-developed package is being handled by Wang, where a spokesman said it should run on "small to mid-range" Decsystem-10s.

Highly modular, the software ranges from $18,500 for a stripped-down version to $105,000 for a complete system including personnel management, Wang said from One Industrial Ave., Lowell, Mass. 01851.

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Papers Sought

PHILADELPHIA — Management and evaluation of computer performance is the theme of this year's international conference of the Computer Measurement Group (CMG), and papers appropriate to that theme are invited, according to program chairman Linda S. Wright of Sun Information Services Co.

Papers for the early December conference may cover various topics including goals for performance evaluation departments, capacity planning, and workload forecasting.

Abstracts of proposed papers (in triplicate) are due May 1; completed papers (also three copies) are due July 1, Wright said from Sun's offics at 1608 Walnut St. (14/3GP), Philadelphia, Pa. 19103.

Software Users Get Bell Mail Drop

PELHAM HEIGHTS, N.Y. — Users now have a central point from which they can get information about software developed within the Bell Telephone system. But the establishment of a mail drop here — with the name Bell System Software — does not mean the company has a new organization to market the programs, according to a spokesman.

Bell's licensing office in North Carolina will still be handling the actual distribution of products, all internally developed, but the mailing address should simplify and therefore speed the processing of requests dealing with software, he said.

The packages now offered by Bell include the Unix operating system for Digital Equipment Corp. PDP-11s, the Machine-Aided Graphics for Illustration and Composition (Magic) system based on DEC XVMs and Decsystem-10s, the Program Affinity Grouping and Evaluation System (Pages) to reduce IBM OS/VS overhead and the QED text-editing systems for IBM or Honeywell mainframes.

All of the software comes from Bell "as is." There is no installation support and no automatic ongoing enhancement plans, the spokesman emphasized, although he admitted Unix at least has undergone considerable development since it was first released.

But that's word-of-mouth information and, in the words of the ad "introducing" the centralized information point, "word of mouth becomes word of print" for users writing to Bell System Software, 10 Pelham Parkway, Pelham Manor, N.Y. 10803.

Updated 'Dfast/VS' Aids DOS/VS Disk Management

HASBROUCK HEIGHTS, N.J. — Improved throughput and more real device independence are said to be the advantages provided IBM DOS/VS users through use of the Dfast/VS enhanced disk management system from Oxford Software Corp.

One important feature of the updated package, according to a spokesman, is its ability to balance arm movement within Public Space "in much the same way as partition balancing is achieved under DOS/VS."

Device independence is enhanced in the package by allowing the user to convert sequential disk files to tape, and vice versa, by supplying an appropriate control card. No recompilation or program modification is needed, the spokesman said.

The software also includes an ability to reblock disk files dynamically — for all disk types — to achieve a maximum logical blocking efficiency. The net result should be faster file transfers and a "significant reduction" in the number of accesses required, the spokesman asserted.

Dfast/VS uses standard JCL, requires no user main memory and is DOS/VS release-independent. The package ranges in cost from $5,625 or $203/mo on a one-year lease.

Oxford is at 174 Boulevard, Hasbrouck Heights, N.J. 07604.

Report Details Error Detection

WASHINGTON, D.C. — Sixty-seven techniques for detecting and preventing errors in DP systems are detailed in a report published by the National Bureau of Standards (NBS). The $2.20 publication provides designers and DP managers with the means of checking systems for correct performance, according to a bureau spokesman.

Performance Assurance and Data Integrity Practices describes current practices that can be tested and put into operation using commercially available hardware and software. It was prepared by Robert L. Patrick.

Within the soft-cover book, procedures are grouped into four categories. These include techniques to deal with data entry, programmer, operator and equipment errors on systems that process large amounts of data.

Although designated NBS Special Publication 500-24 by the bureau, the book is available as stock number 003-003-01879 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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Management Technique Slashes Redefinition

BOSTON — In order to reduce the continuous redefinition of goals, responsibilities and schedules in its DP activity, Liberty Mutual Insurance Co. has implemented a technique known as "productivity management" to solve its systems management problems.

Developed by Keane Associates, Inc. in response to its own cost overruns on fixed-price systems development jobs, productivity management reportedly gets results for the user — on schedule in most cases — employing a six-step software management process:

- Define the job, in detail. By defining business and personal relationships in detail at the outset, specified results can be obtained on time and within budget.
- Get the right people involved. Personnel concerned with the system at every organizational level must be consulted, especially those who will use the system directly.
- Estimate time and costs. Fixing time and cost elements should only come after the job has been precisely defined and the project personnel identified.
- Set up an '80-hour' rule. No single task within the project should take longer than 80 hours, or two man-weeks, from start to finish.
- Set up change procedures. Establish a system for identifying, reviewing and measuring in advance the potential impact of proposed changes during the project implementation.
- Agree on acceptance criteria. Establish criteria for accepting the system at carefully staged intervals of the project, before the project begins.

According to Carl Bletzer, manager of systems and programs at Liberty Mutual, productivity management has served a very useful purpose for the company.

"What Keane gave us was a method by which we could stop and examine how we managed our people and projects. Productivity management is the guideline that put it all together for us," Bletzer said.

Techniques Adapted

To date, Liberty Mutual has adapted productivity management techniques in eight application areas, with three additional areas targeted for completion early this year. The company has trained one-third of its 900 DP personnel in the methodology of productivity management.

The company has applied the management technique in systems development in a number of areas, including its sales application group, property insurance group, worker's compensation, auto and general liability groups for personal and nonpersonal policyholders, accounting, budgeting and other financial applications and in its salary systems staff operation.

Liberty Mutual is also implementing productivity management in its personal life insurance group and in the development of an automated claims payment system and business policy and production auditing system, slated for completion early this year.

"Our goal was to provide detailed risk service policy information, including profit areas, coverage verification and billing/accounting reports to our statistical and marketing departments," Bletzer noted.

"So we analyzed the old system, identified the rough parameters of the project and went from A to Z using productivity management methodology. A major project like this uses more aspects of productivity management than a smaller one.

"After developing it, we tested the system three or four times over a 10-1/2 month period before going 'live' in May 1977 — right on schedule. The system now provides risk service information in more than a half-dozen formats," Bletzer added.

"It's been an outstanding success for us, one of the few major projects we've ever completed on schedule. Thanks to productivity management, we now have a more meaningful system," Bletzer concluded.

"We get better evaluation of requests since implementing this system," Wilfred Kurth II, assistant vice-president for DP said.

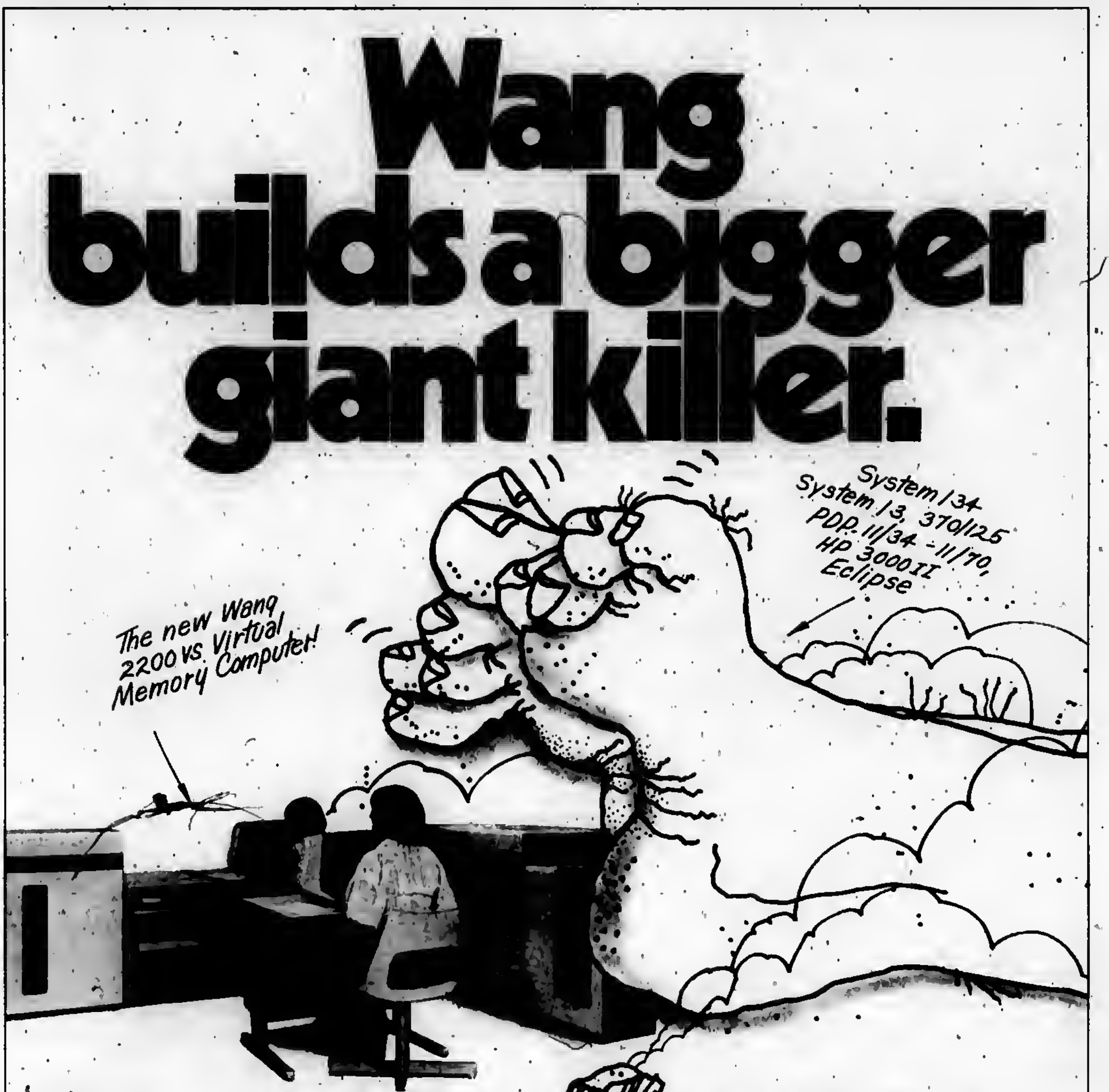
According to Kurth, the system has provided the company with better identification and allocation of resources. By carefully developing the first three steps, resources needed to complete the project can be clearly defined before heavy commitment begins.

Data base concepts and on-line teleprocessing techniques have enabled DP to replace many manual operations with CRT terminals at many of the 145 branch offices in the U.S. and Canada. Policy masterfiles on-line to either Boston or Burlington are available for coverage verification, claims registration, automated checkwriting, case closings, billing and accounting status reports and individual risk experience reviews.

"Like Keane, we employ a six-step approach that begins with the assumption that every DP activity shoud be treated as a separate project," Kurth noted. "Regardless of the size of the activity, elements of productivity management will apply.

"Our feasibility step should answer

(Continued on Page 26)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Use of 'FCS' Generalized

DALLAS — The Burroughs-oriented Release 4.2 of University Computing Co.'s (UCC) Financial Control System (FCS) software includes a range of enhancements that make it useful to commercial users in general, though the package was previously meant primarily for bankers.

Running on Burroughs mid-range CPUs — B2500s through B4800s — the FCS is a general ledger system, built around the system's own data base technology. The updated release supports a report writer, accounting and performance enhancements, a spokesman said.

The report writer is said to provide full access to the financial data base, digit selectivity and both horizontal and vertical math capabilities. Accounting logic now includes improved future-dated, accrual/reversal and standard journal entry features, improved fiscal year processing and easier file maintenance.

DP performance changes support compile-time options for dynamic media assignments for STOQUE (print spooling), tape, head-per-track disks and disk packs. These choices allow each user site to structure FCS to its own operating environment, UC noted.

It costs $40,000 under a 99-year lease.

Full payout lease/purchase plans are also available, the vendor said from 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

NCR 499 Users Get Support In Three Applications Areas

DAYTON, Ohio — In the past month and a half, NCR Corp. has introduced three packages to aid installations using the company's NCR 499 systems in diverse application areas.

The Road Commission System, for example, was designed to help road commissioners monitor and control construction projects. It requires a 24K processor, a 9.8M disk system, cassette handle and line printer.

The software is available now for $4,000, a spokesman noted.

The Rural Electric Cooperative Billing System can handle the needs of almost any one of the approximately 1,000 cooperatives located in the U.S. In addition to supporting the cooperatives' special requirements, the package also eases the calculation of fuel-cost adjustments, he said.

This package utilizes magnetic-striped ledger cards that can be processed by the 499 but can also be read by clerks when they are called upon to answer members' questions, the spokesman continued.

This software runs on a 16K 499 with the magnetic ledger feature, two tape cassette units and a line printer. It is available for $3,000.

NCR has also developed a package to prepare the program log and handle accounting for radio stations. The system is said to be capable of maintaining a list of commercials to be logged for up to a year.

As charges and receipts are posted to customer records or ledger cards, the 499 Radio Station System also prepares customer statements.

This system also requires a 16K processor, a magnetic ledger and two cassette handlers but it uses a continuous forms feeder. Cost of the software is $2,400.

Service Aids DP Gear Dealers

ANAHEIM, Calif. — Computer equipment dealers and brokers can access information about gear for sale or sought by others using a data base service developed by American Computer Referral (ACR) on the Tymnet data service network.

The service supports the interactive posting of entries to either the "Wants to Buy" or the "For Sale" file or the retrieval of information from either file. In developing this service, ACR itself is not a broker or dealer; it takes no commissions from any sales arranged through the listings. Cost to the user installation is limited to an annual subscription fee of $200 and charges for the time on-line to the net are billed at 60 cent/min, but subject to a $50/mo minimum.

ACR is at 423 S. Brookhurst St., Anaheim, Calif. 92804.

'Intercomm' Linked With 'Inquire' DBMS

FALLS CHURCH, Va. — The interplay of data base management systems (DBMS) and data communications was reemphasized recently with the introduction of capabilities to interface Inquire from Infodata Systems, Inc. and the Intercomm teleprocessing monitor from Informatics, Inc.

The Inquire-Intercomm linkage is available from Infodata. It is an extension of interfacing that had previously allowed ties between Inquire and IBM's Time Sharing Option (TSO) or CICS and monitors from other independent software houses.

The Inquire DBMS allows IBM 360 and 370 users in batch or teleprocessing environments to create data bases, implement applications and inquire into and report from data bases without programming.

The full Inquire system costs $98,000, Infodata noted from 5205 Leesburg Pike, Falls Church, Va. 22041.

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The QDP78 system is comprised of the latest LSI video display computer, the VT-78, and includes a processor, 32K bytes of MOS memory, a large 24 line by 80 character video terminal with upper and lower case characters, DECwriter II printer, dual diskette drives, and a portable mini-desk.

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NATIONAL —SPECIAL LEAR SIEGLER ISSUE—
INFORMER

April 3, 1978

GARRY STROHMEYER SAYS,

"THEY'RE PAYING ME TO KEEP QUIET."

The Dumb Terminal: A Success Story
Page 54

* * *

Noted Psychic Sofia Pusnonska Predicts— Lear Siegler Will Dominate the NCC
Page 4

* * *

Rate Your Favorite Peripheral
Page 35

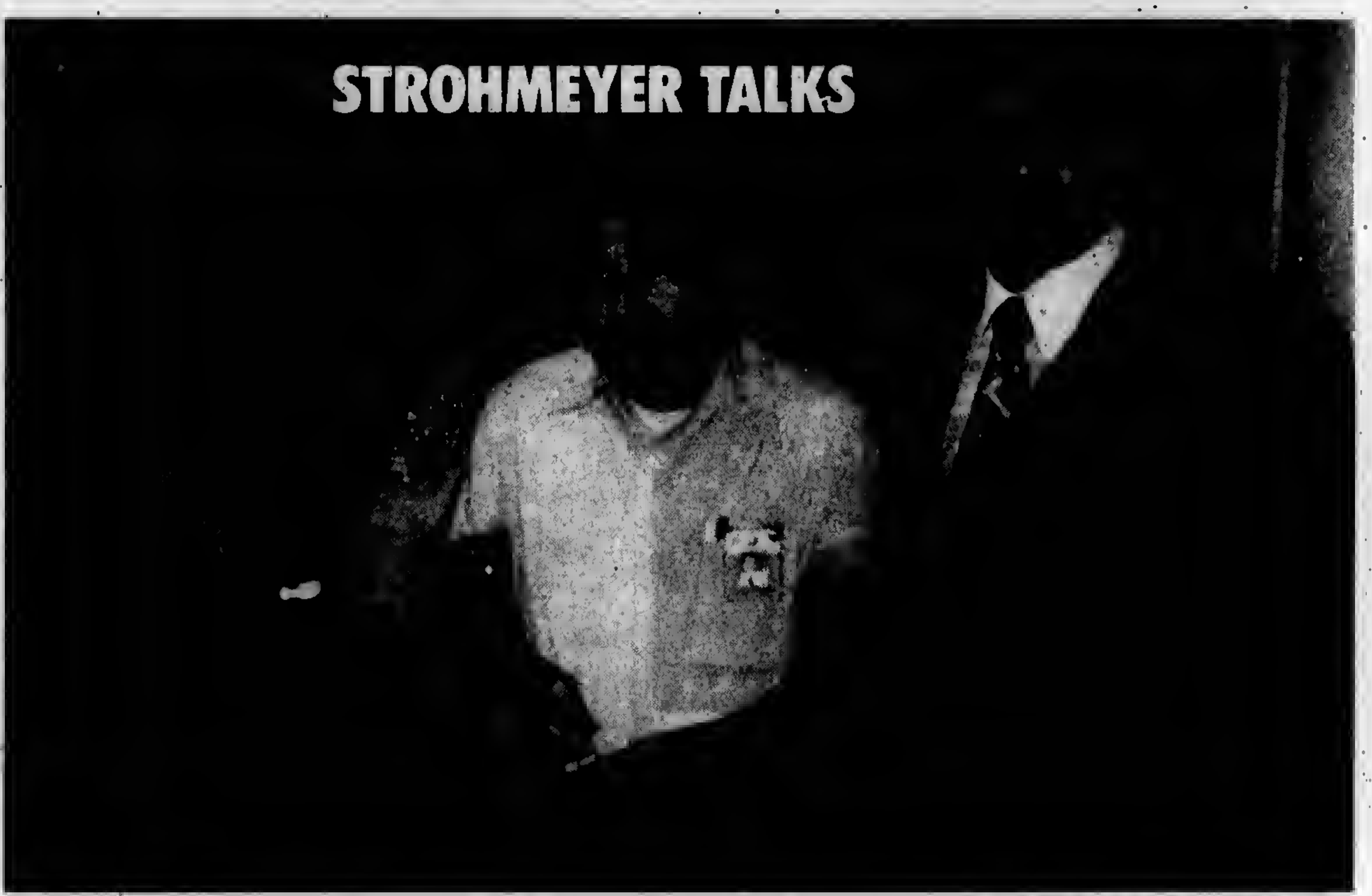
* * *

Ballistic Printer and Dumb Terminal Sales Booming
Page 50

* * *

Is Project X Trying to Create Artificial Intelligence? Has it Already Succeeded?
Page 26

STROHMEYER TALKS



Garry Strohmeyer (center), seen here on his way to a high-level strategy meeting at LSI, is flanked by twa bodyguards. Bodyguards were assigned to Strahmeyer after his talk with INFORMER reporter. INFORMER PHOTO

Garry Strohmeyer, an engineer closely involved in Lear Siegler's hush-hush Project X, told the INFORMER that Lear Siegler is "...paying me to keep quiet about Project X."

Reportedly initiated to dominate the National Computer Conference (NCC) through the development of incredible, new products, Project X remains a mystery.

The INFORMER, however, has recently heard rumors about Project X, one of Lear Siegler's most closely guarded secrets. Reports of new, smart terminals, intelligent terminals, fantastic new printers, and even a terminal controller have filtered down to us through various sources, most of whom prefer to remain anonymous.

Strohmeyer maintains that LSI would prefer not to disclose the details of Project X at this time, and has even approached him to ensure he maintains his silence. "All I can say is this," said Strohmeyer. "When this thing finally blows, the NCC will be ours." This cryptic statement was intriguing, but none of our enticements could persuade Strohmeyer to reveal anything further about Project X.

When questioned directly by the INFORMER concerning Project X, high-ranking authorities at Lear Siegler, Inc. headquarters remained strangely silent.

There are several hypotheses to be made concerning Project X, however, even in the absence of concrete information. When a company of Lear Siegler's stature initiates new product developments, we can readily expect earthshaking new approaches to materialize. And, with the NCC just around the corner, it seems safe to assume that Lear Siegler will stand the entire convention on its ear, so to speak, when it reveals the fruits of Project X's clandestine labor.

In addition to these assumptions, it has come to the attention of the INFORMER that several new scientific approaches have

(Page 7, column 2.)

Minicomputer Provides Support

On-Line Stock Market Data Streamlines Trades

Special to CW

NEW YORK — An advanced minicomputer system at The Equitable Life Assurance Society of the U.S. is providing on-line information support for both securities trading and portfolio management, along with automated paperwork processing of investment transactions in publicly traded securities.

The Trading and Custody Operations System (Tacos) was developed over the past two years with the aid of Index Systems, Inc. of Cambridge, Mass., a management consulting and systems development firm specializing in the investment industry.

"A major objective for Tacos was to improve the effectiveness and efficiency of the trading staff in processing securities transactions," according to John F. Dudley, vice-president responsible for all public market trading activity.

"We wanted to give our professional traders maximum accessibility of information to provide the quickest and most advantageous response to markets, such as broker indications on stocks, bids and offers on bonds and yield opportunities in the money market.

"Also, we recognized the need for automating the paperwork flow involved in such investment activities," Dudley said.

After determining its needs could not be met by a packaged software system or service bureau, The Equitable selected Index Systems to assist in the design and implementation of customized capabilities. The result was an integrated information system implemented on a Digital Equipment Corp. PDP-11/70. Six major subsystems serve specific requirements for trading in equities, bonds and money market instruments, equity and bond portfolio management and Securities Custody operations.

"The system is well conceived, well designed and highly effective because the users were intimately involved in specifying the nature and form of output, and its modular structure permits changes or additions of new programs with relative ease," according to Richard J. Murphy, director of investment research.

Apart from its potential for improved investment performance, the system is expected to provide significant benefits from higher personnel productivity and lower processing costs. In 1974, The Equitable estimated its transaction volume would double by 1980. Tacos will enable The Equitable to handle much of this volume without increasing its trading staff and will give portfolio managers more time for analyzing investment opportunities and handling more accounts.

Equity and Bond Trading

Equity traders now have a system to aid in the process of selecting brokers and monitoring trading services. Broker indications are entered on-line and displays of these indications, as well as historical trades, can be called up either by broker or by issue.

Transaction data entered and validated by the computer includes codes that indicate reasons for executing the trade with a particular broker and the quality of the broker's performance on the trade. Also, all communications with brokers or are recorded by the system to satisfy regulatory requirements.

Buy and sell orders submitted to the trading desk from various portfolio managers are aggregated by Tacos which, upon execution by the traders, allocates stock to participating accounts and prints daily and weekly summaries of trading activity showing cumulative broker commissions.

For public fixed income traders, the system keeps track of current and past bids and offers, accessible both by issue and dealer. Historical trades can be similarly displayed, and year-to-date volume of business with each dealer is shown on daily and monthly printouts.

On a given day, The Equitable has between $600 million and $700 million invested in money market instruments. Before the introduction of Tacos, trade extensions (net amount payable and receivable) had to be computed manually for verification with the dealer or issuer. With Tacos, trade extensions are computed for all instruments traded.

In addition, the system tracks the complex internal constraints the money market traders have to observe regarding the amount of exposure to each Issuer. On-line displays are available to show the day's trading by instrument type and maturity calendars for any time period of interest for any selected account.

The system also provides a dial-in interface to produce the authorization letter required by Equitable's custodial bank, which clears all money market transactions.

Custody Operations

Once an equity, fixed income or money market trader has entered transaction data into the minicomputer, it cannot be altered by another person. This assures a consistency of information to the custody area that was not posible when transaction tickets were transcribed manually.

Tacos provides transaction data to the custody area as well as to the company's securities accounting and daily valuation system. Confirmation approvals, including the nature of any errors, and trade settlements are recorded through the CRT terminals.

The system identifies and reports on exception situations, such as missing or erroneous confirmations, broker fails and overdue transfer operations. In addition it tracks all movements of securities within The Equitable or to outside agencies.

Portfolio Management

Through the minicomputer, The Equitable's portfolio managers have access to a broad range of information. Current status of holdings in any account can be displayed, including market value as of the previous day's close, percent of portfolio, income and yield. Holdings may be listed either by industry, or in order of market value. With other commands Tacos will show:

- Distribution of a single issue among all accounts, including amount held, market value and percent of portfolio.
- A profile of any equity portfolio by divident yields or price-earnings ratios.
- Percentage of portfolio invested in stocks in each industry sector or according to another stock classification established by Equitable.
- A display listing each account's holdings in each industry sector with comparison of industry representation in each portfolio to the aggregate representation in all portfolios or to their representation in portfolios with similar investment objectives.
- Breakdowns of bond portfolios according to coupon, quality and maturity.

Forum to Cover Data Bases

CHICAGO — Management of data base systems is the theme of a conference to be presented by the American Institute of Industrial Engineers at the Ambassador West Hotel here next Monday and Tuesday.

Speakers at the conference will include representatives of International Harvester Corp., RCA's David Sarnoff Research Laboratories and Northwest Industries. The workshop will be conducted by Leo J. Cohen, president of Performance Development Corp. and author of numerous articles and books on data base systems.

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Omar Alvarado
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Macro Edits Eased

DALLAS – A macro edit and verification program for IBM-oriented system programmers, UCC-50 from University Computing Co. (UCC) eases the creation, modification and desk-checking of new or existing macro instructions, a spokesman said.

The package can help train programmers in macro coding and modification and allows macro debugging even before the using program has been compiled, he added.

Since the user seldom if ever works directly with the internals of the macro procedure, it is especially important that it be correct when he invokes the facility with a CALL from the application program, the spokesman explained.

UCC-50 reads macro source code prior to execution, assigns sequence numbers to the source statement, provides a cross-reference of sequence symbols to macro source statements and warns the developer when a variable used in a statement lacks a definition.

This assembly language program runs in batch mode under IBM OS or OS/VS without operating system modification. Its execution requires about 60K bytes of memory.

Sold as a user-installable package, UCC-50 with user's guide costs $1,200 from UCC, 8303 Elmbrook, Dallas, Texas 75247.

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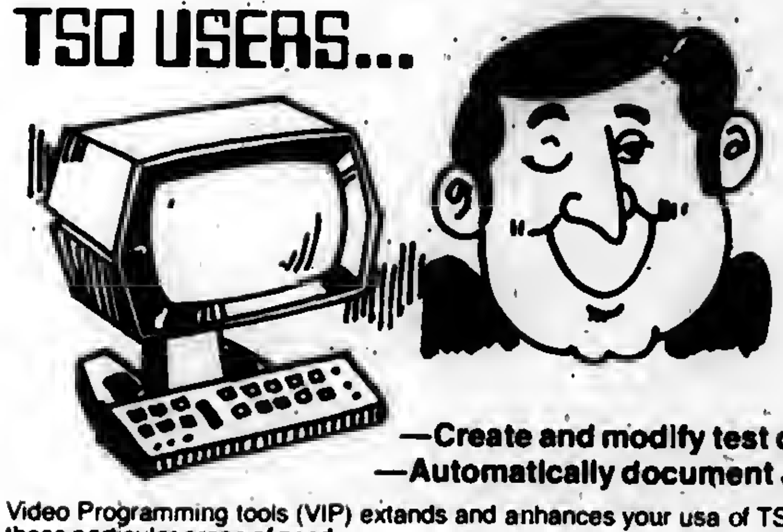

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—Automatically document JCL

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Test data is easily generated and modified by even a novice user through an interactive command processor running in foreground. It is also a simple task for maintenance programmers to select records from live files and modify fields to recreate conditions suspect in program failure. Incidently, VIP understands the need to input HEX, binary and packed data.

More comprehensive test conditions are easily produced and overall program test time significantly reduced (especially compared to the trial and error of batch testing or the awkwardness of working with foreign languages or processors).

JCL documentation is automatically done and always current with VIP's flowchart generator. Each step appears on an 8½" X 11" paper for easy inclusion in documentation manuals.

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Help Asked for Data Inventory

AMHERST, N.Y.– The International Geographical Union Commission on Geographical Data Sensing and Processing is seeking information about programs or cartographic data sets that could be included in an updated and extended *Inventory of Computer Software for Spatial Data Handling*, to be published late this summer.

Sponsored by the U.S. Geological Survey, the listing should reduce the redundancy that now exists because technicians working in various disciplines are not aware of work being done elsewhere, according to Prof. Duane F. Marble, who is coordinating the development of inventory.

Marble is seeking data on any relevant software, whether individual functions, complete systems or prepared data bases. He is interested in listing commercial products as well as those not now on the market.

To ease preparation of the book, Marble has a standardized form he will be glad to give anyone who asks. He would like to have all entries for the 1978 inventory returned to him by July 1.

Marble is at the Geographic Information Systems Laboratory, State University of New York at Buffalo, Amherst, N.Y. 14260.

Data Base Covers Bonds

WALTHAM, Mass. – A data base providing daily on-line municipal bond evaluations is available through the time-sharing facilities of Interactive Data Corp.

The data base covers more than 1.1 million bonds and some 40,000 issues and contains 20 items of such descriptive information as call data, ratings and maturity dates, the vendor said.

Evaluations are generated by a formula-yield matrix system that calculates yield curves based on market ratings against maturity dates and coupon information. The data base is comprised of daily evaluations beginning July 12, 1976.

With service available internationally, Interactive Data Corp. is headquartered at 486 Totten Pond Road, Waltham, Mass. 02154.

User Slashes Redefinitions

(Continued from Page 21)

three fundamental questions. Technically, can the job be done? Economically, should it be done? And operationally, will the finished job satisfy the request?

"This stage is crucial," he pointed out. "No matter what you think the outcome is supposed to look like, unless you firmly implant at the outset what you're going to accomplish, the results aren't going to be what you wanted."

The second step formalizes the project, identifies leaders and teams, assigns specific target dates, sets progress reporting techniques, determines educational needs and documents the entire system via the Hipo method.

A written "contract" specifying project details is then drawn up and signed by all parties before the project proceeds further.

The third step in Liberty Mutual's revised program is "detail, including unit and systems testing plans, initiation of run books, complete conversion plans and whatever detail is necessary to initiate programming on a well-defined schedule.

"Programming and control testing" develops and tests the program designed during detail analysis, within a controlled environment, to ensure program accuracy and to provide complete documentation.

"In the fifth step, called 'systems test,' " Kurth explained, "we check the total development product, regardless of the project size, under conditions that simulate a production environment. We also insist on user acceptance of the system test, which is formalized in a written document."

The final step, "conversion and implementation," puts the system into operation so that it functions on a scheduled cycle.

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As Three Terminals Debut

IBM Introduces RJE Protocol for SNA

By Ronald A. Frank
CW Staff

WHITE PLAINS, N.Y. — IBM has introduced a half-duplex protocol for remote job entry use that operates under its Systems Network Architecture (SNA) and reportedly allows multileaving of jobstreams on the 3776 and 3777 terminals.

The protocol capability was announced as part of an equipment upgrade that included the introduction of the models 3 and 4 of the 3776 terminal system and the Model 3 of the 3777 terminal system.

The Multiple Logical Unit (MLU) protocol operates under control of an RJE subsystem in the SNA host CPU. MLU interleaves up to six individual jobstreams to and from the host in half-duplex mode, according to an IBM spokesman who noted MLU is an SNA-only protocol.

Control of Six Jobs

MLU operates with Vtam, DOS/VS Power, OS/VS1 RES, OS/VS2 JES2, OS/VS2 JES 3 and NCP/VS Release 5. The terminal operator has control of up to six concurrent jobs and the multiple logical operation allows on-line jobs to be initiated any time an SNA session is available for transmission, the spokesman said.

The terminals also allow attachment of one magnetic tape unit. Control of the tape I/O can be assigned to an independent host SNA session or the terminal can be used for local I/O operations.

Message spooling and operator prompting can be accomplished for host system messages via the standard console display, IBM said.

The 3776 Model 3 operates at speeds up to 300 line/min; the Model 4 up to 400 line/min and the 3777 Model 3 up to 1,200 line/min.

The 3776 Model 3 is available under a two-year lease for $750/mo or can be rented for $881/mo. Its purchase price is $30,000. The Model 4 can be leased for $825/mo, rented for $969/mo or purchased for $33,000.

The 3777 Model 3 can be leased for $520/mo, rented for $611/mo or purchased for $20,800.

A representative 3776 Model 3 configuration, which includes a printer, 2502 card reader and line attachment features, can be purchased for $42,000; the Model 4 for $45,000.

The purchase price of a representative 3777 Model 3 including a 2502 card reader, a 3203 high-speed printer and 3411 magnetic tape unit is $97,960.

Under a two-year agreement, the 3776 Model 3 configuration can be leased for $1,033/mo or rented for $1,190/mo; the 3776 Model 4 configuration can be leased for $1,108/mo or rented for $1,278/mo; the 3777 Model 3 configuration can be leased for $2,494/mo or rented for $2,886/mo.

First customer shipments of the terminals are scheduled to begin in the fourth quarter.

Nova, Eclipse Line Multiplexer Mixes Controllers on One Board

WESTBORO, Mass. — Data General Corp. has introduced a universal line multiplexer that combines a four-line asynchronous controller with a single-line synchronous controller on a single circuit board. This communications subsystem, said to save both cost and space over multiboard designs, interfaces asynchronous terminals as well as a synchronous line to a host CPU.

The ULM-5 universal line multiplexer occupies a single slot in a DG Nova or Eclipse chassis. It is software-compatible with DG's ALM series asynchronous line multiplexers and is supported by DG operating systems and software, according to a spokesman.

The subsystem was designed for small and medium-sized systems with on-line terminals and as a link to a host system. It features full modem control, including auto answer, and provides a cyclic redundancy check (CRC) to assist system software in implementing various synchronous line protocols, such as IBM's Bisync mode, the spokesman said.

Each asynchronous interface can operate at selectable line speeds to 9,600 bit/sec either full- or half-duplex. Line interfaces are RS-232C- and CCITT V.24-compatible, and the asynchronous controllers are also EIA or 20mA current-loop compatible, he added.

Software support includes standard DG operating systems (AOS, RDOS, RTOS and its disk operating system). Communications software includes the Communications Access Manager (CAM) under RDOS, which provides system support for standard Ascii and Bisync protocols.

RJE80 and Hasp II workstation emulators permit interfacing to remote DG or IBM-compatible host processors through emulation of 2780/3780 or Hasp II workstations, the company said.

The ULM-5 is available in three forms: as the Model 4243 four-line asynchonous and single-line synchronous controller on a single board for $2,700 or on separate boards as the Model 4241 four-line asynchronous controller for $1,400 and the Model 4242 single-line synchronous controller, which also costs $1,400. DG is at Rt. 9, Westboro, Mass. 01581.

Bell-Type Modem All-CMOS

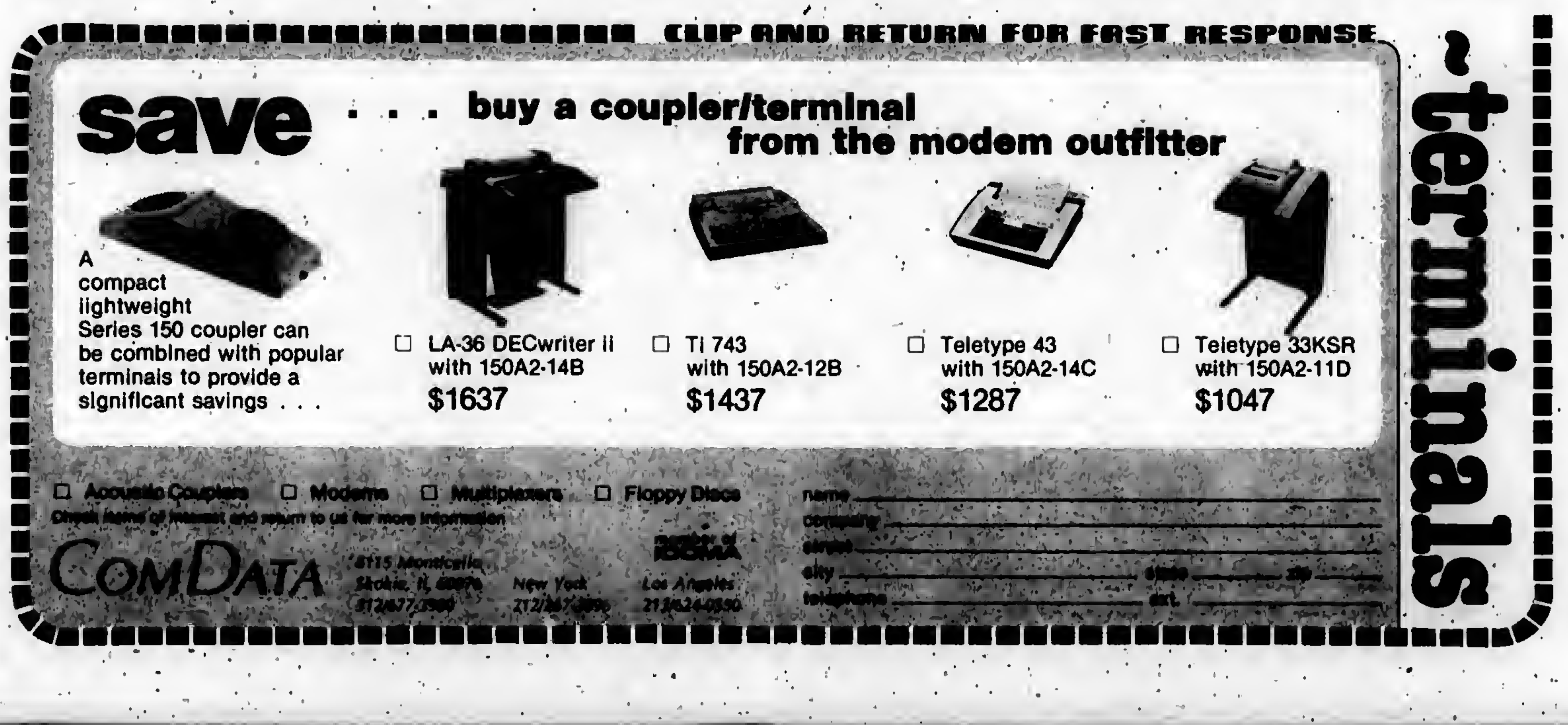
PALO ALTO, Calif. — Prentice Corp. has introduced a Bell 202-compatible, half- and full-duplex modem with all-CMOS circuitry and built-in diagnostics.

The AM-202 interfaces with both data communications terminals and multiplexers and permits nonsynchronous transmission of data over common carrier leased lines, the company said.

An advantage of the AM-202 over the Bell 202T model is said to be its built-in diagnostics. As an installation and troubleshooting aid, the AM-202's diagnostics include LED status indicator lamps and digital and analog loopback switches.

A remote digital loopback feature allows users to automatically control an unattended remote modem and use it to loop back at the remote digital interface for end-to-end network evaluation, a spokesman noted.

The card version of the AM-202 sells for $325. A stand-alone version is priced at $440. Prentice is at 795 San Antonio Road, Palo Alto, Calif. 94303.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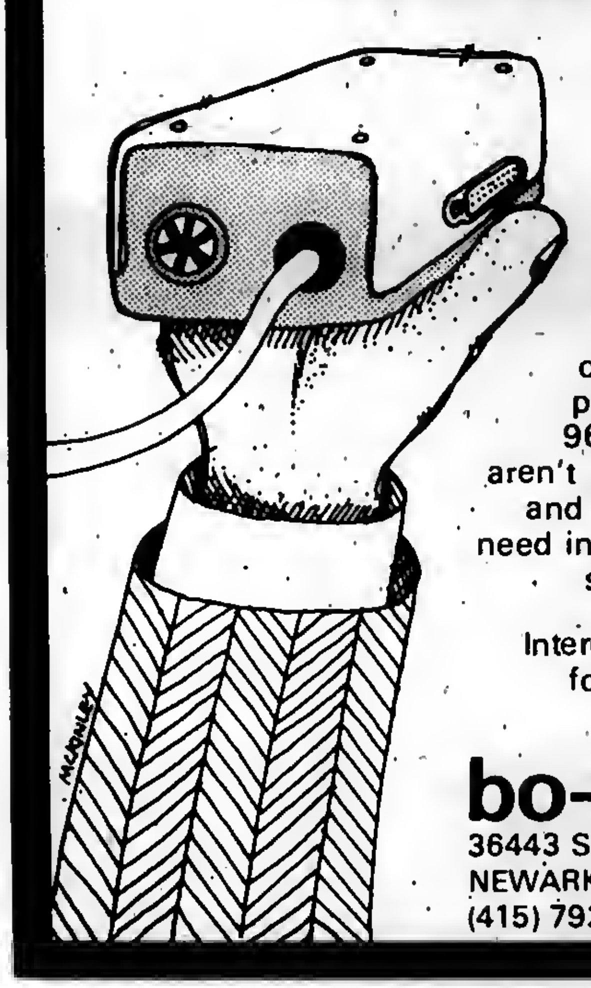

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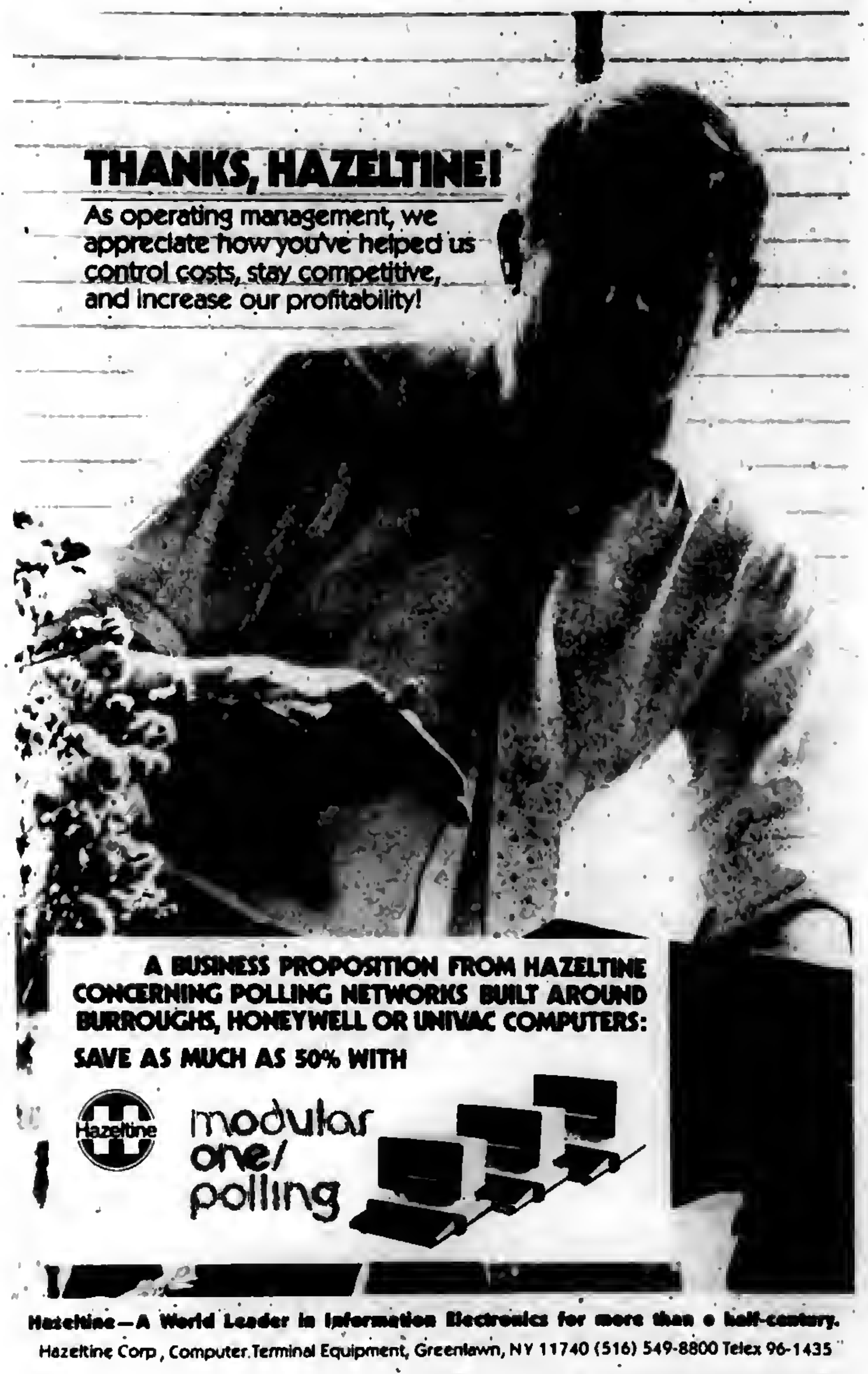

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Wisconsin Control Center Keeps Network's Customers Up for 99.5% of the Time

MILWAUKEE — Blue Cross of Wisconsin has developed a teleprocessing network diagnostic system with testing capabilities that has reportedly improved the delivery of services to computer customers and increased the availability of teleprocessing time from 97% to 99.5%.

This increase has also brought a 4.3% improvement in end-user availability from 92.7% to 97%, according to Dan Reising, Blue Cross telecommunications supervisor, who designed and built the system.

The system has testing capabilities beyond the normal range of terminal customer engineers and common carrier repairmen, Reising said. The control center enables Blue Cross network coordinators to diagnose and expedite repairs on all data communications circuits and terminals. At the same time, it maintains control of problems and their corrections with the least interruption of service to customers.

Reising said problems are resolved by:

- Faster recognition and diagnosis of the problem.
- Prompt identification of the correct vendor in 99.5% of all cases.
- Improved relations with vendors resulting from accurate dispatching.
- Control through effective, timely follow-up of problems and their solutions.
- Retesting capabilities following vendor repairs.
- Problem-tracking capabilities that lead to more effective preventive maintenance.
- Increased customer and vendor awareness of the system's capabilities.

"A most important benefit of the system," Reising explained, "is our ability to restore service to our customers without unnecessary delays. Once a problem is diagnosed, we can get the customer back on-line, and then we can correct the problem. This gives us greater credibility with our customers and vendors and improves our relationships with both groups."

The network control center eliminates confusion and lost trouble reports, he said, noting it also reduces the amount of line and terminal downtime while controlling teleprocessing equipment and software-related difficulties.

Problems can be detected and diagnosd from a central site, often before the user is aware of a malfunction. Preventive maintenance is a key element of the service and regularly scheduled testing programs detect degradation before service is affected.

The preventive maintenance system is a series of benchmark readings of the line parameters. Tests are made on functioning circuits. Weekly checks are conducted during off-hours, and the readings are compared with the benchmarks. If significant degradation is apparent, steps are taken to control the situation.

"The whole idea of network control is to keep customer involvement to a minimum," Reising said. "We are continually working with the vendor to identify and correct equipment problems in order to improve service to our teleprocessing customers."

The Blue Cross communications network control center can control and correct those situations found to be most annoying to customers and vendors, Reising added. As an example, most line-related problems clear five to 10 minutes before a call can be handled by the common carrier. With most systems, there is no way of knowing if a problem is rectified until the common carrier gives clearance; this wastes hours of user availability.

But the Blue Cross system monitors the line and brings it up immediately after the problem has been resolved. There is no waiting for clearance.

Another problem results from unnecessary service calls. Approximately 21% of all service requests can be totally eliminated with a thorough diagnostics program, Reising said.

Trouble related to simple malfunctions (a loose or disconnected cable) or human error (a switch in the wrong position) can be resolved by phone with the operator making simple equipment checks. When phone company or vendor service calls are made in response to such problems, several hours or even an entire day of input time and the technician's time are wasted.

The Blue Cross system diagnoses the problem immediately. The proper vendor is dispatched without delay or error in determining the nature of the problem.

Since the installation of the network in February of 1977, delivery of service to end users has improved by 4.3% to 97%, Reising said. Besides Blue Cross of Wisconsin, its primary customer, the center serves two corporations and 20 hospitals. It maintains 315 terminals on 42 common carrier data links and has a current maximum capacity of 96 data links.

The communications control center has a Bradley V-F Line Analyzer capable of diagnosing a problem in a data link within less than five minutes of the reported trouble. The line analyzer provides an audiovisual means of measuring gain and phase hits, amplitude and phase jitter, harmonic distortion, impulse and steady state noise, frequency deviation and most parameters that can degrade performance.

The most frequently used tool in the network is a Spectron Corp. Model 601 Datascope. It facilitates the monitoring of computer input and output to determine the sequence of events leading to a problem. It also records and plays back the data for later analysis.

There is also a Buffered Data Simulator to simulate the host system and exercise the terminal equipment.

Other network equipment includes level meters, a Milgo 220 test set and an oscilloscope. They operate through a Cooke Dynam-Patch Facility to diagnose problems without interfering with ongoing teleprocessing.

By combining these tools with troubleshooting techniques, network coordinators can pinpoint a failing component in 99.5% of all instances, Reising said.

GA Announces 440 Gains Languages, 3780 Ability

ANAHEIM, Calif. — General Automation, Inc. has announced several enhancements to its 440 Data Series family of commercial systems, including the addition of a Fortran IV and Commercial Fortran (Comfort) programming capability, the extension of Cobol to include Level 2 programming features and the addition of IBM 2780 communications capability for access to host computer systems in a network.

Suggested Applications

A company spokesman explained that the extended Cobol is useful for commercial applications, that extended Fortran is appropriate for industrial control, engineering and scientific calculation environment and that Comfort is appropriate for applications involving commercial tasks.

All 440 systems are offered with Control III real-time foreground/-background operating systems, the MTS multiterminal time-sharing executive and FMS Isam file manager, in addition to one of the language processors most appropriate for the systems, the spokesman said.

A full complement of peripherals can also be specified to match system power with user requirements. These options include expandable disk storage in 10M- or 80M-byte increments, 200- or 600 line/min line printers, 400- or 1,000 card/min card readers and up to 16 current-loop RS-232 or CRT terminals.

A typical four-terminal system, including one language processor, a 128K-byte 16/440 minicomputer, a 10M-byte disk, a 200 line/min printer, all system software, 2780 communications and six weeks of intensive training costs less than $44,000, according to the company spokesman.

GA is at 1055 S. East St., Anaheim, Calif. 92803.

Diebold Brings Out ATM

CANTON, Ohio — Diebold, Inc. has announced the Total Automatic Banking System (Tabs), an automated teller machine (ATM) that can reportedly facilitate up to 20 routine banking transactions depending on the setting of the system's minicomputer.

A 15-key, sealed solid-state keyboard from Micro Switch, a division of Honeywell, permits direct communications with the automatic banking system 24 hours a day and on weekends.

Micro Switch electromechanical switches control paper advance, sense paper quantity, interlock various functions and note the position of the vandal shield, according to a company spokesman.

The bank customer's personal identification number (PIN) is not printed or encoded on the identification card and does not show up on the CRT during the transaction, the firm noted.

The system includes a Bunker-Ramo Corp. programmable control unit minicomputer, but can alternatively interface with other controllers, according to the company.

The system includes hardware, software and both systems and maintenance support. A typical system might have 10 terminals at an average price of $25,000 each and a controller priced at $30,000, making an average total of $280,000.

Diebold is located at 818 Mulberry Road S.E., Canton, Ohio 44711.

ALD Features 'Zero Downtime'

SANTA CLARA, Calif. — A "Zero Downtime" asynchronous line driver (ALD) has been announced by Ven-Tel, Inc.

The Ven-Tel ALD is comprised of a single unit housing two asynchronous line drivers. While one ALD is in operation, the other remains in a ready state as an on-site backup unit, according to the firm.

Specific Features

The "Zero Downtime" option is part of Ven-Tel's latest product line that offers four different stand-alone or rack-mounted ALDs, all conforming to Bell Specification 43401 and utilizing either an EIA RS-232C or 20 mA interface. Specific features of the limited distance line driver include up to 9,600 bit/sec asynchronous transmission, two-wire half-duplex or four-wire full-duplex, point-to-point or multidrop and LED performance indicators, a spokesman said.

Price for the stand-alone version of the ALD is $320 and for the rack-mounted card-only version the price is $235.

The firm is located at 2360 Walsh Ave., Santa Clara, Calif. 95050.

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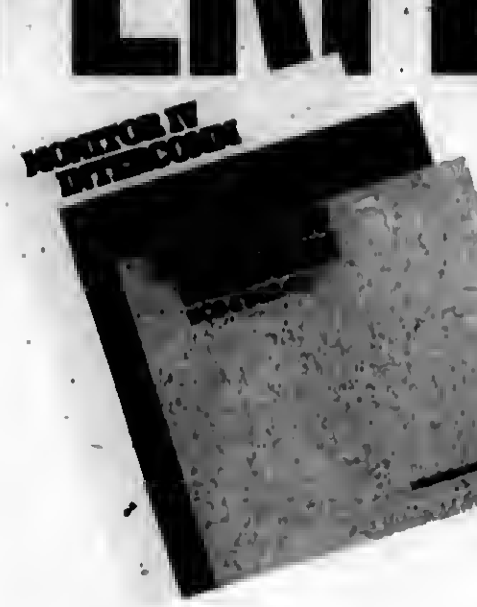

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Backs 3270 CRTs

IUP From IBM Supports Health Care Facilities

WHITE PLAINS, N.Y. — IBM has announced a program that enables a hospital to collect, store and communicate patient care information through the use of terminals linked to a central IBM 370 computer.

The record management program, called the Health Care Support/DL/I Patient Care System, was developed by Duke University Medical Center in Durham, N.C.

The Installed User Program (IUP) is a hospital wide information system that provides a communications link between the admissions office, nursing stations, ancillary departments, accounting and the medical records department, according to a spokesman.

The Health Care System was designed to operate on a system that includes the following components. A 370 capable of supporting OS/VS, CICS/OS/VS, IMS/VS and appropriate application programs.

- An IBM 3270 terminal; control units and CRTs must support at least a 1,920-byte display; any model printer is supported.
- An 80-column card reader.
- A 132-character line printer.
- Sufficient direct access storage to meet system and data base requirements.
- At least one tape drive.

The IUP is written in PL/I and Assembler language. The prerequisite programs require Cobol OS/VS.

The IUP is a user-driven system through which the service departments and nursing stations can manage patient records. This is accomplished by entering doctors' orders through CRTs at the nursing stations, the firm said.

The orders are transmitted to the appropriate ancillary departments and are added to the patient's data base record. The ancillary departments have the ability to display and/or print worklists and to enter results.

Results can then be sent back to the nursing station in hard-copy form to become a part of the patient's chart. The data becomes part of the patient's data base record and is available for inquiry through a CRT.

Cumulative summaries may also be produced, according to the spokesman.

Charges for these services are automatically collected and made available to the accounting system. Upon patient discharge, medical record abstracts are prepared.

The monthly charge for the IUP is $2,900, with charges waived after 24 consecutive payments.

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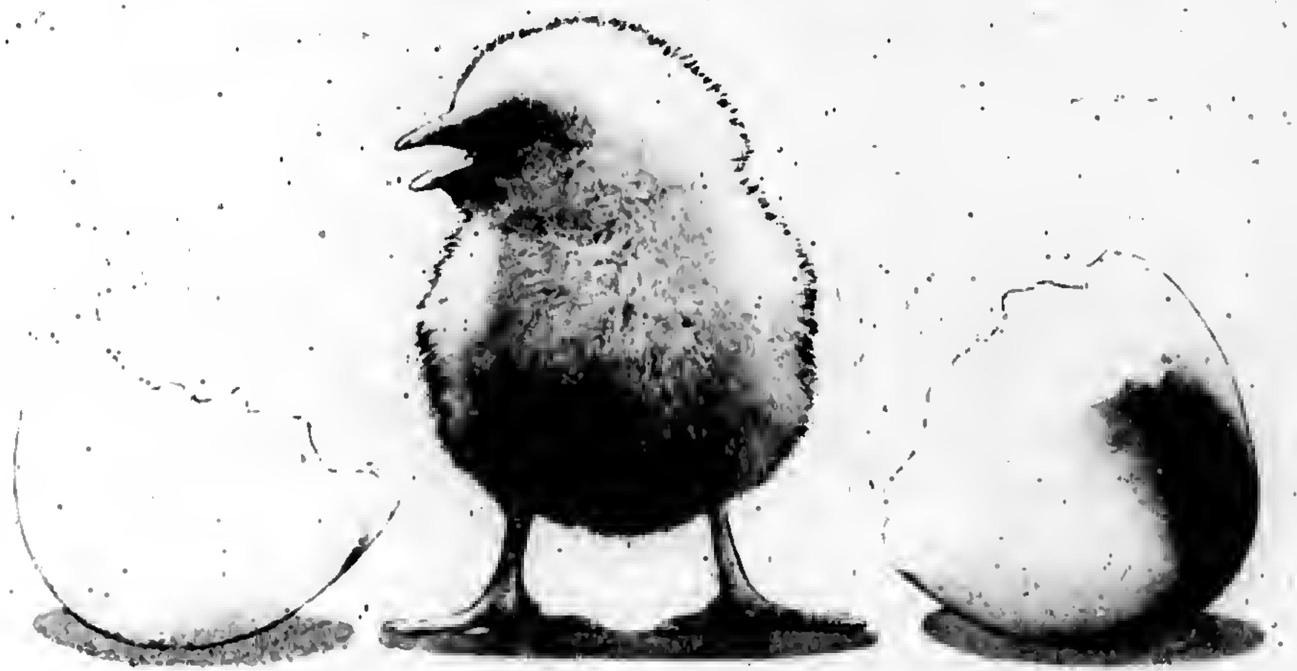

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Teletype 40 Gets Link to CPUs And Terminals

MIAMI LAKES, Fla. — The C-40 and D-40 interface boards from Innovative Electronic Systems, Inc. reportedly allow the 300 line/min Teletype Corp. Model 40 teleprinter to connect to a host computer or terminal that offers a Centronics Data Computer Corp. or Dataproducts Corp. interface.

Complete hardware/software transparency permits plug-to-plug compatibility without system modifications, an Innovative spokesman said. The C-40 allows for the replacement of any Centronics printer; the D-40 provides for Dataproducts replacement.

Self-Contained Board

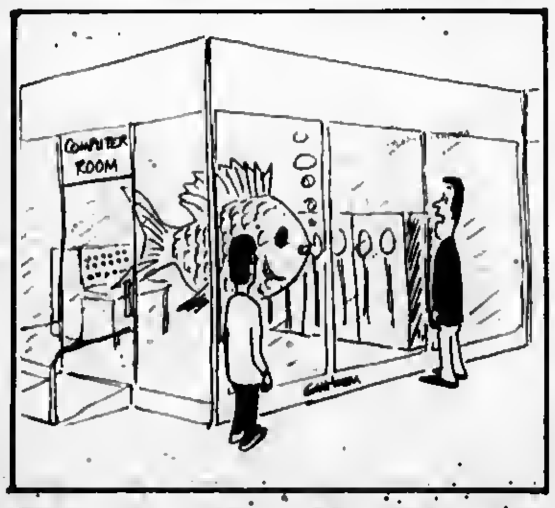
Each board is self contained and does not require external power when mounted within the printer cabinet since power is derived from the printer, the spokesman noted. The board may also be mounted inside the host system, allowing computer/-printer separation via two-wire pairs up to 2,000 feet.

Standard features include a 160-character first-in/first-out (Fifo) buffer permitting data transfers up to 250 kHz; field-selectable control character code conversion, parity selection, extended Ascii and variable motor time out after last character received.

Optional features are bell/alarm, elapsed time indicator, manual select switch (on/off line) and a programmable code converter for nonstandard character sets.

Print speeds up to 500 line/min may be achieved when using the IBM 1403-equivalent 48-character set, the company said.

Nationwide service is available for the C-40, priced at $795. Innovative Electronic Systems is at 15200 N.W. 60th Ave., Miami Lakes, Fla. 33014.



'Well, It Could Be the Night Operator's Idea of a Joke . . .'

Key-to-Disk Net Tracks Aircraft Engine Parts

SOUTHINGTON, Conn. — At any time, 10,000 to 15,000 jet engine parts are tracked in Pratt & Whitney Aircraft Service Center's work-in-process system — with a recently installed terminal system.

According to Leo Croteau, manager of DP for the service center operation, "we wanted a sophisticated data entry system, with the capability of communicating in a Model 20 multileaving mode to both our IBM 370/168s located at the Pratt & Whitney E. Hartford facilities."

A Data 100 Corp. Keybatch system was acquired to replace an overworked keypunch facility that was inadequate for processing the volume of data required. In addition, the keypunch machines had taxed the work force by forcing operators to work overtime to keep up with the volumes of data.

The terminal system allows the service center to enter parts data more efficiently. Upon engine disassembly or receipt of parts from customers, one of the operators keys into the five million-byte system repair data that includes part number and name, sequence of repair operations, target date, priority code, estimated hours to repair and type of modification to be incorporated.

"It took about five weeks to process nearly 50,000 records," Croteau explained, "but with the Keybatch system, the same amount of data can be processed in about three weeks. This resulted in a productivity increase of 60%. Now the operators aren't waiting for the machine to finish processing the data; the system waits for the operators."

The key-to-disk system is credited with reducing error rates to less than 1%, increasing the volume of data processed nearly two-fold and decreasing the time for keying financial documents.

"Our operators used to spend a great deal of time going back through source documents and researching the quantities to correct items on the error sheets. If errors occur now, a search locates the record within the batch that needs correcting, then the entire batch or only corrected records may be submitted," he added.

The output reformatting feature also has proved a time saver in the accounting area, one of the largest user groups. By using different output formats, data within a batch can be reorganized several ways to meet input requirements of individual programs.

Spectron Unveils Portable Testers For Field Use

MOORESTOWN, N.J. — Spectron Corp. today introduced two portable Datascope data communications test instruments for use in field troubleshooting.

The two models — D-301 and D-302 — feature large storage capacity and speeds up to 72 kbit/sec (D-301) and 2.5M bit/sec (D-302).

System operation is shown in full detail, making errors caused by software bugs, equipment malfunctions or line troubles immediately visible.

The D-301 incorporates an all electronic buffer that allows operation at speeds up to 72 kbit/sec. Features include independent speed, synchronizing and setup for each side of the line, right and left justification for codes of less than eight bits.

The D-302 contains all the features of the D-301, but operates at speeds up to 2.5M bits and has a programmable input trap to permit recognition and capture of complex occurrences at high speeds, according to Spectron.

The D-301 Datascope costs $6,800; the D-302 is $11,200.

Spectron Corp. is located at 344 New Albany Road, Moorestown, N.J. 08057.

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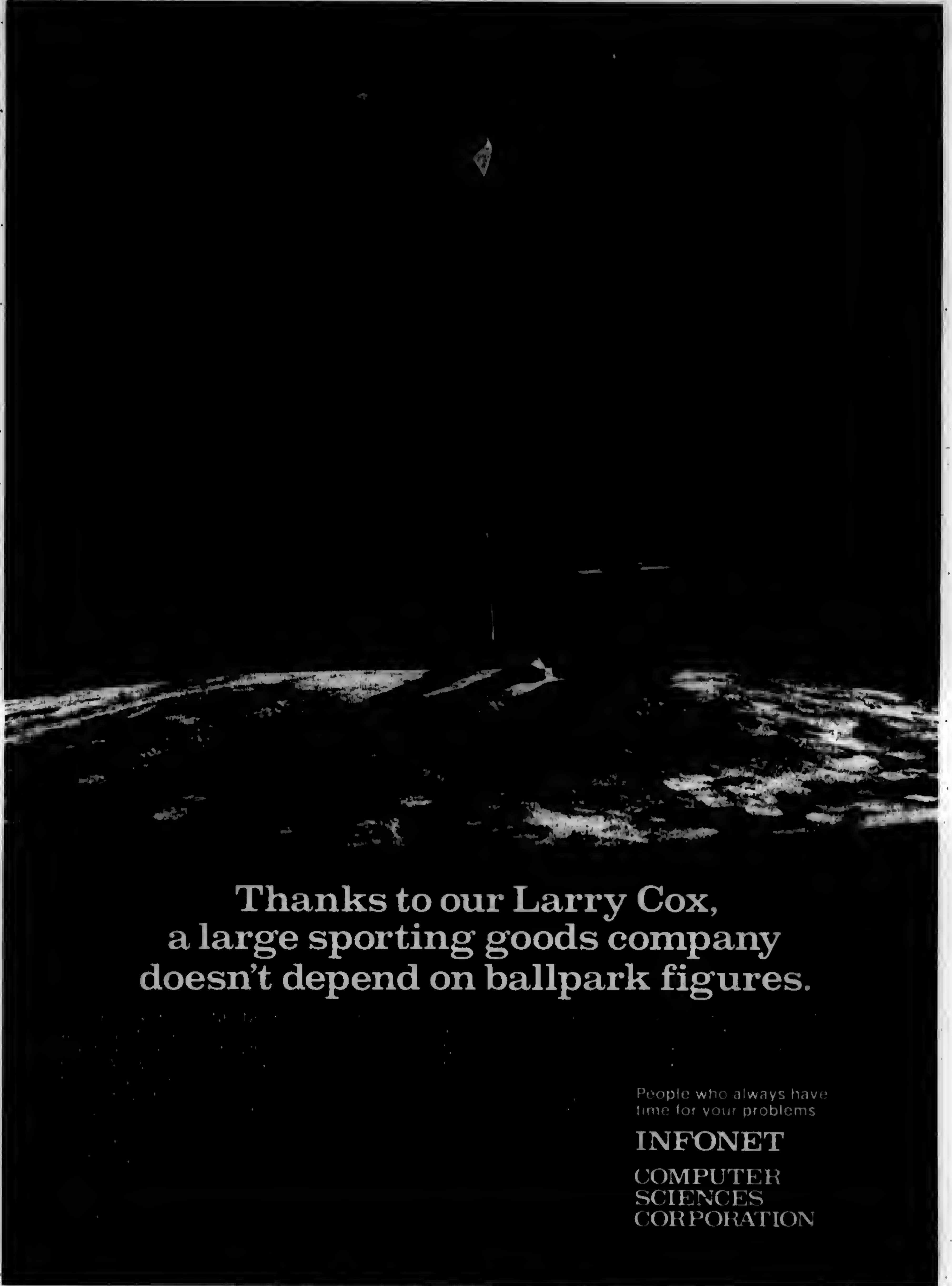

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In fact, why not get started right away? For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free (800) 631-2154.

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N-8370 Links N-8350, N-8450

NCR Tops Off Mid-Scale N-8300 Line

By Frank Vaughan
CW Staff

DAYTON, Ohio — NCR Corp. has introduced the N-8370, its most powerful member of the N-8300 medium-scale family to date. The most powerful system reportedly has twice the power of the N-8350, formerly the most powerful 8300 unit, and can accommodate up to nine programs at the same time.

The system provides a growth path between the N-8350, introduced last year [CW, May 2], and the N-8450, which has 25% more power than the N-8370, the firm said.

Under NCR's numbering scheme, the second digit of the model number in the 8000 series indicates the type of processor; the third digit describes the relative power within the processor class; and the last digit indicates special-purpose models. The prefix "N" indicates the model uses NCR Century software, while a "V" indicates virtual storage and an "I" denotes an interactive operating mode.

The 8370 system, which comes with a minimum of 96K bytes of main memory, features a CPU with a 750 nsec cycle time and four I/O trunks. Memory can be upgraded to 256K bytes in 64K-byte increments following an initial 32K-byte increment, compared with a 128K-byte limit on the N-8350.

The four I/O trunks consist of two with 120 kbit/sec transfer rates, one 545 kbit/sec line and one 900 kbit/sec line. The N-8370 comes with up to 10 integrated communications lines; a free-standing multiplexer can handle up to 253 lines.

NCR's N-8370 can handle up to nine programs at the same time and offers a step upward in processing power for users of the firm's smaller "N-mode" computers. The system has an extensive library of application programs.

The system can reportedly utilize all NCR Century applications, which the firm noted are available for a variety of industries including retailing, financial services, commercial, manufacturing, healthcare, education and government operations.

A 96K-byte N-8370 with multiprogramming, four I/O trunks, operator console, CRT, thermal printer and a dual magnetic tape cassette unit sells for $80,000; monthly rental under a five-year lease costs $1,856/mo.

Other available peripherals include card punch, card reader, line printers with speeds up to 2,000 line/min, disk units with capacities up to 96M byte/unit and magnetic tape units with densities of 200- and 1,600 bit/in. Languages available with the system include Cobol 68 and 74, Neat/3, Fortran and RPG as well as a variety of utility-routines, a spokesman said.

The N-8370 will be available for delivery in the third quarter, he added.

Ex-Keypunchers Boost Productivity 18%

Special to CW

BUFFALO, N.Y. — The Daughters of Charity Hospital here said it increased DP productivity by 18% and reduced mainframe processing time by more than 10% after replacing keypunch equipment with a key-to-disk system.

The hospital recently added a wing, expanding its capacity by 20% for a total of 533 beds. The hospital's DP department processes more than 4,000 patient charges daily. All data for payroll, accounts receivable and admissions are handled by the department.

"The keypunches were like a vicious circle," DP Director Don Bennett said. "More patients meant more data, which meant more keypunches with more operators, more cards and more problems with the cards."

The hospital was encountering backlogs and efficiency problems using the keypunches, according to Bennett, who noted maintenance problems with the equipment also contributed to the backlogs.

The Daughters of Charity Hospital has saved over $3,500 in card costs since it began using a key-entry system.

"We had all the usual problems with the keypunches," he continued. "The cards got lost or out of sequence, and we were always rerunning batches because it is impossible to verify any errors until the mainframe rejects a batch."

One year ago, the hospital replaced its five IBM Model 129 keypunches with a Mohawk Data Sciences Corp. (MDS) 1200 data entry system. Now, slightly more than a year after installation, Benettt indicated the DP-department can handle the additional DP requirements brought by the hospitals' expansion without hiring additional operators.

Materials costs have been reduced, and the number of operating hours on the hospital mainframe have been cut by more than 30 hours each month, Bernett said.

"We're going though more than

(Continued on Page 34)

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Key-to-Disk Boosts Hospital's Productivity 18%

Data Entry Dimensions

(Continued from Page 33)

250,000 cards each month," he recalled. "We've saved $3,500 in card costs alone since we installed the key-to-disk equipment a year ago."

An eight-month feasibility study was conducted by Bennett and the hospital's keypunch supervisor to search for a reliable, simple-to-program data entry system.

During the study several vendors were visited and asked to compose data entry formats for the hospital's patient charges. MDS was the only vendor which could compose the formats without consulting programmers and systems people, he indicated.

"We required a system that was cost-efficient, reliable and simple to operate," Bennett said. "We could have used the IBM 3741, but that would have involved additional steps to convert it to tape. It also meant handling floppy disks all day, and the cost was out of our range. With the other vendors we investigated, there were the same programming and cost problems.

"The MDS people were able to establish the data entry formats in a single afternoon while we were there," he added.

Bennett said that use of the key-to-disk system has allowed the DP department to handle a dramatically increased workload without adding personnel or increasing mainframe activity.

"Our workload increased by almost 20% when the hospital expanded," he said. "we replaced the five keypunches one-for-one with the terminals and, despite the increased workload, our backlogs have disappeared and we are planning on formatting additional applications.

"In addition," he said, "we find ourselves running the same jobs on the mainframe in 30 hours less per month than with the keypunches because we seldom have to run correction batches."

The hospital required 83 data entry formats for its applications. The formats, which convert the papersource documents the hospital uses into CRT images, were composed by the hospital's data entry supervisor, Hanna Patrick, in several weeks.

"I never worked with computers before and at first I had no idea what to do," Patrick said. "But after I worked with the instructor periodically for a couple of weeks, they were no problem at all to write.

"All I had to do was specify the size of the record fields we required and it was done," she said. "We added a lot of prompting questions to make things easier for the operators."

Patrick anticipated morale problems among the operators because of the new equipment, but she said the opposite occurred.

"From the first day we unplugged the keypunches and used the terminals, the staff saw the improvements," she said. "The operators went through a short training program to learn the use of the terminals and we were set to go.

"And we certainly appreciate the fact that the key-to-disk equipment makes no noise. We couldn't hear a thing with those keypunch machines going," she added.

When the equipment was installed, the conversion time was "transparent," according to Patrick. "The system was up and running before we knew what was happening. We kept the keypunches around for a few weeks just in case, but that was unnecessary."

The DP operations at the hospital are streamlined with the key-to-disk equipment because each operator has access to every data entry format on each of the five teminals.

"Each time an operator changed the job she was working on with the keypunches, she had to go over to the files, find the program card, then start punching," Patrick said. "Worker productivity is up now because with the push of a button the format is there, and the operators are ready to go."

Since the mainframe computer is used 10% less each month, Bennett said the department is going to experiment with new applications.

"Presently our Blue Cross billing is handled under a separate division," he said. "Since we are now completely familiar with the system we feel confident enough that we can add additional capabilities to further streamline our operations.

"There is also no reason why we can't process the dietary and menu programs, which are all done by hand now," he added.

Bennett said there have been no system crashes, but should that event occur, MDS helped arrange a reciprocal agreement with another System 1200 user in Buffalo to provide the hospital with backup processing facilities in an emergency situation.

"I've been in the DP business for 23 years," Bennett said, "and throwing out the keypunches and installing this equipment is the greatest relief I've had in all those years."

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Processors Give Auto Club Same-Day Banking

DEARBORN, Mich. — Same-day banking is a dream for many collection managers, and Joe Chattinger of the Automobile Club of Michigan is no different. The club collects over $1 million cash a day, mostly insurance payments. A day saved in deposit of those funds could mean over $5,000 a month in "float" value alone.

That dream has become a reality for Chattinger. By using a payment transaction processor, the 1,250,000-member club deposits 85% to 100% of its cash the same day it is received, at least three days a week.

Besides an estimated $63,000 a year in investment credit or float value, the Michigan Automobile Association of America (AAA) affiliate said $155,000/year is attributed to direct productivity cost savings — plus additional benefits of improved customer service, tighter control and job enrichment for employees.

Through a combination of optical character recognition (OCR) read and operator-keyed data, the IBM 3762 payment processor permits one-step processing of premium notices — or any turnaround invoice — and related checks, eliminating the batch balancing of traditional payment processing.

In one pass at one workstation, the 3762 validates a transaction, inscribes/encodes/endorses bills and checks as needed, prepares bank deposit documents and creates a computer record for updating receivable files: This one-step process eliminated manual reconciliations, duplicate handling of data, microfilming and most presorting.

At the club's headquarters, four dual-unit IBM 3762s at eight workstations process 15,000 to 20,000 transactions a day, mixing membership renewals and premium payments for the club's automobile, life, homeowner's and boatowner's insurance. The 3762s are linked to an IBM 370/158 CPU in the form of distributed processing.

User Control

Functionally, however, the operation is almost entirely independent of the main CPU. For all the system's obvious values, the most prized may well be the least visible — user control.

Installed in a little over three months, the 3762 operation attached smoothly to the club's extensive on-line operation and 55-branch statewide telecommunications network.

"The 3762 brought the company the final step from three- and four-day banking to at least 85% same-day banking," Chattinger said. "Moreover, we ended up saving over $200,000 a year, a bigger overall cost savings than anyone anticipated. Even with same-day banking and breaking even in cost, we would have been happy with the results. The additional value is a tribute to the system and the enthusiasm and control of the user."

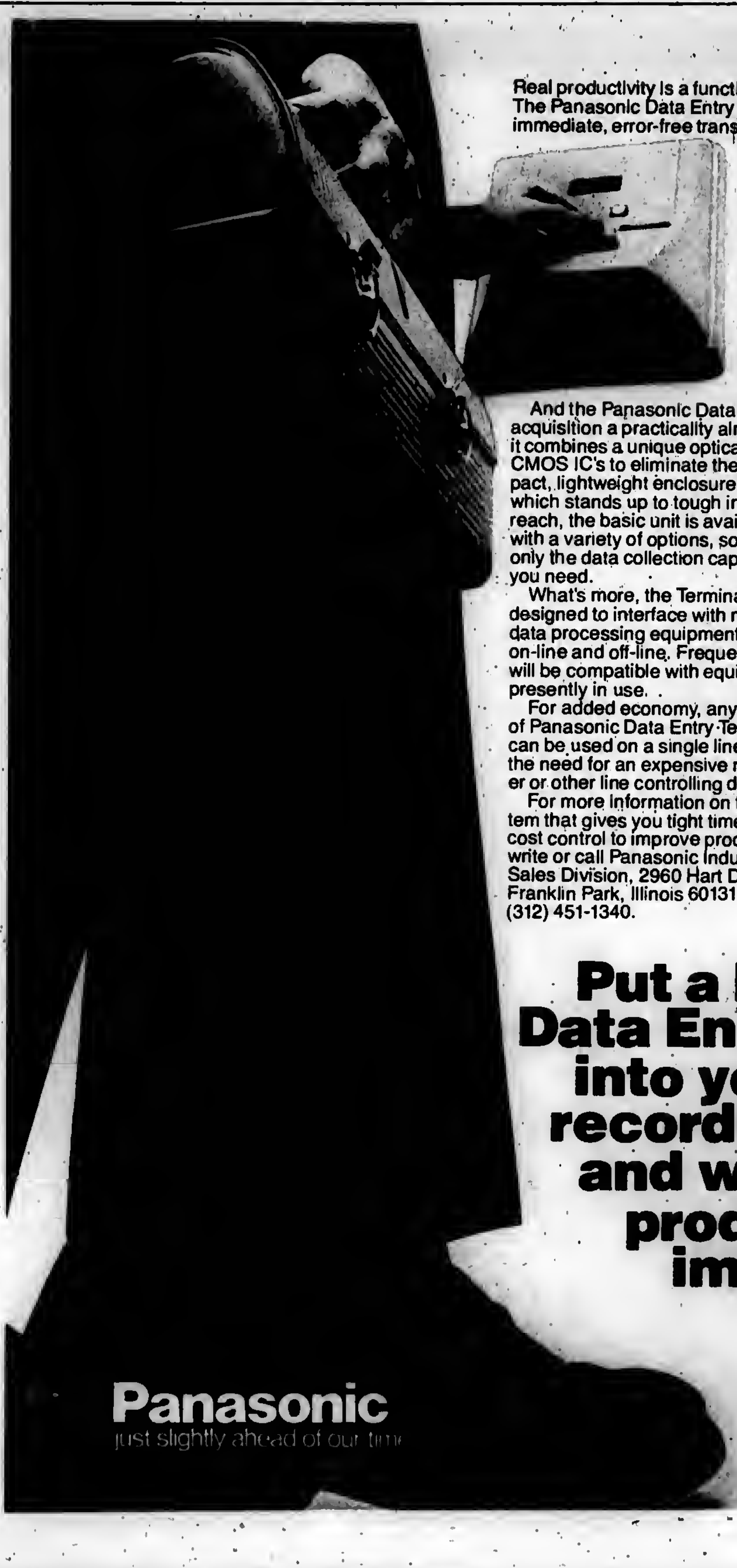
"Our basic philosophy is to make the user responsible for systems, with control in the user department wherever possible. Systems people would have handled this entire project four or five years ago. The user would have let other people solve the problems. The 3762 can be entirely user controlled. You can format and program it yourselves. You don't have to get a priority list with computer operations to use it," group processing manager Bob Whaley added.

From 12 Steps to One

The one-step approach replaced an old cash-processing method at the Michigan club. Remittance processing, lifeblood of the insurance business, was one of the last areas for system changes.

The club itself is sophisticated in the use of DP, with IBM large-scale CPUs here and over 200 IBM 3270 CRT terminals throughout the state. On-line applications range from claims reporting to policy rating, from verifying applicant driver records to processing automobile en-

(Continued on Page 40)



Real productivity is a function of time and performance controls. The Panasonic Data Entry Terminal helps by providing simplified, immediate, error-free transmission of data by any worker, at any station, directly to the computer.

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Chattinger said. "

Plug-Compatible CPU to Link IBM Tellers

By Tim Scannell
CW Staff

BRIDGEPORT, Conn. — The Citytrust Bank here recently installed a large-scale, IBM plug-compatible CPU that will be the driving force behind an on-line system ultimately linking terminals in 31 branch offices throughout the southwestern Connecticut area.

"We now have five branches installed off-line and are just completing the tail end of our on-line system design and getting ready to start coding," according to Michael George, senior vice-president and head of Citytrust's Operations Division.

On-Line Communications

The bank's Automated Teller Program, (ATP) scheduled to become operational later this year, will provide on-line communications between the IBM teller systems already present in each branch office and an Itel Corp. AS/5 Model 1 set up at the Bridgeport headquarters, George stated.

The biggest advantage of having a "totally on-line automated" system is that it will reduce customer waiting time at the teller's window. "Nobody wants to stand in line anymore," George said.

"From a technical standpoint, the teller's job is going to be much easier, which will allow the teller to really interface with the customer," he added.

Demands on Tellers

A teller's job is very complex today, George pointed out: "We ask tellers to be a lot of things. We ask them to be technicians, then we ask them to be marketing people and then we remind them to be a lot of other things in between."

All in all, "it's a very difficult job," he stated. The ATP system will allow the bank to "eliminate much of the technical training that goes into being a teller and spend that time teaching them to be good customer service people and to offer more personalized banking."

On-Line Experience

On-line banking is not new to Citytrust's operations, George observed. Although most of the branch banking transactions with the main office were conducted in a batch mode, the bank did have some on-line capabilities.

Citytrust was operating an on-line inquiry system of 25 automated teller machines (ATM) that were connected on-line and a computerized personal trust system. So "going on-line isn't totally foreign to us," George said.

He noted, however, that the ATP system will involve integrating 370 terminals scattered a great distance from each other.

Better Price/Performance

The Itel AS/5 at the main office contains 1M byte of memory, several IBM 3420 tape drives, Itel disk drives and two printers.

Although Citytrust officials had considered IBM 370/148 and 158 configurations, they decided to purchase the AS/5 because "it offered a price/-performance that we didn't feel any of the IBM machines could touch," George stated. "We spent about three months evaluating what our alternatives were before we made the decision to go with the Itel equipment.

"Frankly, after seeing the design of the AS/5 vs. what IBM was marketing, we felt the Itel was technically a more advanced machine," he remarked.

Even though the ATP system is not operational, "all the other major applications in the bank are running on the AS/5 right now . . . with absolutely no problems," George said. "That includes checking accounts, savings, commercial loan, installment loans, Master Charge transactions and personal and corporate trust systems."

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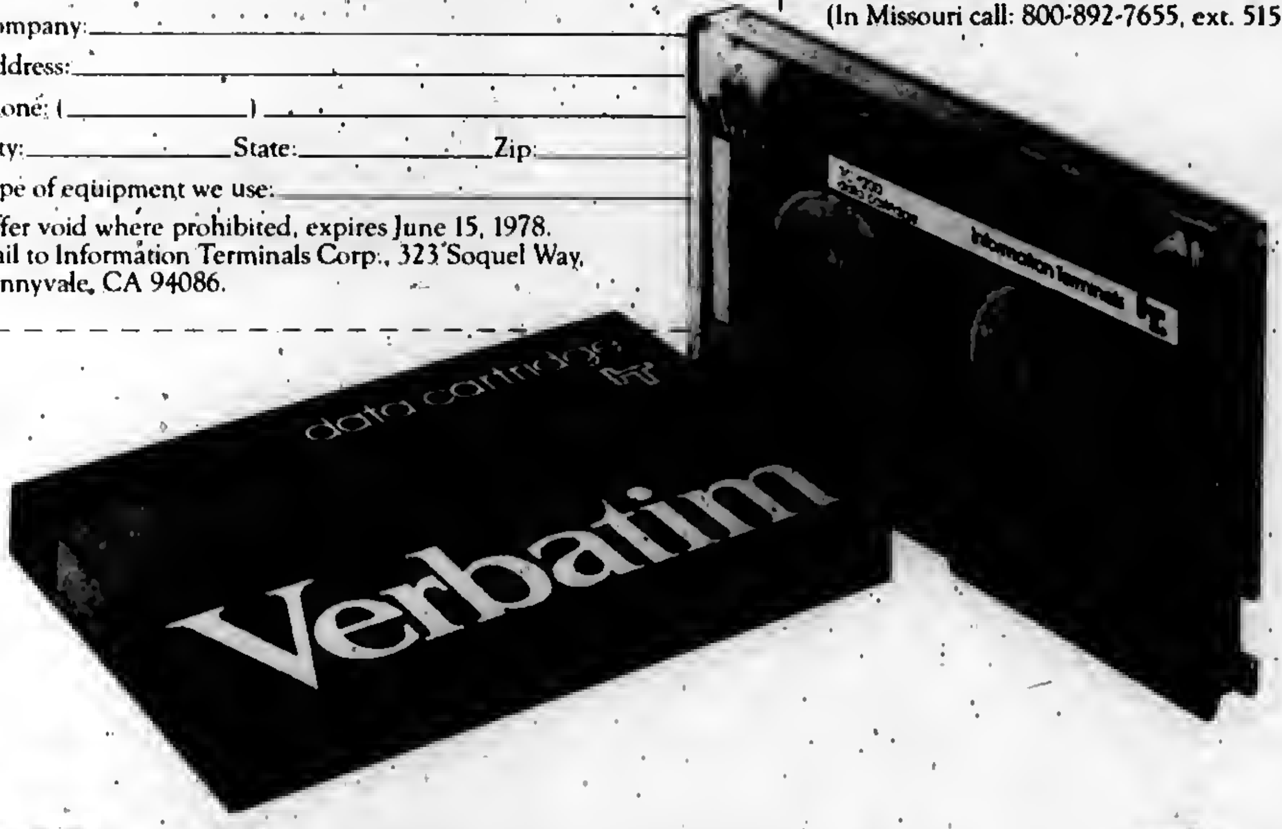

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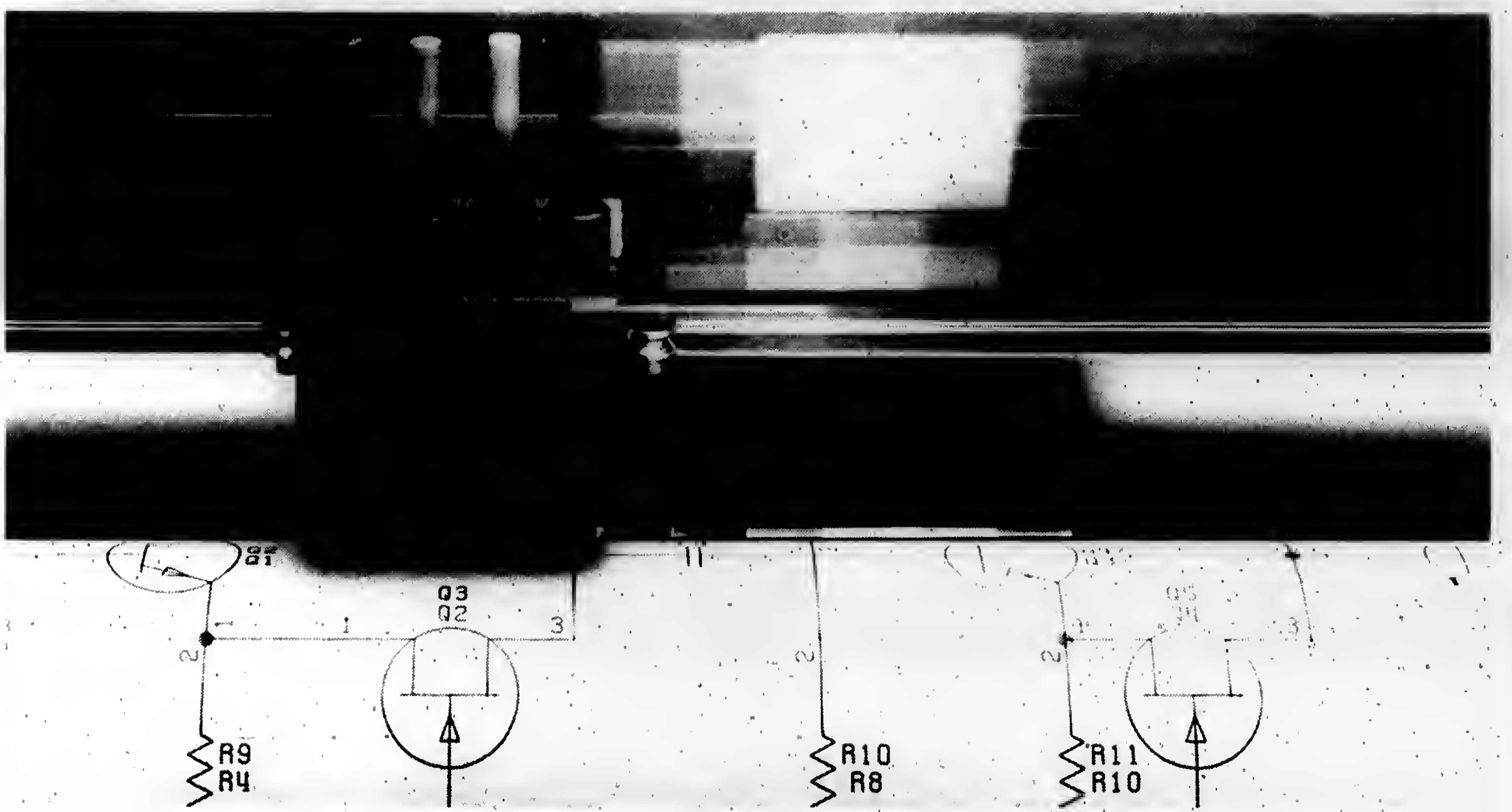

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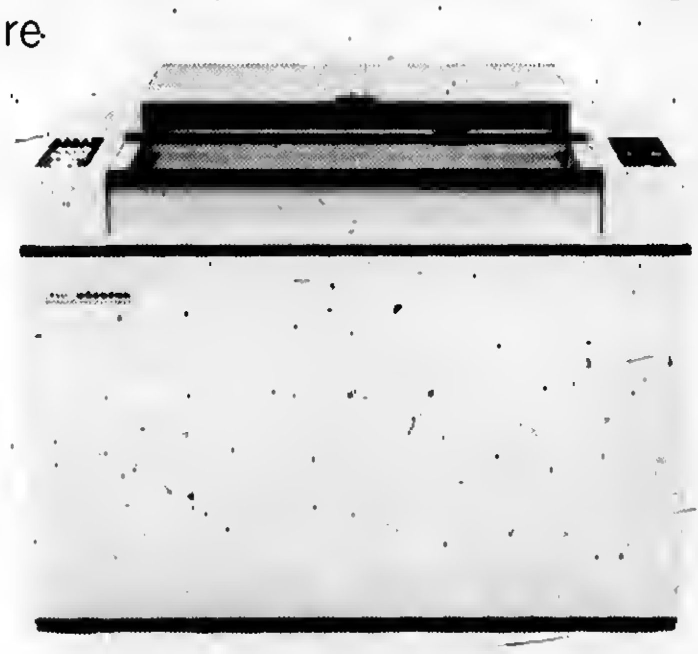

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Processors Drive Down Costs for Auto Club

(Continued from Page 35)

dorsements. But the cast system was a complex, multistep application.

Cash handling required as many as 12 steps, from presorting of mail and batch controls to microfilms and audit trail research. The key was batch control. Checks and premium notices were separated at the start, but had to batch balanced before cash could be deposited.

Differences Hand-Printed

Premium and membership renewal bills or "stubs" were scanned, differences between check and bill amounts then hand-printed for further scanning.

All scanner rejects were reviewed and keypunched for subsequent data entry. Reject rates were 2% or more, high for nearly 20,000 turnaround documents a day.

The process took three to four days and consisted of scanning the first day, review and correction of rejects the second day and a final run plus microfilming the third day. Over 95% of all batches were out-of-balance for one reason or another — usually simple clerical or keying errors or deviations between billed and paid amounts.

"The out-of-balance situations created much of the work. With club memberships, for example, a high percentage of items in a batch might be regular $26 dues payments. Finding one payment out of balance could be horrendous," Whaley said.

A series of moves helped make the process more manageable. Machines were installed to inscribe magnetic ink character recognition (Micr) characters on the face of the check and endorse the back with an audit trail. Special envelope opening equipment was installed in the collection department, bypassing the mailroom operation. The changes were not enough. "In October 1976 we set a goal of same-day banking," Whaley noted.

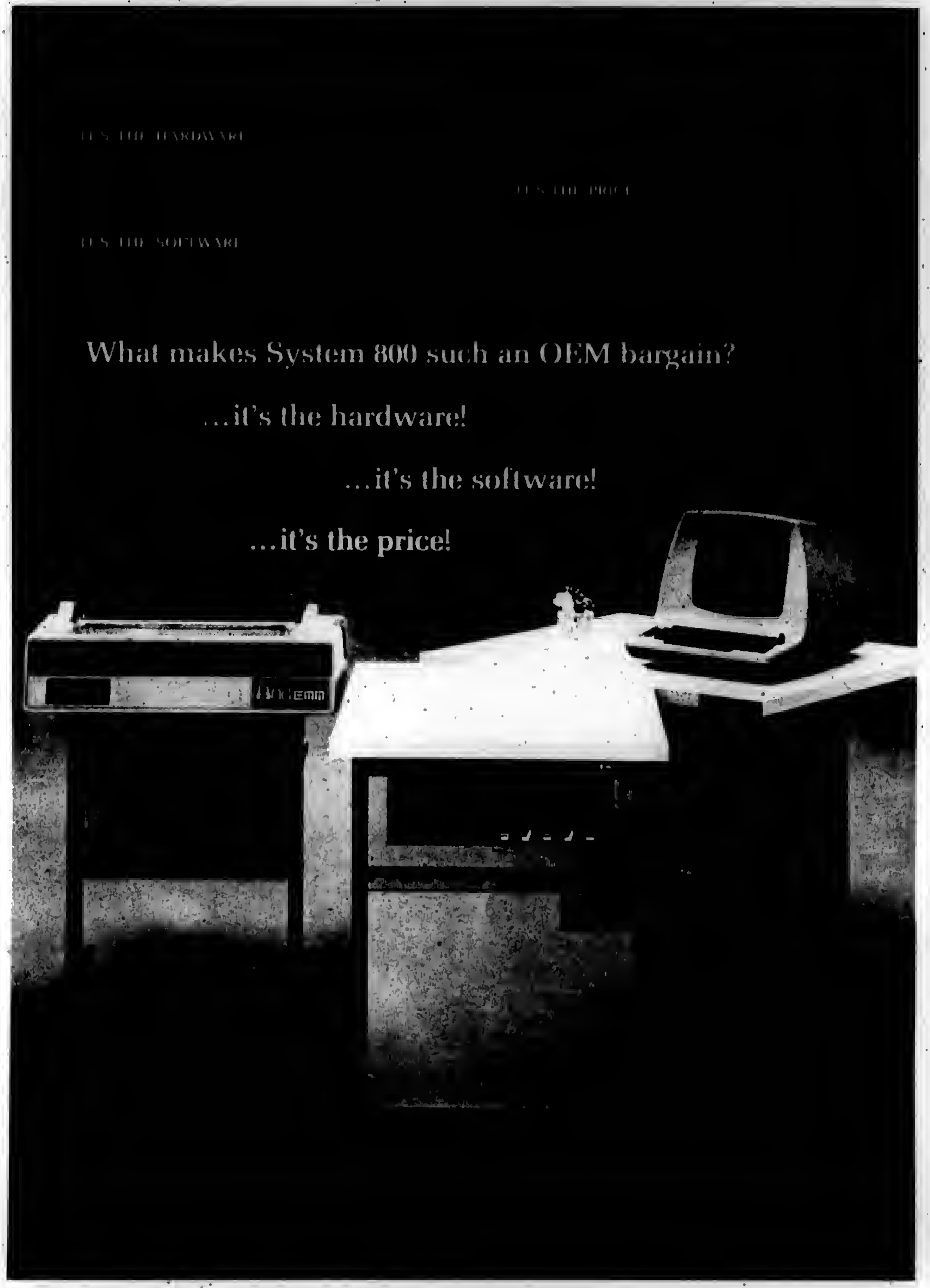
'Near-Impossible' Schedule Met

At about that time, the club learned of one-step processing equipment. An in-house task force under user control set and met a near-impossible installation schedule. Actual "programming" came to roughly 10 man-days, mainly creating an output record compatible with existing host computer operations.

Ten days after its August installation, the 3762 was fully operational. One month later, $1.4 million has been banked through the system in one day. Within three months, 70% to 100% of all cash was deposited the day it was received.

With same-day banking, the tangible value of the 3762 approach totals well over $200,000/year. Except for Mondays, which are usually double normal volume, the club is steadily improving its deposit percentages. Whaley said, "We can get a rough idea of our cash flow for the day at 10:00 a.m. by counting input trays. We never had that kind of control before."

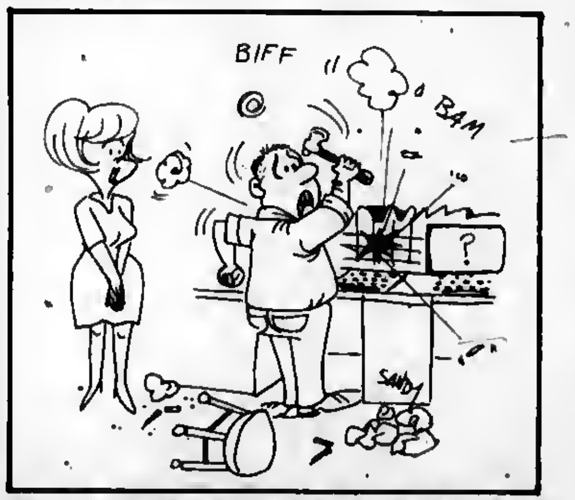
Through a unique cash management approach, the club has also achieved same-day banking for payments made at branch offices, 40% of total volume. All branch-payment checks are deposited in local banks. By 2:00 p.m. each day, all branches key the amount deposited on 3720s. The Dearborn office telecopies this data to the head office of a Detroit bank, receiving immediate credit for cash deposited throughout the state. Payment documents are sent to Dearborn for next-day entry into the computer.



Firms Offer Free Brochures

The following firms are offering free brochures:

- A catalog describing the American Microsystems, Inc. S2000 single-chip microcomputer is available from that firm at 3800 Homestead Road, Santa Clara, Calif. 95051.
- A 12-page illustrated brochure is being offered by Powertec, Inc. on the company's OEM II series of open-frame dc power supplies. Powertec is located at 9168 DeSoto Ave., Chatsworth, Calif. 91311.
- A six-page application brochure detailing the design of a data-acquisition system that can be constructed with four dual-in-line packages is offered by the Micro Networks Corp., 324 Clark St., Worcester, Mass. 01606.
- A six-page brochure describing the features of the Verbatim TC-2000 and the TC-1200 data cartridges is available from the Information Terminals Corp., 323 Soquel Way, Sunnyvale, Calif. 94086.
- A six-page pamphlet describing the characteristics and applications of the Model J16 Digital Photometer/Radiometer can be obtained from Tektronix, Inc., P.O. Box 500, Beaverton, Ore. 97077.



'Did You Remember to Always Type a Space Before the New Opcode?'

On Micro Technology, Uses

Potential First-Time Users Get Briefing

By Ann Dooley
CW Staff

PASADENA, Calif. — Many first-time users don't know what to look for or what they're buying when they decide to purchase a small business system, Bob Harp, technical director for Vector Graphics, Inc., told a Micro-Business '78 audience here last week.

Harp outlined some of the technical advances in microcomputers and some of the components of typical microcomputer systems for his audience so they would have a better understanding before buying a system.

Recent advances have enabled large amounts of data to be put on a single chip, which in turn has created low-cost memory, Harp noted.

The impact of these advances means a greatly decreased cost for the overall system, an increase in reliability, the availability of smart peripherals — or peripherals that used to be primitive but now have a chip built in — and low-cost software, he said.

Software costs will decline with increases in volume, according to Harp.

Typical Applications

A user can expect to use his microcomputer system for several applications such as word processing, inventory control, accounts payable, accounts receivable, general ledger, taxes, real estate investment analysis or projections on cash flow and mailing lists, Harp said.

Harp outlined a typical system for his audience that included a mass storage device, usually a disk that is used for program and data; a micro which includes the mainframe and boards; a data entry terminal, usually video, and a hard-copy or dot-matrix printer.

Disks are preferable because they can be accessed quickly, whereas tape has to be run through before locating the necessary information, Harp noted.

He went on to tell his audience that the components of a micro are a serial and/or parallel I/O device, permanent read-only memory (ROM) programming, a CPU, main memory or random-access memory (RAM) and a disk controller. Optional equipment can include an alphanumeric video display, a tape cassette interface and an analog interface, he added.

For a business application, a user would need more RAM. and a minimum of 8K memory, although a more typical size would be 32K, he said.

Harp recommended the user select a common, time-tested CPU such as the Altair 8080 or the Zilog Z80.

The business user picking a mainframe should select one with at least 15 slots, should find out if disk drives can be built into the mainframe and should avoid front panel switches because they tend to scare a nontechnical user, according to Harp.

CW at Micro-Business

Disk capacity ranges from 45 pages of text/disk to 180 pages or from 1,000 items to 4,000 items of inventory, Harp explained, adding that the price doesn't increase in direct proportion to the added density.

The software should be Basic, which has a half dozen versions, and the user should know enough programming to be able to make modifications, Harp told the audience.

Price for a typical system with a terminal, printer, mainframe, CPU, 32K of memory, a serial I/O and disks would amount to approximately $6,600, Harp estimated.

CW Photo by A. Dooley

Bob Harp

Interdata Packages Minis Into Ready-to-Use Systems

OCEANPORT, N.J. — Interdata has packaged several of its minicomputers into systems that are ready to use, according to the firm.

The Pack 160 and Pack 320 offer users the "essential components for program development work," according to Ron Johnson, systems product line manager for the firm.

But at the same time, he said that both systems are "minimally configured building blocks" that can be expanded by users for particular application needs.

The Pack 160 includes a 16-bit Interdata 8/16E processor with 64K of memory, a 10M-byte disk and a Model 1100 display terminal. For a base price of $26,280, the system includes Extended Fortran IV, an OS/16MT2 operating system, a multimedia diagnostic package, universal clock, powerfail/auto restart, auto-load program and hex display panel, the firm said.

Interdata Pack System

Memory on the unit is expandable to 256K, the company added.

The Pack 320 system includes a 32-bit Interdata 7/32. Configured with 192K of main memory, a 10M-byte disk, a Model 1100 terminal, Dynamic OS/32 MT and Fortran IV software as well as the diagnostics package, universal clock, hex display, powerfail/auto restart and auto-load program, the unit costs $39,300, Interdata said.

Memory can be expanded to 1M byte.

Also available on the Pack 320 at the time of purchase are a communications subsystem and a multiterminal development subsystem. The communications subsystem includes the Interdata Telecommunications Access Method (Itam), high-speed data handling hardware and a Bell 201-type data set adapter. The communications subsystem, priced at $4,600, permits communications with another similarly equipped Pack 320 or host system using bisynch.

The multiterminal development subsystem, with an extra 64K of memory and four additional terminals, allows concurrent online program development, it added.

The subsystem costs $14,000 from the Interdata Division of Perkin-Elmer at 2 Crescent Place, Oceanport, N.J. 07757.

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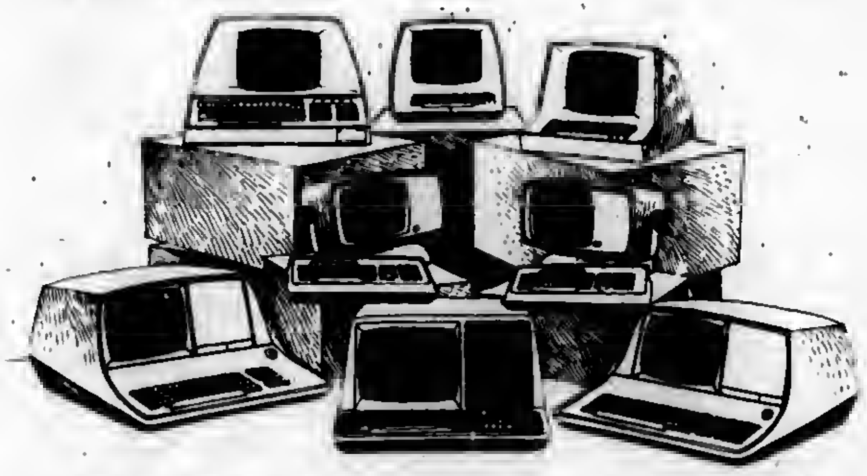

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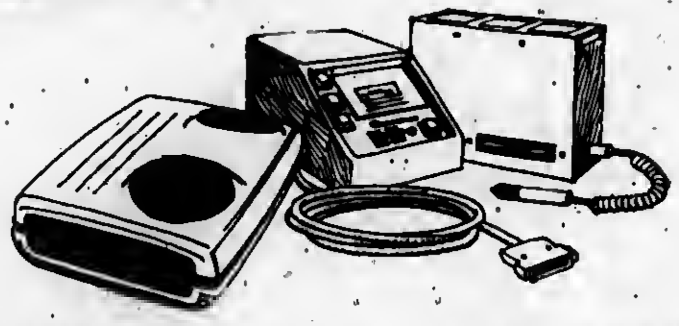

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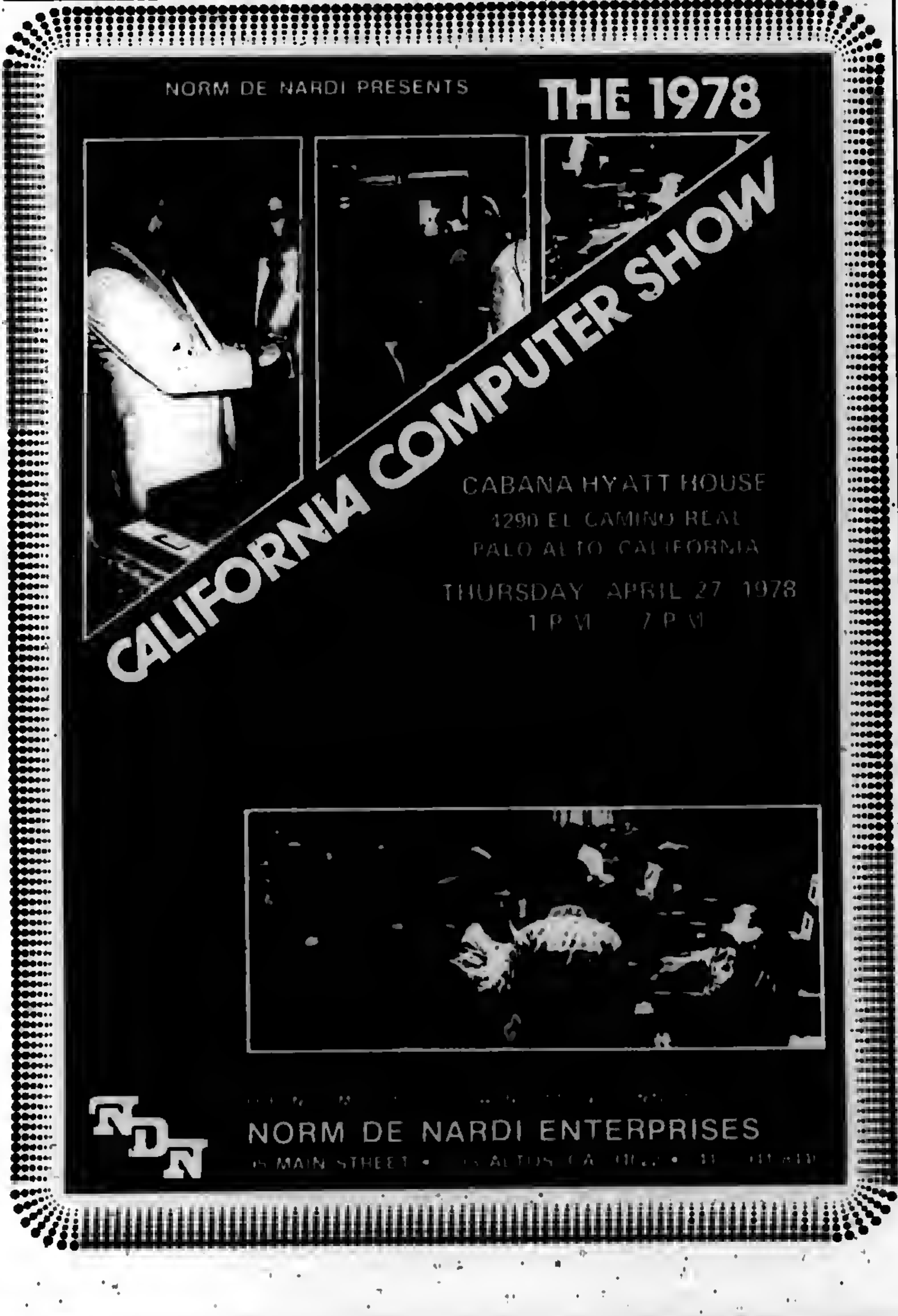

Move to Disk-Based System Proves Boon to Lumber Firm

CLAIRTON, Pa. — The move from a card-oriented system to a disk-based system has provided Busy Beaver Building Centers, Inc. with greater throughput and smoother operations, according to the firm's DP manager.

Busy Beaver operates 27 retail lumber stores that are due to be connected to the firm's headquarters here through point-of-sale (POS) terminals within the next year, Kevin Tag, the firm's DP manager, stated. The stores are located in Pennsylvania, Ohio and New York.

Previously, an IBM 3/10-user, the firm began its experience with DP by putting an accounts payable system on its small IBM system in the spring of 1974. This was followed by a daily cash-auditing system, an accounts receivable system and a point-of-sale system that allowed the firm to gather sales information from its stores and to process sales analysis reports on a weekly and monthly basis.

Now, register tapes are forwarded to the firm's DP center for processing, but eventually Busy Beaver intends to convert to an on-line system, Tag said.

In 1976 the company decided it needed more processing power and began looking for a system that would support its future communications needs, Tag noted. "We wanted the type of capability that would allow us to place CRTs around the office so people could inquire about credit information or inventory status," he noted. "And beyond that, we needed quite a bit more disk storage.

Because an upgrade within the IBM line was probably the most logical step for the firm, it did look at the IBM 3/15 as well as at Univac's 90/30 system. The decision to rent the Univac system was based on a price comparison of the two. "Also, the 90/30 had more computing power,;" Tag added.

Since the installation of the more powerful system, the company has added various capabilities. The system now can transfer inventory between stores and process insurance reconcilations. But Tag acknowledged, "Basically, we've been in a holding pattern since the converison because we are planning on really developing our POS system."

With the updated system, the 90/30 will poll all of the store locations nightly to retrieve inventory and sales information that will be put into the credit and inventory files, he explained. The office users of the systems will have access to up-to-date information for decision-making, he pointed out.

The development work is being handled by the firm's 10-member staff and a consulting group, he noted.

The firm has noted many advantages with its system, especially increased throughput, Tag said. Also, "when we converted to the 90/30 we did away with our card punch. Now the system is totally disk-oriented," he said.

The system is also modular, he added, allowing the company to add core, tape and disk drives at will.

Converting from the IBM 3/10 to the 90/30 was "painless," Tag said, noting that about 98% of his systems are written in RPG-II The RPG langauges used on the IBM and Univac systems are similar, he added.

Stamp Dealer Grows 58% With Small System's Help

CHEYENNE, Wyo. — The use of a small-scale system has enabled a first-day commemorative stamp dealer, after nine years, to manage 31 times the business of its first year, with only six times the workforce.

Under the trade name Fleetwood, Unicover Corp., with a staff of 110 people, designs and markets first-day covers to more than 200,000 stamp collectors.

Headed by Jim Helzer, the mail order business was formed in 1968 and has grown at the compounded rate of 58% a year.

Helzer noted that the central customer information file on an IBM 3/15D has speeded up order processing and updating of the customer list.

Unicover, which generates 10 million to 12 million pieces of mail a year from its new 56,000 sq-ft facility also uses the computer for payroll, accounts receivable and general administrative purposes.

One of the system's most useful applications is helping company officials plan and implement marketing strategies through inventory control and analysis of forthcoming stamp isues, according to Helzer.

"We market all first-day covers offered in the U.S. Canada and the UK and selected issues from 130 other nations," Helzer said. "To assist us in developing marketing programs, we use the computer to maintain our central information file."

For example, the company will take France's first-day cover schedule, translate it and put the information into the System/3, he said.

"The system generates a report by category, month, subject and country," he added. "From that, we can look ahead 12 months to 18 months and pick what we want to market."

"From our friendly neighbor Canada to the People's Republic of China, we're at the forefront of first-day cover developments," Helzer said.

MDB Systems Offers Reader Controller

ORANGE, Calif. — Card reader controllers for several minicomputers are available from MDB Systems, Inc.

The units plug into Digital Equipment Corp.'s PDP-11 and LSI-11 systems, Data General Corp.'s systems and Interdata, Inc.'s minis and provide a parallel interface to most standard punched card readers, the company noted.

Said to be transparent to host diagnostics, drivers and operating systems, each controller is contained on a single circuit board.

The controllers are priced from $650, the firm said from 1995 N. Batavia St., Orange, Calif. 92665.

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Prime computers are also true multi-user systems: one computer can handle up to 64 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time-sharing, and database management. And the PRIMOS Operating System allows any user to use any language at any time.

For the detailed story of how Prime is helping SEI and for more on how we might help you, contact David R. Johnson, Marketing Manager, Prime Computer, 40 Walnut Street, Wellesley Hills, MA 02181.

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Cancer Laboratory's Mini Cuts Paperwork

Special to CW

LANCASTER, Pa. – Cytology Laboratory Ltd., manually processed over 36,000 smears and the associated paperwork last year. Each smear, when received, required a typewritten form, a manual search for a card with the written report, use of a copying machine to combine the report to the patient's doctor with his address, preparation of the patient's bill and address, posting receipts and an extensive filing effort. Follow-up billing had to be done manually.

If the patient's doctor wanted the patient to know examination results, a special search authorizing such disclosure was required.

Today, one clerk handles all these functions on a minicomputer, according to Roland A. Loeb, president of Cytology Laboratory, Ltd.

With software written by Prodata, Inc. of Carlisle, Pa., the system records each smear and stores the essential data as the clerk types it at a CRT station, The entries are checked and can be corrected on the CRT.

After the smear has been examined by a technician, the results are posted by typing a simple code. The mini searches for the doctor's permission to print out negative findings that are added to the patient's bill in layman's language. Results are printed in narrative form for the doctor.

The patient's bill is printed with authorized information and address. Second and third bills are printed if required, while periodic summaries are printed on request.

When a data file is full, the system calculates a statistical report and produces a hard copy of the file and a quality control report. On request, the mini will also print a sorted index.

Clerk's Job Simpler

The entire operation is greatly simplified for the administrative clerk. There is only one machine, no paper until bills and results are printed by the system and all records are filed and accessible, Loeb noted.

There is more data recorded than with the manual system. The laboratory technician is identified for each smear, results from previous smears on a particular patient are available and a permanent audit trail is available from the receipt of a smear to the final bill payment.

The system is based on a Data General Corp. Nova 3/D with a 32K word memory, dual floppy disks, a CRT and a Dasher printer/terminal. The half-bay cabinet, printing terminal and a desk with the CRT on it fit into one corner of the reception room so the clerk can act as a receptionist for incoming patients.

Loeb has identified several areas of savings that will allow the system to pay for itself in less than 3-1/2 years. On each smear there is a savings of 21 cents on paper and labor that totals over $7,560 per year.

The operation also increases the manpower available for other tasks within the laboratory.

Data can be retrieved much more quickly and the documentation of work performed is by itself insurance against malpractice allegations.

The Cytology system in this laboratory is just a start as Loeb visualizes it. The minicomputer has much more capability than is currently being used. The next step will be to add an accounting package to include payroll functions. Also being considered is the development of word prcessing capabilities for the system.

Not Turnkey

The cytology system was not sold to the laboratory as a turnkey operation. Rather, it was developed in the cytologist's office slowly, with extensive testing and continual modification so that it was exactly tailored to requirements. Loeb took a personal interest in the development and operation of the system.

Engineers Plan Forum Series For Mini Users

OAK BROOK, Ill. – The National Engineering Consortium, Inc. (NEC) will be conducting several programs of interest to minicomputer users this spring, a spokesman said.

"Introduction to micro/minicomputers" was designed for people with no previous computer experience and will cover such topics as the basic fundamentals of minicomputers, standards of system comparisons, an overview of software, and micro/minicomputer applications. The session will be held April 30-May 2.

Software Covered

Micro/minicomputer software development will be covered in another session held the same days. This discussion will cover software for on-line applications, communications and business applications; data structures and their usage; and memory management and scheduling, the spokesman said.

For engineers and managers who design products and systems using micros or minicomputers, the organization will present a session called "Successful Project Management of Micro/Minicomputer Systems" May 3-5.

Each session costs $495. Additional information is available from NEC, Oak Brook Executive Plaza No. 2, 1211 W. 22nd St., Oak Brook, Ill. 60521.

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CW at Micro-Business '78

Many Still Reluctant About DP

Small Business User Seen Misunderstood Breed

By Ann Dooley
CW Staff

PASADENA, Calif. — Many people are still uncomfortable with computer technology, and this applies to the small businessman who is thinking of getting a computer system but is unsure of what it will mean to him, according to Michael Levy, senior systems analyst and partner of Jethro, a consulting firm.

Speaking on a panel at Micro-Business '78 here, Levy told his audience that the small business user and his market are misunderstood. Statistics show there are 13 million small businesses in this country, but that figure is inflated. The Market is actually much smaller than many realize, he said.

In addition, it is not as easy for the small user to afford programmers and equipment as many people think, Levy claimed.

The reason the small businessman wants a micro system is to produce information used in the business on a timely basis and at a profit, he said. He wants the computer to save labor and increase productivity, Levy added.

Two types of systems are available; one is analytical and used in simulation, forecasting and cash flow, and the other is used for transaction and data manipulations such as payroll and order entry, he explained.

The micro people are trying to do what the mini makers and mainframers did — have the computer do the work of 15 people, Levy stated.

But, he added, a better application for the micro would be in busines analysis, providing information for better decision-making.

Slow Converion Advised

The small businessman should go into automating his business slowly, Levy said. He should see if he likes dealing with the system by dedicating it to one overriding job and adding other applications later. "It's important to do one thing well first," he advised.

Before deciding to computerize, a businessman should look at his company's size, revenue and number of transactions, according to Levy. Most micro users should be around the $1 million level in business volume and should be transacting 100 orders a day or 12 typed orders hourly, he said.

A micro system costs about the same as the salary of one clerical worker, and software usually costs more than the hardware, Levy noted. The costs can be justified if a business is well run and profitable.

A problem that frequently arises is the philosophical conflict between businessman and programmer. The small businessman often works intuitively and can't define his procedures in computer language, according to Levy.

The programmer, on the other hand, can often be compulsive about the system and operate the machine for his own purposes and not anyone else's, he said.

Another problem in automating a small business is that there are often no standard procedures; one person knows how to do the job his own way and resists changing, Levy noted.

It is essential to make the computer conform to procedures, not the other way around, he said.

Hal Whitestone, a management consultant for Arnold S. Daniels Associates, told the audience that since people are a vast source of untapped energy and a large part of the budget, it is important to use their energy efficiently.

Whitestone described the typical entrepreneur as a creative, confident, competitive, risk-taking, hard-working individual who expects others to do the same.

Most programmers, he said, are knowledgeable specialists with high standards who are more factually than people oriented, efficient and need direction. Employers often don't provide that direction, Whitestone claimed.

The consultant said he uses a "predictive index" to determine how easily the other person communicates and how changeable his behavior is.

A common problem occurs when programmers decide to become self-employed businessman and deplete their energy trying to cope with the changes. For best production, it is important to realize where people are most effective and encourage them to stay there, he added.

Hardware Problems

Michael Busch, vice-president of Info 2000 Corp. and the third panel member, spoke about hardware and hardware problems in the microcomputing industry.

A large problem is the rate of change. The industry is going through future shock and the rate of change is increasing drastically, he said.

Micro hardware is really no different from any other type; it's just smaller, cheaper and changing faster, Busch noted.

This trend often has a paralyzing effect on users, who think they should wait for three months and something better will come along. Unfortunately, they could wait forever, he added.

Users are afraid of becoming dead-ended or fearful they will have to keep buying each new product as it comes along, he said.

The solution to the problem is to get a piece of hardware that can incorporate new technology so it will give the user a growth path, according to Busch. He recommended the Altair 8080 family tree since it is fairly stable and its software has a longer life.

If not the 8080s, search out some equipment that seems stable and incorporate those into the specifications, Busch told the audience.

An additional hardware problem is maintenance, since manufacturers are not equipped to provide support for a system worth under $10,000, he noted. However, the equipment is usually reliable so the problem is not as severe as it could be, he added.

Another factor to consider is hardware vs. software economics, he said. Software has become much more expensive for the user than hardware and the budget must allow for this, Busch advised.

Levy ~~closed~~ the session by advising analyst consultants to clarify what the businessman wants from his system and to perform a study outlining those needs. The study should explain the purpose of the system so that both the analyst and businessman are satisfied the system will perform the tasks it was supposed to accomplish.

In addition, the study should include simple flowcharts to show component relationships, input specifications, file descriptions to delineate what will be stored and output report specifications, Levy stated.

Randal Upgrades Link-100 With Two-Sided Floppies

TORRANCE, Calif. — The Link-140 from Randal Data Systems, Inc. is a version of the firm's Link-100 system upgraded with double-sided floppy disk drives that reportedly increase the system's throughput by 50%.

Using Shugart double-sided floppy disks, the system can accommodate up to 4.8M bytes of auxiliary storage, with each drive handling 1.2M bytes. The system is both hardware- and software-compatible with other members of the Randal line, the firm said.

Two 132-column printers are available for the system, with speeds of 30- and 70 char./sec. Operating under the RTOS 1 time-sharing operating system, the unit can support two users operating concurrently performing business applications.

A basic system with 32K bytes of memory, keyboard/printer and one drive costs $13,350 from 365 Maple St., Torrance, Calif. 90503.

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Real-Time System Keeps Atlanta Maps Current

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ATLANTA — What first started out as a program to provide the police department here with up-to-date maps showing criminal activity has since turned into a real-time interactive graphics program that allows any computerized file in the city to be referenced to any specific address, by geographic coordinate, according to officials.

Called the Georgia Coordinate Mapping Project (GCMP), the mini-based system creates address and intersection coordinates, or centroids, for any legal address in the city, providing a tool to link the data bases maintained by various city agencies to common reference points.

A total of 813 different 20-in. by 30-in. planimetric maps covering the 175-square mile Atlanta metropolitan area have evolved as a result of this program.

"In the past, different city agencies were using different reference points and scales to map their activities," according to Vic Davis, graphic group leader at the Systems and Programming Division of the city's Bureau of Management Systems. "As a result, information could not be transferred easily from one map to another."

Davis noted that maps in the city were based on a variety of standards — some on federal topographic surveys, some census tracts and others on coordinates established by the locations of pumping stations, to name a few. "Thus, if an administrative change were made in one department — changing the boundaries of police beats, let's say — fire department maps might not be easily upgraded to reflect this."

Brought Commonality

Use of coordinates has gone a long way toward bringing commonality to city maps, while at the same time providing the municipal government with an effective means of alerting all departments to any administrative changes, Davis noted.

"For example," he explained, "whenever street names are changed, or if streets are widened or even eliminated, that information goes into the GCMP data bank and is reflected on all subsequent maps of the area." In cases where, for example, streets have been eliminated entirely — and hence the addresses that would serve as coordinates — cross-reference data is supplied explaining where the addresses were, he pointed out.

Maps generated from this data base are plotted, according to Davis, using a California Computer Products, Inc. Model 7000 drafting system. The system, which features a Model 748 flatbed plotter that operates at speeds up to 42 in./sec, is in turn interfaced to a Univac V-74 minicomputer dedicated to this application.

"We started the program using the city's IBM 370, and some of our programs have yet to be converted to run on the V-74," Davis said. "However, we anticipate that all GCMP programs will be running on the dedicated system in the near future."

Of even greater significance, Davis said, is the use of GCMP programs and the maps generated from the Calcomp plotter as tools for city planning. "People here are just beginning to see the significance of this program," he noted.

"With the high-speed plotter, we can show the incidence of fires, crimes or whatever, for a variety of time frames using one of many scales. All the information needed to locate new police stations, or other facilities, is right there. We will even be able to tell the public library system how many people in what area checked out books from which branches."

In addition to agencies of city government, the utility company supplying gas to the Atlanta area also participates in the GCMP program. Instead of data on library books or police beats, however, the utility provides the locations of its gas mains. This, too is referenced to the address and intersection centroids that form the basis of all maps printed by Davis' group.

"Dig-ins are always a problem," he said, explaining the participation of the utility. "One city agency or a utility digging up the streets might not know where pipes or mains were, since there were no common reference points.

"Several years ago we had a number of gas explosions resulting from improper dig-in," Davis said. "In one case we lost some houses; in another, a church."

Updates relating to the locations of these gas mains — or for that matter to any feature to be mapped — are incorporated into the GCMP data base using a Sanders Associates, Inc. graphics terminal. The V-74 then updates the data base, which is then transferred to the Calcomp plotter, and a map is run off for approval. Once approval has been granted, the master file residing on disk is updated, with all subsequent maps reflecting the change.

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As Component Prices Drop

Micros Taking Over Auto Functions

By Tim Scannell
CW Staff

DETROIT — Microelectronics will account for 10% of the total cost of an automobile by the year 1990, according to a Ford Motor Co. spokesman. In fact, in 10 or 15 years, most functions of the automobile will be in some way controlled by a microprocessor.

"This is going to be a whole lot bigger than the automatic transmission," E.R, Karrer, Ford's vice-president of engineering, said. "If you did it today, it would probably be very expensive. However, all you have to do is look at calculators, digital watches and things like that to realize once you get into mass production, the cost just has to go down," he said.

Automobile manufacturers anticipate the industry will rely heavily on the use of computers and microprocessor chips in order to comply with increased government regulations on fuel economy and emission standards. "The fact is, in recent years the automobile has become subjected to restrictions and standards the industry never dreamed could come about," C.W. Snider, a group executive with the Chrysler Corp., noted.

Meet Every Requirement

"With design factors for fuel economy, safety, emissions and service written into law, we have lost all control over engineering tradeoffs" and as a result, "we have to meet every requirement," Snider remarked.

A microprocessor will virtually enable a car to monitor itself, Snider pointed out. "Signals sent to the instrument panel will alert the driver to any trouble — from an overheating engine, to running low on oil, to low tire pressure, dangerous brake line wear, and so on," he predicted.

Although critics say that automakers were hesitant to accept electronics, those involved with the industry claim this is an unfair indictment. "We think that microelectronics are actually more reliable and durable than some of the things in a car today simply because we can protect a chip against the elements by encapsulation or sealing it in epoxy," Karrer noted. "It has no moving parts, which makes it inherently more reliable than a device that does . . . such as a voltage regulator or solid-state ignition."

'This is going to be a whole lot bigger than the automatic transmission.'

If anything, the electronics industry had to struggle to adapt to the standards of the automobile, according to John T. Auman, a senior engineer at the General Motors Corp. Microcomputers within an automobile must be able to function at below-zero temperatures and survive the stresses encountered on bumpy roads, Auman said.

Most car manufacturers purchase chips from "the big houses in the country such as Intel Corp., Texas Instruments, Inc., Motorola Semiconductor Products, Inc. and National Semiconductor Corp.," Karrer explained. "However, we do make the module that contains the chip."

Microprocessors are used to a great extent today in diagnostic analyzers and troubleshooting equipment. An Electronic Engine Performance Analyzer developed by Chrysler can check 60 different engine functions in less than four minutes and supply a printout of instructions telling the mechanic what unit or module to replace in the automobile, Snider said.

An alphanumeric display on the console of the analyzer guides the service technician step-by-step through each automotive test, so little training is required in the computer's use. The console displays the test results and identifies any component not meeting specifications, Snider explained.

Already in Use

The use of computers, in general, is not entirely new to the automotive industry, a spokesman said. Analog processors have been installed in Chrysler, General Motors and Ford cars since 1977 and are used to regulate the firing of spark plugs, adjust spark timing according to engine temperature and altitude and monitor the rate at which exhaust gases are recirculated to cut down on the amount of nitrogen oxide emissions.

Some manufacturers use microprocessors to control the motion of windshield wipers, pausing them every so often for those bothered by squeaky blades, the spokesman added.

Industry analysts doubt, however, that people will ever see the day when an automobile is totally controlled by a computer to the point of eliminating the need for driver intervention. "This type of operation would take you almost into the problems (you might face) in total mass transit," Karrer observed. "You can't do it alone because it must be done with special roads and that sort of thing."

Heath Answers User Questions on Its H8

By Frank Vaughan
CW Staff

BENTON HARBOR, Mich. — In its maiden issue, *REMark*, the official magazine for users of Heath Co. computer equipment, provided a forum for that firm to answer several popular questions concerning the H8 microcomputer.

Many hobbyists have challenged Heath's use of the 8080 microprocessor in its H8, feeling that the faster Z80 would have been a better choice. In responding to that question, a Heath spokesman noted that "in early 1975 when the development of the H8 started, the two primary 8-bit microprocessors that were available were the 8080 and the 6800.

"We chose the 8080 over the 6800 because it was lower in cost, had more second sources and was far better documented. In addition, there was far more software available for the 8080 than the 6800. Since software is the key to getting practical value from a digital computer, the software issue was probably the most important. The 8080 won," he explained.

In addressing the Z80 question, the spokesman noted, "When H8 development was starting, the Z80 had not been announced and was not available. In fact, it was totally unknown and, as a result, was not among our available choices. When the Z80 appeared on the scene, there had been far too much time and money invested in both hardware and software development to abandon the 8080."

Another area of interest to hobbyists has been Heath's bus structure. Heath has adopted a 50-line bus, in contrast to the popular S100 bus. When the H8's development began, the Mits Co. Altair computer had just been announced. This computer uses a 100-line bus design that has since become a de facto standard in hobby and personal computing. At that time, no other competition was around, the spokesman explained, and the 100-line bus design was not as well-known as it is today.

Heath engineers evaluated the S100 bus design and determined that it was not suitable for Heath's use because it was obsolete, expensive and far larger than required. Heath feels its 50-line bus is lower in cost, cleaner electrically and easier to interface. The bus has been placed on the side to take advantage of convection cooling.

In explaining why octal notation is used instead of hexadecimal, the spokesman said that for one thing, the 8080 machine language instructions are formatted in octal notation. Another reason for using octal is that most people feel it is easier to understand than hexadecimal. In addition, Digital Equipment Corp. used octal notation with the LSI-11 microcomputer and "we felt that it was desirable to use the same notation on both the H8 and H11 computers."

The octal vs. hexadecimal discussion will never be fully resolved, he said, noting that many individuals simply favor one system over another because they are used to it.

"Our position here at Heath is that an individual professionally or avocationally involved with computers would be able to use octal or hexadecimal notation equally as well. There is no particular handicap or benefit to either system," he suggested.

REMark is available through the Heath User's Group located on Hilton Road, St. Joseph, Mich. 49085.

Board Emulates Any Mini, Micro

VAN NUYS, Calif. — Dynamic Sciences, Inc.'s T-1000 is a single-board computer that can be microprogrammed to run the instruction set of any minicomputer or microcomputer, according to the firm.

The board's bipolar construction and byte slice architecture permit speeds in the 300,000 operation/sec range, while allowing the board to emulate computers with 8-, 12-, 16- or 32-bit word lengths, a spokesman claimed.

The board's processor contains 16 full word (16-bit) hardware registers, and up to 64K words of memory can be directly addressed with 256K words of extended addressing available. The board operates on a single +5V power supply.

The board derives its emulation control from a 1K by 32-bit microprogrammable memory, the spokesman explained.

Additional memory, programmed I/O, interface and data option modules are available on additional boards.

Prices for single quantities start at $2,500, depending upon the computer that is being emulated, while prices of quantities of 100 or more begin at $1,000 from the firm at 7660 Gloria Ave., Van Nuys, Calif. 91406.

PARITY BIT — 1. The parity bit is used to check that data has been transmitted accurately; a receiving device counts the "on" bits of every arriving byte. If odd parity is specified, an error condition will be flagged any time an even number of "on" bits are detected, since at least one bit must have been lost or gained in transmission for an even number of "on" bits to remain. 2. A binary digit appended to an array of bits to make the sum of all the bits always odd or always even.

PEN LIGHT — A pen-like device with a light on the tip used with a CRT.

PERIPHERAL EQUIPMENT — 1. Units which work in conjunction with a computer but are not a part of it (e.g., tape reader, analog-to-digital converter, typewriter, etc.). 2. In a data processing system, any equipment, distinct from the central processing unit, that may provide the system with outside communication or additional facilities. 3. The auxiliary machines which may be placed under the control of the central computer. Examples are card readers, card punches, magnetic tape units and high-speed printers. Peripheral equipment may be used on-line or off-line depending upon computer design, job, requirements and economics.

PERIPHERAL INTERFACE ADAPTER (PIA) — Some microprocessors have incorporated LSI devices exclusively dedicated to enhance their I/O capabilities and thus simplify the interfacing task of the design engineer. For example, several firms provided microprocessors with special peripheral interface adapters that act like a universal I/O interface. The typical PIA offers two eight-bit, three-state buses to interface with peripherals, along with the ability to service four independent interrupt lines. The unit also provides handshake control logic signals for synchronizing I/O devices to the microprocessor.

PLA (PROGRAMMED LOGIC ARRAYS) — 1. A PLA is an orderly arrangement of logical AND and logical OR functions. In application they behave very much like a glorified read-only memory (ROM), but PLA is devoted primarily with a combination logic device. 2. A PLA is an alternative to ROM which uses a standard logic network programmed to perform a specific function. PLAs are implemented in either MOS or bipolar circuits.

POINTER — 1. A word giving the address of another main memory storage location. 2. Pointers automatically step through memory locations. Automatically stepping forward through consecutive locations is known as autoincrement addressing; automatically stepping backward is known as autodecrement addressing. These modes are particularly useful for processing tabular or array data.

LEARNER'S LEX

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The Conference. Computer Expo's Conference takes place from 9 AM to 1 PM, leaving your afternoons free for the Exposition. The Conference includes keynote speeches, case studies, presentations, panel discussions and workshops. Well-known authorities – consultants and users – will share experiences, ideas, insights and foresights with you.

Here's what the Conference includes:

Tuesday

The Executive Briefing.
A keynote speech, "Strategic Systems Planning: a View from the Top." Case Studies on Data Base and the Executive; Potentials of Distributed Data Processing. Presentations on Trends and Opportunities in System Financing; The Computer Resource of the Future.

Wednesday (Two simultaneous conferences)

Managing People Problems.
A keynote speech by an expert in managing data processing personnel. Case Studies on Career Pathing for Operators and Programmers; Improving the User/DP Relationship. Presentations on Testing for DP Competence; Coping with Security/Privacy Regulations.

Small Business Systems.
A keynote speech, "Data Processing in Small Business Today." Case studies on Computer Uses in Financial Reports; Computer Uses in Operations Planning and Reporting. Presentation on How to Negotiate with Vendors. Day-end panel that includes you, your questions, views and comments.

Thursday

Distributed Data Processing.
A keynote speech, "Critical Issues in DDP." Case Studies on Applications for DDP; Equipment Selection. Presentations on Networking Aspects of DDP; The Data Base Question.

Here's the Computer Expo 78 Schedule:

HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

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Datacube Adds Video Board

READING, Mass. — Datacube/SMK-I has introduced a video terminal board that interfaces directly to Intel Corp. SBC-80 and National Semiconductor Corp. BLC-80 series microcomputers.

The Datacube VT-103 is bus-compatible with both microcomputers and provides a 96-character Ascii subset in 7 by 9 font on a 64-character, 16-line external monitor, a spokesman said. The board is addressed as an I/O device and programming is switch-selectable. The board features direct cursor addressing and 11 other cursor control functions. Composite and direct drive video outputs are also available, the spokesman said.

The VT-103 has an input port for an optional external keyboard. Use of the keyboard can replace teletypewriters or other terminals in many applications, the spokesman claimed.

Inputs for a strobe and seven data lines are provided at a 26-pin printer circuit edge connector.

The terminal board costs $450, $275 in quantities over 100. Other quantity discounts are available from the firm at 670 Main St. Reading, Mass. 01867.

Shows Scheduled From Coast to Coast

Following is a listing of all the significnat microcomputer shows whose managment has notified *Computerworld* of the dates. The microcomputer show business is highly volatile, and hobbyists should contact show managers before making firm plans to attend:

April 22-23, Trenton, N.J. — **Third Trenton Computer Festival.** Contact: Amateur Computer Group of New Jersey, UCTI, 1776 Raritan Road, Scotch Plains, N.J. 07076.

April 28-30, Long Beach, Calif. — **Percomp '78.** Contact: James H. Lindwedel, Royal Exposition Management, No. 108, 1833 E. 17th, Santa Ana, Calif. 92701.

June 5-8, Anaheim, Calif. — **National Computer Conference & Computer Festival.** Contact: Steve Miller, SRI International, 333 Ravenswood, Menlo Park, Calif. 94025.

June 23-25, Detroit — **Macc Computerfest '78.** Contact Jim Rarus, Semco, Box 9578, North End Station, Detroit, Mich. 48201.

Aug. 25-27, Philadelphia — **Personal Computing '78.** Contact John Dilks, Rt. 1, Box 242, Mays Landing, N.J. 08330.

Sept. 15-17, New York — **Second National Microcomputing Exposition and Conference.** Contact: H.A. Bruno & Associates, Inc., 78 E. 56th St., New York, N.Y. 10022.

Oct. 5-8, Chicago — **Second Midwest Personal Computing Exposition.** Contact: Louise Garcia, 1435 Rio Rancho Drive, S.E., Rio Rancho, N.M. 87124.

Oct. 12-15, Chicago — **1978 Mid-America Personal Computer Show.** Contact: International Personal Computer Shows, Inc., P.O. Box 844, Greenwich, Conn. 06830.

Nov. 3-5, Los Angeles — **Third West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302.

Hobby clubs or schools planning smaller, regional microcomputer shows may contact *Computerworld* at 797 Washington St., Newton, Mass. 02160, to have their shows listed in a regional listing.

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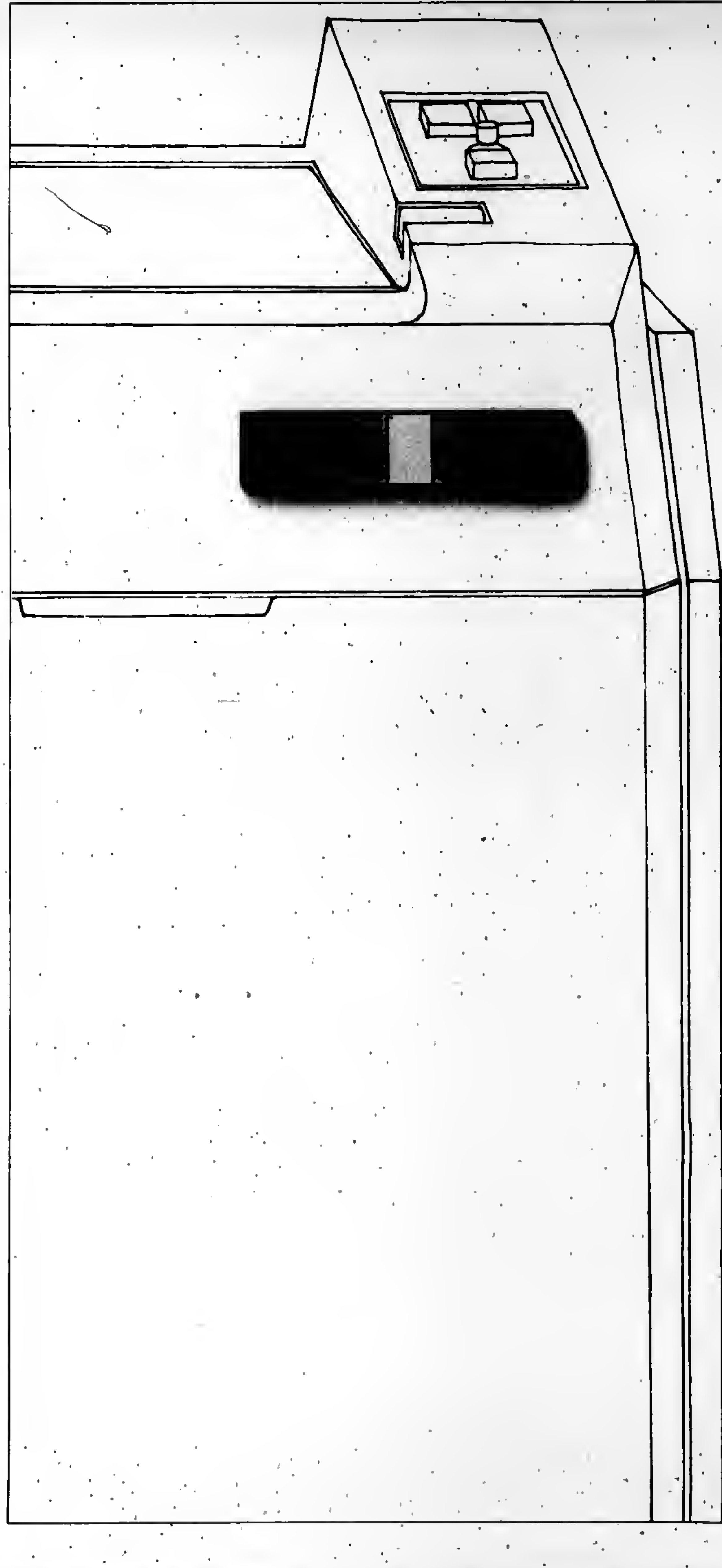

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☐ Please have a sales engineer call to arrange for an appointment.

☐ Please keep me on your list for future updates and mailings.

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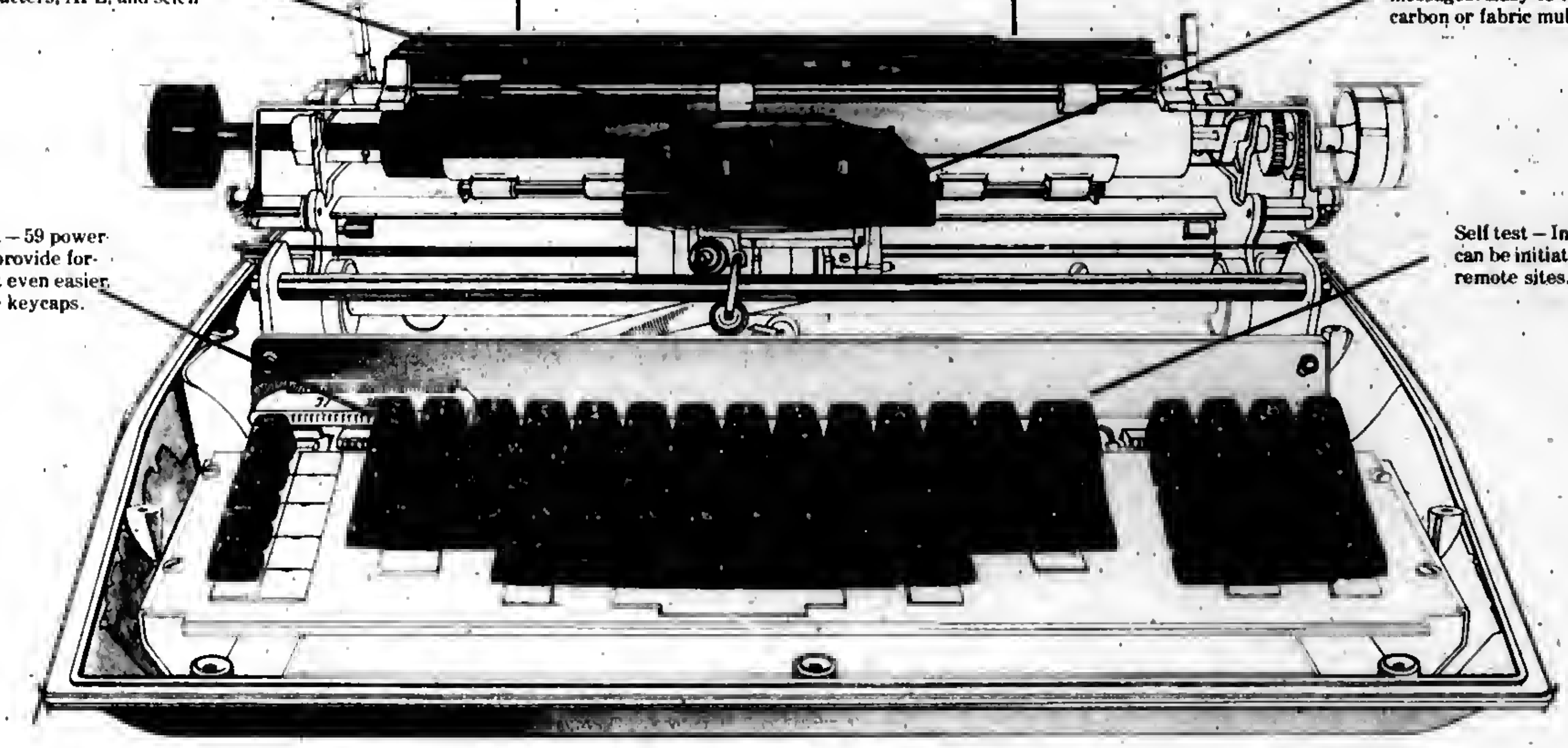

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CI Notes

DP Credited With Aiding Favorable Trade Balance

WASHINGTON, D.C. — The favorable balance of trade for office, computing and accounting machines (including copiers) in 1977 marked a 27.1% increase over 1976, according to statistics recently released by the Computer and Business Equipment Manufacturers Association (Cbema).

The Cbema statistics, compiled from U.S. Department of Commerce data, indicated a $2,349,840,118 favorable balance of trade for the industry, which is an increase of about $500 million over the 1976 year-end figures.

Total exports were up from $3.2 billion to $3.9 billion and imports rose from about $1.35 billion to more than $1.6 billion in 1977 over 1976. About 21% of the increase in exports was attributed to an increase in sales of DP equipment.

In addition, the ratio of exports to imports for 1977 was 2.46.

Cary Gains Chairmanship Of The Conference Board

NEW YORK — Frank T. Cary, chairman of the board of IBM, has been elected chairman of The Conference Board, a nonprofit business and economic research organization. Cary will serve until the next regular election of Conference Board officers at the annual meeting in September.

Cary succeeded G. William Miller, who resigned as Conference Board chairman upon appointment as chairman of the Federal Reserve Board. Cary has served as a trustee of The Conference Board since 1974 and last September was elected co-chairman of the organization.

Supershorts

The Western Electronics Manufacturing Association (Wema), largest electronics trade association in the U.S., changed its name to American Electronics Association effective March 1. The group has a membership of more than 900 firms in the electronics industries nationwide. E.E. Ferrey, president, forecast that membership will exceed 1,000 companies by the end of 1978.

Time Ripe for IBM Move Toward Breakup: Analyst

By Don Leavitt
CW Staff

CHICAGO — For a variety of reasons, IBM has been evolving into a corporate structure quite different from that of the late 1960s. This may mean the environment is right for IBM to approach the Department of Justice with an antitrust settlement plan, according to the vice-president for institutional research at E.F. Hutton & Co., Inc.

Speaking here recently, Thomas J. Crotty said the month-long break expected after the government completes its case in the U.S. vs. IBM trial would be a natural time for such an approach "if it hasn't taken place already."

At that time, if the government doesn't gain a directed verdict against the company, Justice attorneys will be in a "no-win" situation, only able to defend the current trial record without adding any new evidence, he said.

In effect, the government then will only be able to run "guerilla actions against IBM" and they would be of nuisance value only, he told software industry executives gathered in conjunction with the International Computer Programs, Inc. "Million Dollar Awards" ceremonies.

The IBM overtures, which will probably lead to a settlement even if nothing is announced in the near-term future, will outline a "breakup" plan similar to several suggested by various observers before the case went to trial, Crotty said.

But, he added, the logic behind the proposal now is as much to help the company maintain its own growth as it is to resolve the antitrust situation. In effect, IBM may well tell Justice: "Here's our plan; we're going to follow it even if you can't accept it and insist on continuing the trial," according to Crotty.

Like GM Structure

The company's evolution has been toward a "General Motors type of organization" with competing divisions, and essentially IBM will offer to carry that one step further, setting up a holding company and five subsidiaries, all wholly owned but all operating

(Continued on Page 60)

Users See Series/1 as Bridge To IBM 380, Survey Reveals

SAN JOSE, Calif. — Users apparently view the Series/1 from IBM as much as a bridge to the next generation of IBM equipment as a stand-alone minicomputer, according to a report from SBS Publishing here.

The report, based on user surveys, revealed that IBM 370 users approaching their capacity limitations are viewing the Series/1 as the logical intermediate step before moving to the IBM 380.

The Series/1 is viewed as both a means to improve the performance of a network centered on a 370 and a versatile tool in its own right, the report said. This tool allows users to optimize the performance of their DP function on a company wide level.

The IBM investment in the Series/1 was minimal at its introduction, but has since multiplied to the point where industry observers feel the system is one of the best to be offered by IBM, SBS said.

This versatility shows itself in many ways, not the least of which is the wide range of applications and the diversity of configurations in which the Series/1 is used, the firm added.

Originally Tools-Only

Originally introduced as a tools-only product, the Series/1 has been reinforced by IBM in a number of areas, including the introduction of three major operating systems in a 14-month period. The system software is, of course, the key to successful integration with other computer systems.

In terms of the displacement of other equipment by the Series/1, the report stated that while a significant segment of replaced equipment was IBM gear, an equal percentage of displaced equipment belongs to competitors such as Digital Equipment Corp., Computer Automation, Inc., Sanders Associates, Inc., Singer and NCR Corp.

The report is available for $175 from SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

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Korea Struggling: 'Make or Buy or Assemble?'

By Bill Orr
Special to CW

The South Korean economy has been booming and the country's leaders increasingly realize rapid modernization also means rapid computerization at all levels of economic life.

The government has projected a robust 20% annual growth rate in computers over the next eight years. By 1986, South Korea expects to have 6,300 computers installed at a total value of some $340 million.

A still-open question is: Will South Korea follow the Japanese example and develop its own computer industry?

This is the first of two articles looking at the present state of computing in South Korea. This week Orr covers government activities; next week's article will focus on some large users.

The alternatives being actively debated are whether to continue reliance on foreign suppliers (mostly U.S. and Japan) or to function as a "systems house" — buying components from OEMs and doing the hardware integration and system software.

Government researchers looked closely at the costs of acquiring computer systems under these alternatives. They considered not only the visible costs, but also "hidden" costs such as government subsidies. The conclusion was that a $330,000 purchased system could be made in South Korea for $40,000 or assembled from components for $80,000. A larger $550,000 system could be made for $70,000 or assembled for $180,000.

This analysis indicated South Korea can manufacture a computer system for about one-eighth the cost of purchasing it outright, or it can assemble the system from OEM components for one-fourth to one-third the purchase price.

For some, this analysis clearly favors a "made in Korea" policy. Others would prefer not to divert scarce technical talent and manufacturing resources from highly successful export industries and more pressing domestic needs.

In exports, which have grown at a 40% annual rate over the past 15 years, the momentum is strongly in the direction of heavy machinery — steel and cement plants, oil refineries and supertankers. By 1981, about half of South Korea's exports will be in-heavy machinery.

"Why change a winning combination?" runs a convincing argument of those who oppose a national plunge into the expensive uncertainties of the world computer market.

Obviously, the outcome of these ongoing policy debates will have a sharp impact on the local computer marketplace.

No one expects South Korea to venture into manufacturing large computers. But a proposal to produce minicomputers has been on the drawing boards for more than a year. If this becomes policy, the long-run prospects for foreign mini suppliers will drop overnight from extremely good to extemely poor.

The Koreans aren't opting out of the world computer market altogether. A technical consensus is forming around the policy of developing software as an export product. South Korea needs a strong software capability for its internal development anyway, so it's not such a big step to add complete software systems to the process plants it exports.

Trend to Minis

Computerization in South Korea is a recent development. The country's first computer, an IBM 1401, was installed in 1967 for econometric computations. Over the next decade, a total of 140 systems were installed with an average value in the $300,000 range.

By 1986, the end of the third Five-year Plan, the average value will have dropped to $54,000. This projection reflects the accelerating shift to small computers and minis that began in 1975.

Except for the big trading companies and a few large banks, business in South Korea is the domain of hundreds of small establishments. Most are managed by proprietors using manual methods. Helping to bring these managers and their methods up to competitive levels is one of the main missions of Dr. Young W. Kim, director of information industry in the Ministry of Science and Technology (Most).

International News

Most has a dotted-line relation to the Korea Institute of Science and Technology (Kist), a 10-year-old "center of excellence" dedicated to the same end — modernizing the South Korean business establishment. Within Kist, Dr. Ki Soo Sung sets the national pace for computer development in his Software Development Center.

The staff is task-oriented, taking on jobs that require leading-edge technology or are of critical national importance. Among its accomplishments:

- Programming impact printers to print Hangul, the Korean phoenetic alphabet.
- Computerizing the national telephone billing system, replacing 300 keypunches with a stand-alone optical character reading system.
- Introducing time-sharing to managers of companies of all sizes in all sections of the country.

Kist has South Korea's most powerful computer installation, topped by a Control Data Corp. Cyber 73/18. Along with batch processing for its business and government clients, the Kist systems support a nationwide network of more than 40 time-sharing terminals.

Kist is in the midst of a major upgrade of its CDC system to three times its present price/performance ratio. The decision will come after months of benchmarking, designed by Kist to nullify the built-in advantage of incumbent CDC. In what started out as a crowded field of contenders, the finalists are CDC (Cyber 174 or 175) and IBM (3032).

Like everybody else in time-sharing, Sung is unhappy with the cost of data communications, which for Kist's users equals the rental for terminals. Communications, both voice and data, have a high priority in the government's modernization program.

IBM Move Toward Breakup May Be Near, Analyst Says

(Continued from Page 59)

at arm's length from one another, he said.

One of the subsidiaries will build and sell mainframes on both the international and domestic markets. A second will combine the current Office Products and General Systems divisions into an "Office Systems Division," a phrase already heard in the "hallowed halls of Armonk," according to Crotty.

Next on Crotty's list is a "general products" subsidiary that will focus on peripheral devices and might include some that would attach to non-IBM mainframes. Instrumentation might be provided by this unit, Crotty said, noting that IBM has already developed a medical system for the National Aeronautics and Space Administration.

An IBM communication corporation, with Satellite Business Systems as a subsidiary, would be strong enough "to go right at AT&T" and if that happens it would certainly be "the singularly most important aspect" of this view of IBM's future, the researcher continued.

A move into the service business then would be too expensive, Crotty judged, but by 1981, when the SBS satellite is aloft, the economics will have changed and that's when this unit of the new IBM may make its entry.

The final subsidiary Crotty expects to be in IBM's offer to Justice would be there largely to meet an expected government demand rather than any particular desire of the company, he said. This would be an IBM acceptance corporation — "much like GMAC" — that would handle most of the financial "paper" for the computer industry.

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Approaching Large System Volume

Business Uses Seen Boosting Micro Shipments

LOS ANGELES — Spurred by increasing use in business applications, microcomputer shipments may soon equal total shipments of large computers during the past decade, an industry executive predicted here recently.

Ryal R. Poppa, chairman of the board, president and chief executive officer of Pertec Computer Corp. told an audience at the Financial Analysts Federation Symposium on High Technology that the very small business systems segment "is assuming the role of growth leader in the computer industry." Small businesses today are finding they can get more computing power for less money — and also operate them for less — than they ever could with larger systems, he claimed.

"This acceptance of microcomputers — more popularly known as personal computers — is expected to take this part of the computer industry from a projected sales level this year of $398 million to 1983 sales rates of more than $1 billion, largely on the strength of affordability to the small businessman," he said.

"Most of the technology to meet the needs of the corner drug store, regional hardware chain or cotton gin farmers is already in place — or ready to be introduced," Poppa said.

"Intelligence on a semiconductor chip and low-priced peripherals are available. Complete systems are being built into desks, and by year-end there will be even further reductions in system size, giving even more for less," he predicted.

"The price of such a computer, including the vital software to make it run, is around $15,000 for the average installation today. But that price is declining and the $10,000 system should be common in 1979," he said.

"Software requirements are also ready. Since 1975, some 20,000 Mits/Altair systems have been sold and put into operation. Those buyers — many of them home hobbyists — did some original software programming and are now making it available to end-users and manufacturers," he noted.

As a result, all of the pieces are in place for a revolution that will more than match — unit for unit — the number of computers that have been installed in the past decade.

Poppa predicted that this unit-for-unit doubling could come in as little as eight years, if the "technology of matching user need to equipment capability is developed at a rapid rate.

"Small businesses won't be able to afford not to use computers in the very near future. These microcomputers will become versatile, personal business tools, as much a part of running a business as the cash register and the telephone.

"The marketing challenge lies in reaching companies with annual sales in the $200,000 to $5 million range through retailers whose own sales are at those same levels," he said.

Pertec, which supplies 55 stores dedicated to only Mits/Altair products and some 250 other outlets that carry Icom and other product lines, expects to double its own market channels over the next 18 months.

Typically, retail dealers need an inventory of $75,000 to $150,000 to get under way. Then, they need the marketing, training and technical support of a well-capitalized major corporation that understands all the aspects of this business, Poppa said.

Air Force Gets 'Breadboard' Bubble System

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A magnetic bubble memory that stores two million bits of information in garnet chips has been delivered to the Air Force Avionics Laboratory (Afal) here.

The memory and associated electronics were developed by Texas Instruments, Inc.'s Central Research Laboratory, Dallas, under contract to Afal's Electronic Technology Division. The total bubble system is designated a "breadboard" model for laboratory testing only.

The laboratory is the focal point for development of magnetic bubble memories for the Air Force, and the breadboard bubble system is part of a total program that is the largest Air Force effort to date on bubble memories.

According to Afal program manager Stewart Cummins, the Air Force is funding research and development of bubble memories because of their advantages over conventional memory devices.

"The bubble memories would be smaller, more reliable and store more information per volume than currently used data storage systems," Cummins said. "The 'bubbles' also could replace magnetic drums and disks in ground-based computers for both military and commercial applications.

"Delivery of the breadboard bubble system to Afal is a milestone in this new technology. The device is operating well, and evaluations to date show that the 'bubbles' provide much lower error rates than mechanical data storage machines," he said.

The basic storage device for the breadboard system is a major/minor loop magnetic bubble chip using 5-micrometer diameter bubbles. The nominal storage capacity of each chip is 135,000 bits. Sixteen chips are contained in the system, and half of those are accessed in the operating system.

The magnetic module used contains two chips in a dual in-line type package that operates with 250 kHz, triangular waveshape coil-drive. The bubble memory packages are mounted on two memory cards called bubble data modules (BDMs).

The breadboard electronics includes a read-only memory (ROM), which allows the use of the chips with some inoperative minor loops. This technique improves chip yields and reduces the cost of magnetic bubble devices.

The overall breadboard bubble system is controlled by a 16-bit microprocessor that can be programmed for various applications and functions such as self-checking.

During the second phase of the Afal program, TI will develop and build three fully populated, 16M-bit brassboard bubble memory systems. They are intended primarily to be airborne computer mass memory systems, but similar systems would be suitable for satellites, ships and submarines, the Air Force said.

The brassboard bubble systems will be delivered here in one year.

Foreign Orders & Installations

Nordic Bank, Ltd. of London has purchased a minicomputer-based banking and communications system from Arbat (UK) Ltd. The system is based on twin 64K-word DEC PDP-11/60 minicomputers and triple RK06 disk subsystems.

General Distributors of Canada Ltd., has installed two Univac 90/30s. One system is located at the administrative headquarters of Metropolitan Stores of Canada Ltd. in Pointe Claire, Quebec; the other is located at General Distributor's offices in Winnipeg, Manitoba, where it will be used for payroll and accounting.

Rotaprint Ltd., a printing equipment and supplies company in the UK, has installed a Honeywell Information Systems, Inc. Model 66/05 system.

Trident Television Group, which operates the Yorkshire and Tyne-Tees independent television stations in the UK, has installed a Honeywell Information Systems, Inc. Level 66 system valued at $950,000 at its offices in Leeds, W. Yorkshire, UK. The system will handle advertising bookings for the two channels.

Barclays Bank International Ltd. of London has ordered a Nonstop 16 system from Tandem Computers, INc. for the bank's foreign exchange dealing room.

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Will Start Slowing After '82

IRD Predicts Fast Growth in Multiplexer Area

NEW CANAAN, Conn. — Markets for data multiplexers are expected to grow rapidly in the 1978-82 period and more slowly thereafter, according to a report from International Resource Development (IRD), Inc. here.

The multiplexer market could grow to more than $500 million worldwide by 1988, the firm said, based on its survey of multiplexer users.

Most of the users of data multiplexers (beside the common carriers and time-sharing companies) fall into the "Fortune 1,000" group of major manufacturing and service firms, IRD said. These users are rapidly growing more sophisticated in their use of data communications equipment and services, and many of them are adding senior data communications professionals to their staffs, according to IRD.

In the survey, data communications users were asked whether they expected significant changes in their network configurations following the advent of the Satellite Business Systems (SBS) network (which is currently expected to be operational in 1981 or 1982).

While a majority of the respondees expected to be users of the SBS services and expected significant network changes to result, they were not inclined to wait until the early 1980s before purchasing multiplexers and other data communications gear.

Many of the respondees envisioned that the greatest benefits of satellite communications, as far as their companies were concerned, would flow from the availability of SBS-type wideband services for international communications.

Most of those users planning multiplexer purchases were most interested in intelligent time-division multiplexers (ITDMs), which they saw as providing the most flexible and cost-effective multiplexing functions. In fact, the IRD study pointed out that the expressed intentions to purchase ITDMs within the next two years were so strong that there is some question as to whether suppliers will be able to meet the demand for this type of equipment.

Some of the ITDM suppliers are believed to be having teething troubles with their new products, according to IRD, and many of the users need considerable vendor support in the installation and servicing of their ITDM products.

Users were asked about their potential use of packet-switching networks, such as those operated by Telenet and Tymnet, in place of dedicated multiplexed networks. Several users indicated they planned to make some use of packet switching, but most expected to retain their own networks and did not see a significant negative impact on their use of multiplexers.

Further details on the report are available from IRD at 125 Elm St., P.O. Box 1131, New Canaan, Conn., 06840.

Contracts

The Pertec Division of Pertec Corp. has signed $1 million agreement with Computer Labs, Inc. of Greensboro, N.C. for the firm's T9000 tape drives and D3000 disk drives.

Datagraphix, Inc. has received a rental contract for 15 computer output microfilm systems from the U.S. General Services Administration.

Metridata Computing, Inc. has been awarded a five-year facilities management contract for DP services by First Security National Bank and Trust Co. of Lexington, Ky.

Cable & Wireless Ltd. of London has been awarded a contract to manage a message-switching system for Citibank N.A., New York. The system is to be located in Manama, Bahrain.

Memorex Corp. has been selected for a contract award by the Air Force Computer Acquisition Office at Hans com Air Force Base, Mass. The company will provide disk storage equipment to be connected to an IBM 360/-85 used by the Strategic Air Command (SAC). The contract is valued at $315,000.

CD Systems, Inc. has received contracts from Goodrich Dairy and Scott Footsavers for turnkey systems to assist in performing inventory control, accounts receivable, general ledger and payroll functions.

The Pertec Division of the Pertec Computer Corp. has been awarded a $3,500,000 contract frome Pfizer Medical Systems, Inc. for tape transports, tape drives, cartridge disk drives and flexible disk drives for use in th Pfizer 0200FS and 0400 body scanners.

Tymshare, Inc. has received a two-year contract from Western Electric Co. to provide general time-sharing and specialized services to the Bell System.

Business Systems Products (BSP), Inc. has been awarded a contract to provide its Adviser business system to the city of South Gate, Calif.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

- KEY-TO-DISK
- KEY-TO-TAPE
- KEYPUNCH
- OCR
- POINT-OF-SALE SYSTEMS
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If data entry is one of the things you have to cope with, then *Source Data Entry — Getting the Job Done* is data you should enter. It'll be in our April 24th issue.

If you'd like to advertise, the closing date is April 7th, and more information is available from your *Computerworld* sales representative. Or call Terry Williams at (617) 965-5800.

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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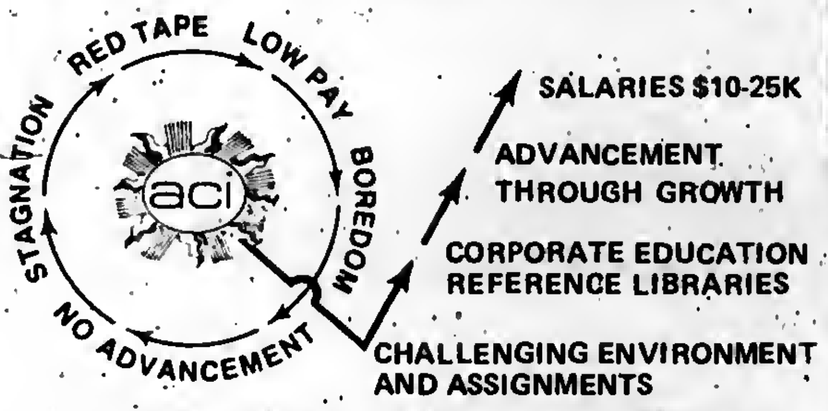
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* * *

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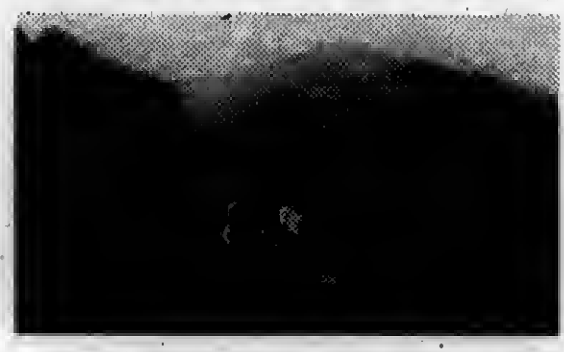

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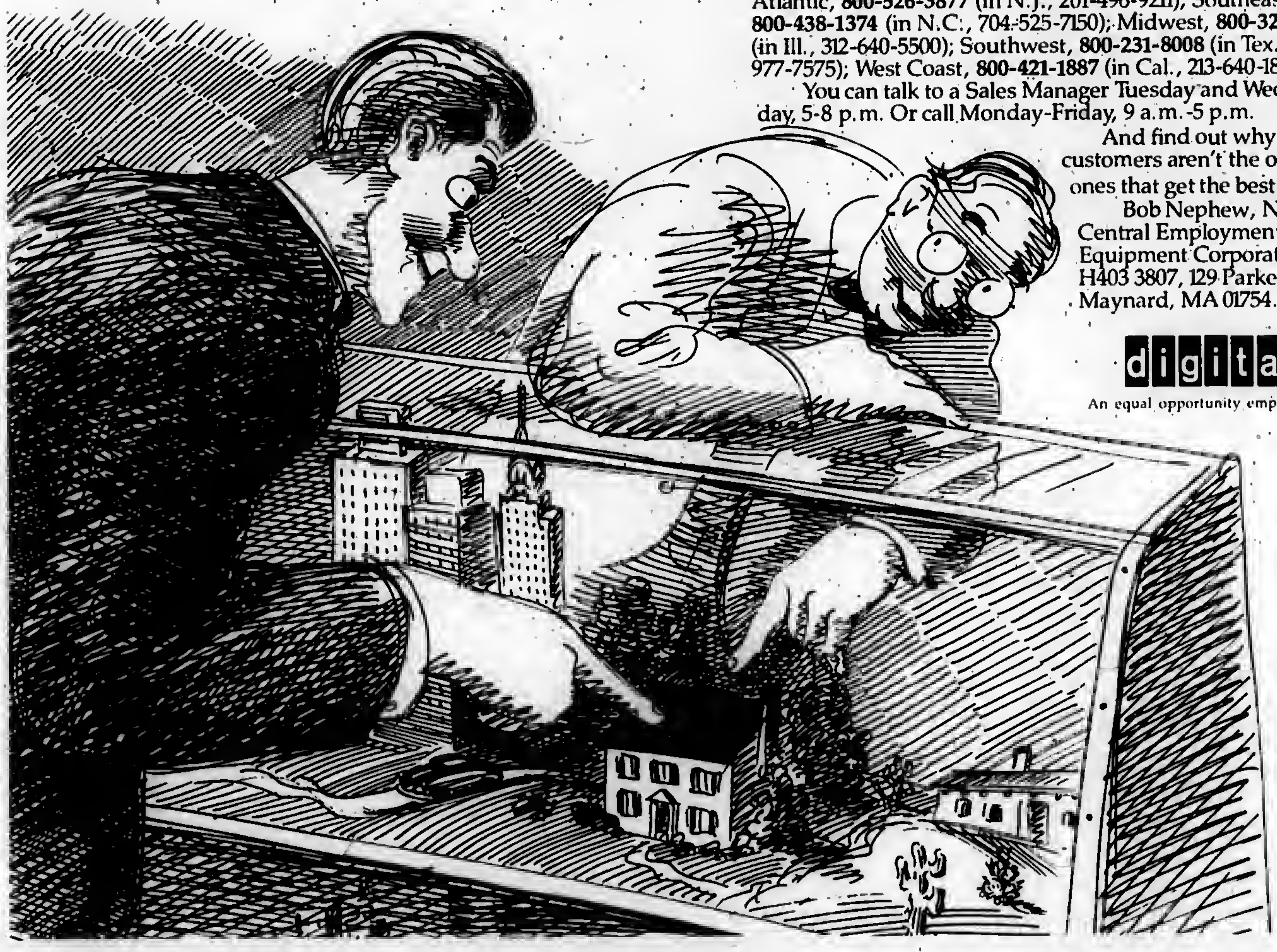

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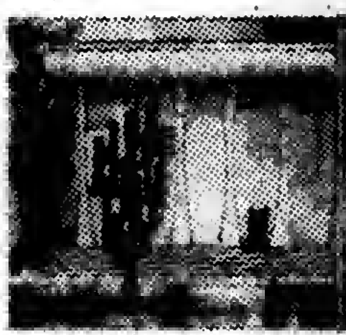

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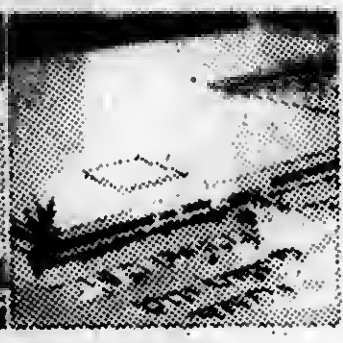

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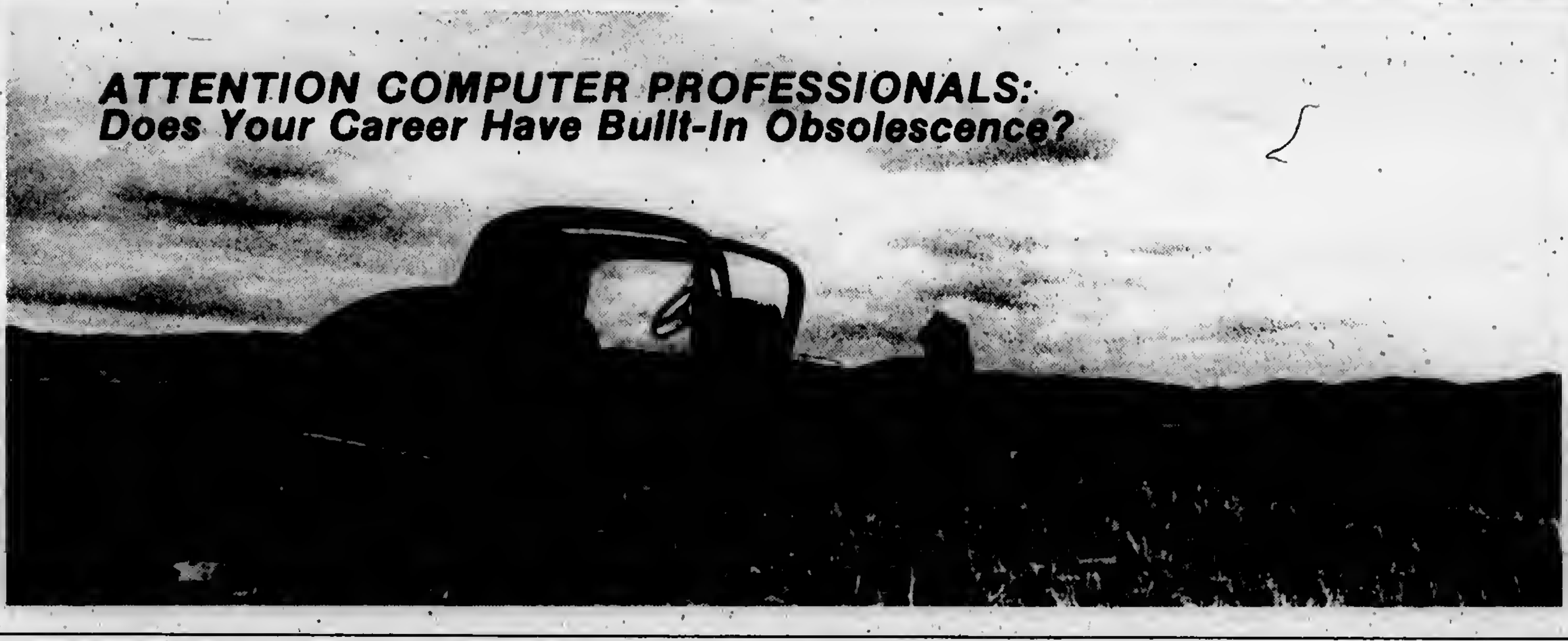
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Jit Saxena was one of our early Systems Engineers in the field. Today he heads the department responsible for all software related to Distributed Processing Systems. And right now Data General has some interesting challenges for software pros.

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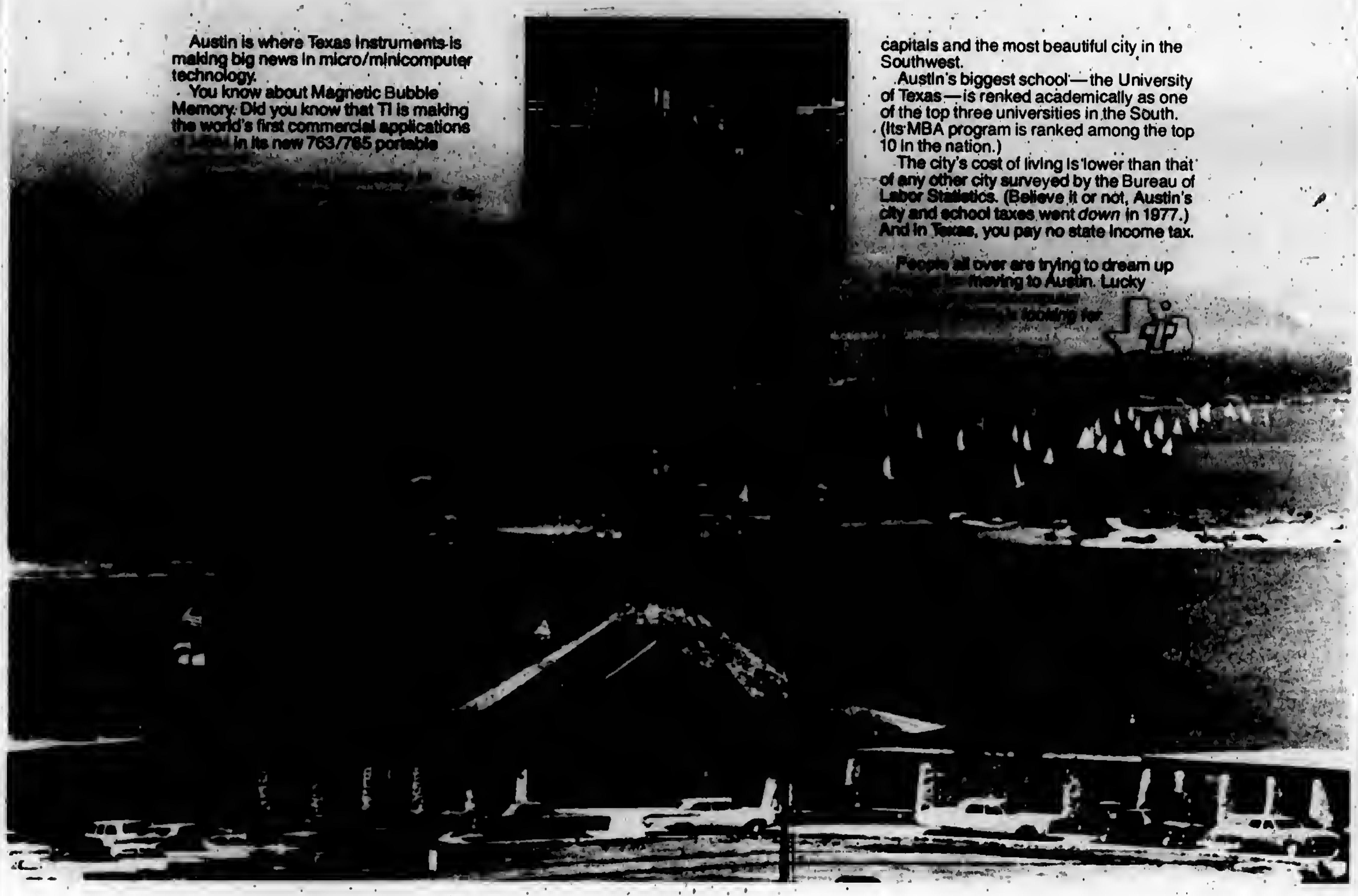

Austin is where Texas Instruments is making big news in micro/minicomputer technology.

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Ken Rodrigues
Supervisor,
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Bachelor's degree in Computer Science or related field with one-two years in application system design and analysis. Two years experience in data base technology. DMS-II knowledge desired.

SENIOR SYSTEMS ANALYST

Bachelor's degree or equivalent with 3 to 4 years experience as a systems analyst. DMS-II experience; hospital and/or educational applications background a plus

SYSTEMS PROGRAMMER

Bachelor's degree or equivalent with 2-4 years in systems programming, at least one year in B6700-B6800 systems support programming desired.

ANALYST/PROGRAMMER

Bachelor's degree or equivalent; two years as programmer/analyst; experience with COBOL required. DMS-II experience desired.

Applications are also being accepted for the following additional new positions scheduled to be filled between May 1, 1978 and July 30, 1978. Application deadline is April 30, 1978.

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Data Processing

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- systems technical support background helpful
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Call toll free (800) 327-1990 or send resume with salary history to: Bob Brodie. The best qualified candidates will be contacted by April 21st.

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Interested and qualified candidates are invited to send thier resume including salary history in confidence to: "Technical Instructor", Human Resources Department.

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Kannath P. Van Kammen
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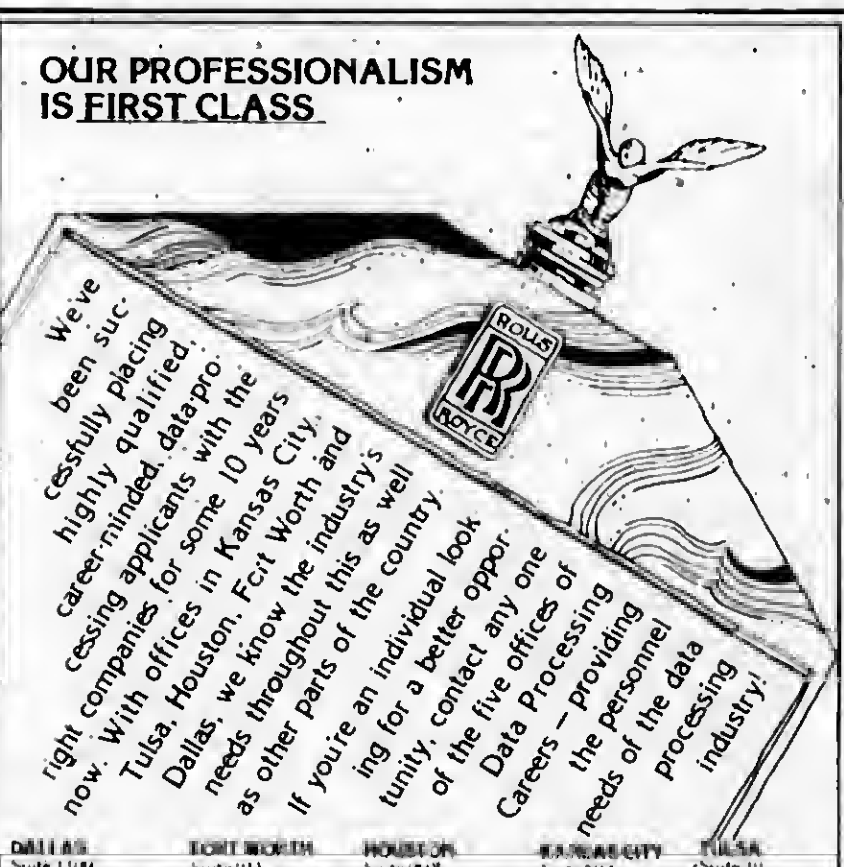
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Inquiries will be responded to until April 20, 1978.

The University of Nebraska is an equal opportunity employer. Minorities, women, and the handicapped are invited to apply.

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To work in designing and developing on-line applications in a Burroughs 4700 Medium Systems environment. COBOL experience is required. Experience in any of the following areas is desirable:

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- Burroughs Medium System NDL
- Financial and/or Student Accounting Systems for an educational institution.

Send resume, salary history, and salary requirements by April 21, 1978 to:

Kenneth F. Van Kammen
Data Processing Manager
Gateway Technical Institute
3520 - 30th Avenue
Kenosha, Wisconsin 53141

Gateway Technical Institute is an Equal Opportunity Employer/Program.

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(including Manager position)

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EOE M/F

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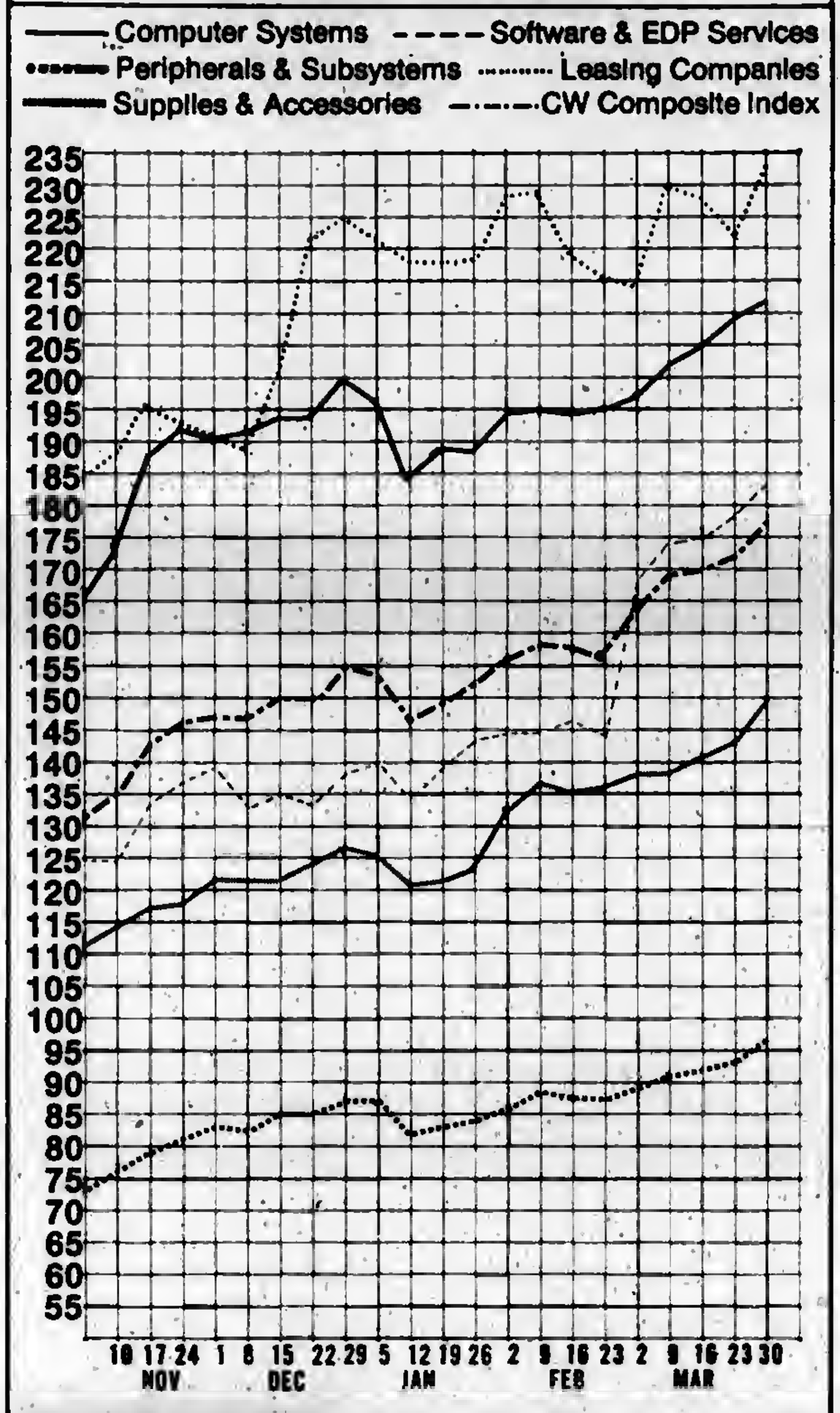

Earnings Reports

MICRODATA

Three Months Ended Feb. 28

	e1978	1077
Shr Ernd	$.44	.....
Revenue	15,922,000	$8,626,000
6 Mo Shr	.72	.31
Earnings	980,000	8,000
Revenue	25,406,000	16,203,000
Earnings	1,620,000	695,000

e-Includes results of Computer Machinery Co. of which Microdata acquired a 75% interest in December 1077.

PENRIL

Six Months Ended Jan. 31

	1976	1977
Shr Ernd	$.48	$.30
Revenue	6,600,547	4,683,967
Earnings	616,167	375,961

PLANTRONICS

Three Months Ended Feb. 25

	1078	1977
Shr Ernd	$.30	a$.24
Revenue	14,588,000	14,244,000
Earnings	1,600,000	1,252,000
9 Mo Shr	.60	a.70
Revenue	39,830,000	34,557,000
Earnings	4,244,000	3,712,000

a-Adjusted for two-for-one stock split in January 1977.

TAB PRODUCTS

Three Months Ended Feb. 26

	1978	1977
Shr Ernd	$.33	a$.38
Revenue	13,721,000	12,397,000
Earnings	411,000	473,000
9 Mo Shr	1.02	a1.32
Revenue	40,609,000	36,599,000
Earnings	1,281,000	1,647,000

a-Adjusted for three-for-one stock split in October 1977.

TELEFILE COMPUTER

Year Ended Sept. 30

	1677	1678
Shr Ernd	$.85	$.56
Revenue	11,601,865	5,652,676
Tax Cred	456,000	341,289
Earnings	1,126,867	736,617

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 29, 1978

TRADE QUOTES

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 55	46 5/8	-2 7/8	-5.8
N	BURROUGHS CORP	55- 91	60 1/4	0	0.0
O	COMPUTER AUTOMATION	18- 30	24	- 1/4	-1.0
N	CONTROL DATA CORP	20- 29	25	+ 1/4	+1.0
C	CRAY RESEARCH INC	15- 31	29	+ 1/2	+1.7
N	DATA GENERAL CORP	35- 54	43 7/8	+ 5/8	+1.4
N	DATAPOINT CORP	18- 42	42	+1 3/8	+3.3
N	DIGITAL EQUIPMENT	37- 53	39	+ 1/4	+0.6
N	ELECTRONIC ASSOC.	2- 4	4 1/4	+ 3/8	+9.A
A	ELECTRONIC ENGINEER.	8- 16	13 1/4	+ 1/4	+1.9
O	FOUR-PHASE SYSTEMS	13- 23	22 1/4	0	0.0
N	FOXBORO	28- 54	33	-1 5/8	-4.6
O	GENERAL AUTOMATION	6- 9	8	- 1/8	-1.5
O	GRI COMPUTER CORP	1- 1	1 3/8	+ 1/8	+10.0
N	HEWLETT-PACKARD CO	62- 87	63 1/4	- 3/8	-0.5
N	HONEYWELL INC	43- 55	45	-1 1/2	-3.2
N	IBM	238-286	238 1/2	-1	-0.4
O	MANAGEMENT ASSIST	5- 12	12 1/4	+ 3/8	+3.1
O	MICRODATA CORP	7- 18	12 3/8	- 5/8	-4.8
O	MINI-COMPUTER SYST	5- 12	6 1/4	- 1/4	-3.8
O	MODULAR COMPUTER SYS	5- 12	11 1/2	+1 1/2	+15.0
N	NCR	32- 47	43 1/2	+1 1/2	+3.5
O	PRIME COMPUTER INC	12- 32	31 1/8	+2 5/8	+9.2
N	PERKIN-ELMER	17- 22	18 1/8	+ 1/8	+0.6
N	RAYTHEON CO	16- 37	35 5/8	+ 5/8	+1.7
N	SPERRY RAND	30- 42	34 7/8	- 1/4	-0.7
O	SYCOR INC	8- 21	20 5/8	- 1/8	-0.6
A	SYSTEMS ENG. LABS	5- 14	12 5/4	- 1/8	-0.9
A	WANG LABS.	10- 16	16 1/8	+1 1/4	+8.4

LEASING COMPANIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 6	5 3/4	0	0.0
O	BOOTHE COURIER CORP	8- 16	16 1/8	0	0.0
O	COMDISCO INC	9- 16	9	- 1/4	-2.7
A	COMMERCE GROUP CORP	1- 3	3/4	+ 1/4	+50.0
A	COMPUTER INVSTRS GRP	1- 2	5/8	-	-8.2
M	DATRONIC RENTAL	0- 2	1 5/8	+ 1/8	+8.3
A	DCL INC	1- 4	2 1/2	- 1/8	-4.7
N	DPF INC	6- 10	9	+ 3/4	+9.0
N	ITEL	13- 22	17 5/8	+ 3/8	+2.1
N	LEASCO CORP	19- 31	30 1/4	+ 3/8	+1.2
O	LEASPAC CORP	1- 2	1 3/8	0	0.0
A	PIONEER TEX CORP	5- 11	6 1/4	+ 1/2	+8.6
N	U.S. LEASING	10- 16	13 3/8	+ 1/4	+1.9

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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SOFTWARE & EDP SERVICES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 1/8	- 1/8	-10.0
C	ANACOMP INC	7- 12	10 1/2	+ 1/8	+1.2
A	APPLIED DATA RES.	5- 10	9 1/2	- 1/8	-1.2
N	AUTOMATIC DATA PROC	23- 30	28 1/8	+ 7/8	+3.2
O	COLEMAN AMERICAN COS	1- 2	1	0	0.0
O	COMPU-SERV NETWORK	9- 15	9 1/4	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	- 1/4	-2.7
O	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	8 3/8	+ 1/8	+1.5
N	COMPUTER SCIENCES	7- 11	10 1/2	+ 5/8	+6.3
O	COMPUTER TASK GROUP	1- 2	2	+ 1/4	+14.2
O	COMPUTER USAGE	1- 3	2 3/4	+ 7/8	+46.6
C	COMSHARE	5- 10	9	- 1/4	-2.7
O	DATA DIMENSIONS INC	3- 5	4 3/8	- 3/8	-7.8
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	17 7/8	- 3/4	-4.0
O	INSYTE CORP	2- 3	1 1/2	+ 1/8	+9.0
C	IRS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/8	0	0.0
O	KEYDATA CORP	1- 3	1 5/8	- 1/8	-7.1
A	LOGICON	7- 17	12 3/8	- 3/4	-5.7
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 19	19 1/4	+1 3/4	+10.0
O	NATIONAL DATA CORP	4- 8	8 1/8	+ 3/8	+4.8
A	ON LINE SYSTEMS INC	16- 24	23 3/4	+1 3/8	+6.1
N	PLANNING RESEARCH	3- 6	5	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 4	4	+ 1/8	+3.2
O	REYNOLDS & REYNOLD	17- 21	19 3/4	+ 1/4	+1.2
O	SCIENTIFIC COMPUTERS	1- 4	4	+ 5/8	+18.5
O	TYMSHARE INC	14- 23	19 3/8	+ 1/2	+2.6
A	URS SYSTEMS	4- 6	6	0	0.0
N	WYLY CORP	1- 3	2 3/4	- 1/8	-4.3

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 18	17 5/8	+ 1/8	+0.7
O	ADVANCED MEMORY SYS	7- 10	9 3/4	+1	+11.4
N	AMPEX CORP	8- 13	13	+ 5/8	+5.0
O	ANDERSON JACOBSON	3- 6	6	+ 1/4	+4.3
N	APPLIED DIG DATA SYS	10- 20	13 7/8	+ 1/2	+3.7
O	BEEHIVE INT'L	5- 12	5 1/2	+ 1/4	+4.7
A	BOLT,BERANEK & NEW	6- 9	5 3/4	- 1/4	-4.1
N	BUNKER-RAMO	8- 14	13 1/2	+ 1/8	+0.9
A	CALCOMP	3- 5	4 3/8	+ 1/4	+6.0
O	CAMBRIDGE MEMORIES	1- 4	2 5/8	- 1/8	-6.6
N	CENTRONICS DATA COMP	16- 30	19 1/2	+1 1/8	+6.1
O	COGNITRONICS	1- 1	3/4	- 1/8	-14.2
O	COMPUTER COMMUN.	5- 8	9 1/4	+1 1/2	+19.3
O	COMPUTER CONSOLES	4- 7	5 1/4	+ 3/4	+16.6
A	COMPUTER EQUIPMENT	2- 4	4	- 1/4	-5.8
O	COMPUTER TRANSCEIVER	1- 1	1 1/2	+ 1/4	+20.0
C	COMTEN	9- 15	14 5/8	+ 5/8	+4.4
N	CONRAC CORP	19- 28	20 1/2	+ 1/2	+2.5
O	DATA ACCESS SYSTEMS	4- 5	5	0	0.0
O	DATA 100	6- 12	11 7/8	- 1/8	-1.0
A	DATA PRODUCTS CORP	9- 19	15 3/4	+ 1/4	+1.6
O	DATA TECHNOLOGY	3- 4	4 1/4	+ 1/8	+3.0
O	DATUM INC	1- 3	2 5/8	+ 1/8	+5.0
O	DECISION DATA COMPUT	2- 3	1 3/4	- 1/4	-12.5
O	DELTA DATA SYSTEMS	1- 1	1/4	- 1/8	-33.3
A	DOCUMATION INC	6- 12	11 3/8	+ 5/8	+5.8
O	DATARAM CORP	2- 24	16	+1 1/2	+10.3
M	ELECTRONIC M & M	4- 5	5	+ 3/8	+8.1
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	+ 1/8	+11.1
N	HAZELTINE CORP	8- 15	13 7/8	+ 1/4	+1.8
N	HARRIS CORP	28- 48	47 1/2	+1 1/2	+3.2
O	INFOREX INC	4- 8	7 5/8	+ 1/4	+3.3
C	INFORMATION INTL INC	8- 14	10	0	0.0
O	INTEL CORP	38- 57	42	+3	+7.6
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP.	6- 15	13	- 1/4	-1.8
N	MEMOREX	23- 34	31	+1 3/8	+4.6
N	MOHAWK DATA SCI	5- 9	8 7/8	+1	+12.6
O	PENRIL CORP	2- 6	7 3/8	+ 5/8	+9.2
N	PERTEC CORP	7- 11	10 1/4	+ 5/8	+6.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3	- 1/8	-4.0
O	RECOGNITION EQUIP	6- 10	8	+ 1/4	+3.2
O	SCAN DATA	1- 2	1 3/4	+ 1/8	+11.5
O	STORAGE TECHNOLOGY	10- 30	30	+1 1/4	+4.3
O	T BAR INC	7- 16	14 1/4	+ 1/2	+3.6
O	TALLY CORP.	4- 8	7 3/8	0	0.0
A	TEC INC	6- 10	7	+ 5/8	+9.8
N	TEKTRONIX INC	29- 40	34 3/4	-2 3/8	-6.3
N	TELEX	2- 5	4 3/8	0	0.0
O	TESDATA SYSTEMS CP	13- 20	15	+ 3/4	+5.2
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAR 29 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	7 7/8	+ 3/8	+5.0
O	BALTIMORE BUS FORMS	1- 4	2 3/4	+ 3/8	+15.7
A	BARRY WRIGHT	10- 19	17 7/8	- 1/8	-0.6
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	19 5/8	+ 3/8	+1.9
N	ENNIS BUS. FORMS	6- 11	10 7/8	+1	+10.1
N	3M COMPANY	44- 56	44 3/4	+ 1/8	+0.2
C	MOORE CORP LTD	24- 31	29 1/2	- 1/4	-0.8
N	NASHUA CORP	14- 28	24 5/8	+ 5/8	+2.6
O	STANDARD REGISTER	18- 25	23 3/4	+ 3/4	+3.2
O	TAB PRODUCTS CO	8- 19	8 7/8	+ 7/8	+10.9
N	UARCO	18- 24	23 7/8	+2	+9.1
A	WABASH MAGNETICS	10- 15	12 1/2	+1	+8.6
N	WALLACE BUS FORMS	17- 21	20 7/8	+ 1/8	+0.6

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*Fran Tarkenton, Minnesota Vikings' Quarterback

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NEWSPAPER

News to Note

Judge Thwarts IBM Motions

SAN FRANCISCO — Memorex Corp. attorneys last week rested their case in the firm's antitrust action against IBM and, as in the other such cases against it, IBM attorneys made their usual bid for a directed verdict.

But this time it didn't work. Judge Samuel Conti, sitting in the U.S. District Court for the Northern District of California here, rejected their arguments to end the trial, moving it ahead to its defense phase.

In its efforts to bring the case to an end, IBM attorneys offered five motions. An omnibus motion was based on Memorex's entire case and claimed that Memorex failed to show IBM intended to act unlawfully. This was denied.

A second motion was based on Memorex's claim that IBM monopolized telecommunications processing with its 3704 and 3705 transmission control unit and thus blocked Memorex's entry into that market with its

(Continued on Page 6)

Trends Reverse Personnel Woes

By Don Leavitt
CW Staff

SAN FRANCISCO — Although there are a series of personnel problems that concern major DP sites generally, there are also a series of trends emerging to counter those problems, according to David R. Morin of International Data Corp. (IDC).

Obtaining and keeping qualified personnel was the top problem cited by respondents surveyed in more than 50 large-scale installations. But concern about union interference was also high on the users' lists, Morin told attendees at IDC's Conference on the New EDP Economics held here last week.

Trying to work with the quota system of hiring to meet Equal Employment Opportunity (EEO) affirmative action plans was a problem, but then so was the more classic challenge of meeting salary demands of workers, he said.

Worker productivity, still another

(Continued on Page 4)

For In-House or On-Line Use

Service Bundles Custom Systems

By Jeffry Beeler
CW Staff

WELLESLEY, Mass. — Custom-written applications packages, operating systems, installation and support are all bundled together with hardware in a series of small business system "packages" introduced here last week by Keydata Corp.

The service firm, which is the second in three weeks to begin offering hardware [CW, March 27], claimed the fixed-price packages represent the first such "totally supported" small business systems ever offered.

The Unity series — reportedly comparable to the IBM System/32 and 34, the Microdata Corp. Reality and the Basic/Four Corp. small business systems — are available on a purchase basis and can be used either as stand-alone units or hooked into Keydata's on-line services network. A spokesman recommended the latter option for first-time users who want to ease into in-house processing.

The key to the systems is their operating systems and applications packages which will be custom-tailored to individual users — not the hardware that is based on Data General Corp. Nova minicomputers.

In the past most small- and medium-sized companies that have elected to install a computer system have had to resort to multiple-vendor arrangements in which no single supplier assumes total responsibility for an installation's success, according to L. Edwin Donegan Jr., Keydata president.

"Application software development and implementation has always been the most difficult aspect of any computer installation," he explained.

(Continued on Page 8)

Promising Cancer Drug Developed With DP's Help

By Nancy French
CW Staff

SAN FRANCISCO — A drug pharmacologists said can kill hundreds of millions of cancer cells in laboratory mice with only one dose has been developed here using computer-based tools that allow a researcher to simulate a single molecule of a chemical and study its bonding behavior with DNA.

According to Dr. Martin Apple, the pharmacologist responsible for the discovery, the drug is one of several that were developed with the help of DP at the University of California Medical Center.

The drugs under development — azetomycin and another that is an anthracycline compound — show promise in cancer treatment because they bind to the cancer cells' DNA longer than other substances; because of this property, they can kill the cancer cells more effectively, Apple explained.

Apple, who presented his findings at the American Cancer Society's annual science writer's seminar, recently said adriamycin, a common anticancer drug, binds for one second. Azetomycin, on the other hand, binds for 25 to 30 minutes.

Further, drugs that kill up to 100,000 cancer cells per dose are infrequent, and those that kill 10 million are rare. One dose of azetomycin kills several hundred million cancer cells, he said.

The computer-based "investigatory

(Continued on Page 4)

SNA Improvements Needed To Suit Future DDP: Martin

By Ronald A. Frank
CW Staff

RYE, N.Y. — IBM's Systems Network Architecture (SNA), while not bad today, needs improvement, particularly in the areas of the transmission subsystem and software capabilities, according to lecturer and author James Martin.

Martin, who has been an internal IBM computer and communications specialist, made the statement here in an interview in which he announced he was leaving IBM in order to be able to speak from a "totally independent" point of view.

Martin, who emphasized that the parting was friendly, also predicted that value-added satellite communications networks and distributed operating systems would become a reality for users in the near future.

SNA needs enhancing, he said, in order to keep up with changing user needs and requirements. For example, in the area of the SNA transmission subsystem, Martin said IBM would have to develop a mechanism to handle such things as the virtual circuits de-

(Continued on Page 4)

It's That Time of Year Again

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Finished? Made your last calculation? Taken your final deduction? It's nearly April 15 and time to put that tax return in the mail.

What happens to the return and, hopefully, the refund request after they leave your hands? You've put down a great deal of data about yourself, your income and your household on that Form 1040 or 1040A. How will the Internal Revenue Service (IRS) process it?

A computer center with a master tax file in Martinsburg, W. Va., forms the hub of the IRS tax processing system and serves 10 service centers located throughout the U.S. The service center nearest you and the national computer center in Martinsburg will be responsible for processing your return, according to Sol G. Dubroof, technical advisor to IRS' assistant commissioner for data services.

Aging System

The IRS' centralized computer system, while state-of-the-art at one time, is rapidly aging. Your return will be one of 85.8 million individual tax statements the system will process this year, Dubroof said.

By 1985, when the IRS is faced with 102.8 million individual returns and nearly 150 million tax reports from corporations, fiduciary institutions and the like, the present equipment replacement program will have to end and a new system must be installed to handle the workload, he added.

At one of the 10 regional service centers, IRS data entry personnel will convert the typewritten or handwritten information on your return to magnetic tape. Each center has a direct data entry system based on Honeywell Information Systems, Inc. 2050 and 2050A CPUs and on General Electric 420 processors.

Developed by GE and the IRS several years ago, the direct data entry

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Upgrades Installed Terminals

Data 100 Adds Back-End Processor

By Ronald A. Frank
CW Staff

MINNEAPOLIS – Data 100 Corp. has introduced a back-end processor system that reportedly upgrades the company's existing installed terminals into multifunction processing configurations.

Called the Model 85 Attached Applications Processor (AAP), the system relies on the in-place communications capabilities of Data 100 remote batch, Keybatch data entry and IBM 3270 emulation terminals and configures these into subsystems of a Remote Information System (RIS).

The Model 85 includes a control unit with 96K to 128K of main memory, up to 100M characters of fixed or removable disk storage and up to 15 CRT terminals operating in local mode to the AAP. The terminal subsystem can off-load tasks onto the AAP with its associated storage and CRTs.

Cobol and RPG compilers together with a multitasking operating system allow the Model 85 to work in systems running up to eight independent concurrent tasks. In a typical RIS configuration, an existing Data 100 terminal retains control over communications with a host CPU at a central DP site while utilizing the added storage and processing power of the attached Model 85, a spokesman explained.

The Model 85 was designed to interface with the earlier M76 and M78 remote batch terminals, the M74 Keybatch data entry system and the M82 terminal, which operates in IBM 3270 communications mode.

When used with the 76, the AAP allows Cobol and RPG-II source data entry, remote file management and report generation tasks to be performed concurrently with high-speed remote job entry at speeds up to 56 kbit/sec.

When used with a Keybatch system, the AAP allows volume data entry applications to be processed and files created on the AAP to be transmitted via the Keybatch processor to a host CPU. Files created on the Keybatch processor can be routed to the AAP for processing, Data 100 said.

When used with the 82 remote display system, the AAP allows users to do source data entry with access to a host CPU using IBM 3270 communications. A user at a terminal can access files at the remote site or files stored in the host, the spokesman said.

Possible Peripherals

Peripheral equipment that can be used with the AAP includes local mode printers ranging in speeds from 62- to 1,250 line/min and 9-track 800- and 1,600 bit/in. tape drives, according to the spokesman. Peripheral devices can be switched between the AAP and the communications processors that are part of the terminal subsystems, he added.

An RIS can communicate in synchronous protocols using point-to-point or multipoint techniques and in IBM Synchronous Data Link Control (SDLC) communications. Standard emulators allow IBM Hasp, 3270, 2780 and 3780; Univac 1004, Nine Thousand Remote (NTR) and DCT 2000; General Electric Remote Terminal System GRTS/355; ICL, Inc. 7020; Honeywell Information Systems, Inc.; and Burroughs Corp. line protocols, the firm said.

A minimum RIS consisting of a Model 85 AAP with 96K memory, two operator keystations, a 10M-byte disk, 125 line/min printer and appropriate software and a Model 76 (with communications under Hasp protocol at 4,800 bit/sec and a 150 card/min reader) leases for $1,377/mo on a 42-mo lease including maintenance; the purchase price is $52,422.

Customer shipments of RIS that support RPG-II systems will start in the third quarter. Cobol-based will be available in the first quarter of 1979. Data 100 is at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

HIS Privacy Symposium Set

SCOTTSDALE, Ariz. – Honeywell Information Systems, Inc.'s fourth annual Computer Security and Privacy symposium will take place here on April 18-19.

Among the speakers will be Donn B. Parker of Stanford Research Institute, David L. Linowes of the Federal Privacy Protection Commission and attorney Susan H. Nycum of the law firm of Chickering & Gregory, who specializes in computer crime and privacy legislation.

Topics to be discussed include computer crime investigation and prevention, proposed federal privacy legislation that would affect all commercial computer users and computer auditing guidelines.

Additional information on the symposium is available from Jerome Lobel, computer security manager at HIS, P.O. Box 6000, Mail Station K-99, Phoenix, Ariz. 85005.

Clarification

In "Support Recipients Get Paid Twice, Then Billed" [CW, March 13], it was noted that Clay County's computerized child support system was installed by Missouri-based Diversified Computer Services, Inc. *Computerworld* has since learned there is at least one more firm with the same name also in the business of automating court systems. That second firm, incorporated in Illinois and Delaware and based in Downer's Grove, Ill., was not involved in the Missouri system.

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(Name)

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- **Hypothesis 1:** *A new IBM employee, his or her brain muddled by all those* Think *signs, sent the card by mistake. Only later will he or she learn the truth and gasp in amazement: "You mean we make sorts, too? But... but I thought we were a hardware company!"*
- **Hypothesis 2:** *Maddened by years of playing second fiddle in sorting, IBM has created a new, high-level Sorting Performance Investigation Team (SPIT) to find out what really makes SyncSort tick. As soon as the data is received and strapped to the operating table, voices will be heard muttering through surgical masks: "Scalpel... suture... somebody count those sponges..."*
- **Hypothesis 3:** *Deep in the caverns below IBM Plaza, a lonely researcher, doing advanced work on MVS performance, mutters: "If only I had a sort program that didn't chew up so many resources... something like (choke) SyncSort..."*

Naturally we hope it was No. 3 who sent off the card. Because we'll be glad to help solve that nagging MVS problem.

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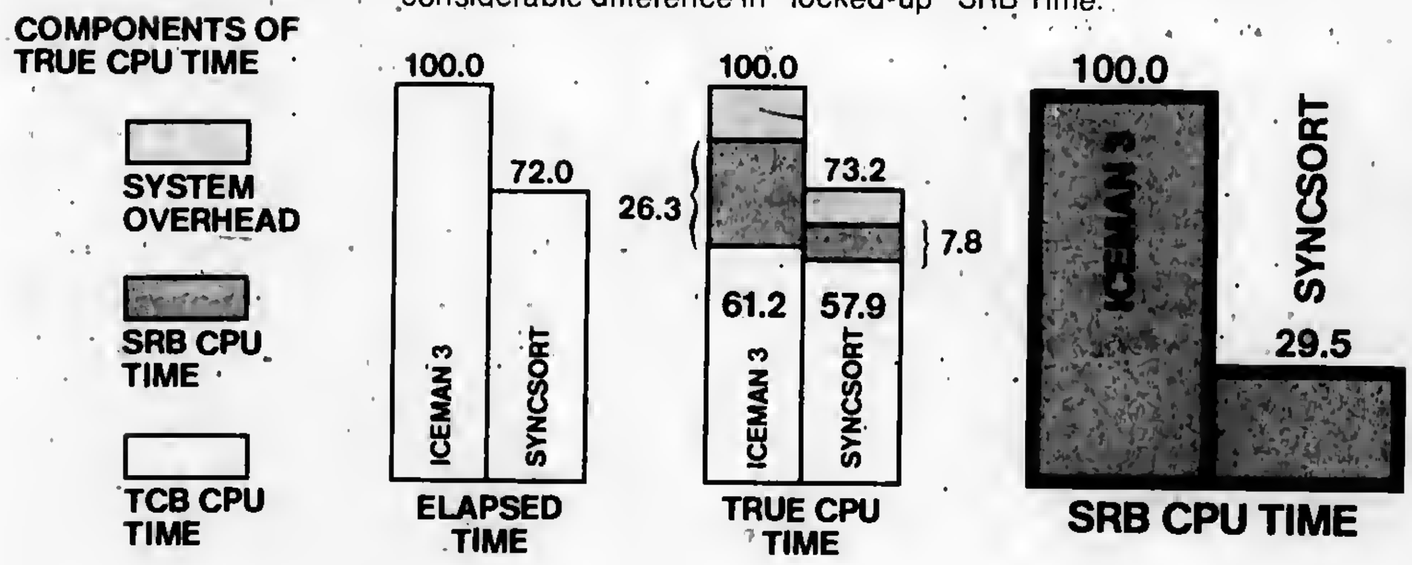
- *SRB Time, which is* non-interruptible. *The line is always busy—and too bad about those other, non-sorting jobs in the mix.*

Then we'll display the charts below, which compare SyncSort's overall performance with IBM's own 5740-SM1, Release 3, and pinpoint the considerable difference in "locked-up" SRB Time.



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SNA Enhancements Needed: IBM Specialist

(Continued from Page 1)

signed for public packet networks if the firm wants to live up to Level 2 of the X.25 protocol standard.

Furthermore, Level 4 of the same standard on applications development will require IBM to add functions for establishing a session on a network, he said, and will require the firm to incorporate macro instructions for user applications within the architecture.

In addition, network control functions such as queuing, flow control and request/response operations need to be upgraded in the SNA software for IBM to live up to the Level 4 X.25 standard, he said.

Demands of DDP

Martin said that in the future, the advent of distributed data processing will require capabilities not found in SNA today. For example, today's complicated control mechanisms required for both data base management and network architecture will be replaced with distributed operating systems, he said.

While there are no such operating systems available yet, the SNA Advanced Communications Function is a step in this direction, he said.

Vendors, however, will continue to develop architectures oriented toward their own systems, but these systems will be interfaced to the standard X.25 networks through "bridges" that will provide compatibility, Martin predicted.

In the satellite area, Martin said the advent of service from Satellite Business Systems (SBS) will help alleviate the current limitations of local loops, since the SBS service will provide wideband communications links through rooftop antennae at user sites.

But at the same time, the SBS services will force users to restructure the way they handle communications, he predicted.

Since users can integrate voice, data and facsimile or electronic mail communications in the proposed SBS services, Martin said this could cause "cultural changes" in the way companies operate since all of these functions are separate today.

Furthermore, existing communications protocols will have to be changed with the advent of the satellite services, he said, in order to overcome the propagation delay problem and to take advantage of the broadcast mode of satellite transmission.

While SBS services will initially be only for the largest users, Martin predicted that value-added satellite networks will be developed in the coming years. These, he said, will take advantage of the technology developed by SBS and would bring the cost for such services within reach of smaller users.

Turning to data base management, Martin said more must be learned about the logical structuring of software and performance parameters. Better logical data designs can facilitate efficient organization of information within data bases, he noted.

Back-end processors will also change data base management. These high-speed CPUs will have their own instruction sets and will include built-in keys to help the data base administrator. Primary keys will handle production problems related to data while secondary keys called "search engines" will speed the location of files within data bases.

Improved data base languages will also overcome the need for Cobol or similar higher level languages, he said. Instead, interactive multifunctional statements will be used to communicate with data bases and a diverse collection of end-user languages will make it possible to get at data in data bases without programming, Martin forecast.

Public Data Nets

Turning to public data nets, Martin said packet technology is now in its third generation. Recent recommendations for developing a datagram capability along with the earlier virtual circuit approach to X.25 will provide users with an alternative to the present networks.

The datagram will be best for short messages using low-cost terminals without intelligence, including retail, credit and electronic funds transfer (EFT) transactions, he said, while other applications will be best served by the virtual circuit method.

Finally, Martin predicted that the next few years will be frustrating for users because vendors will not want to interface their network architectures to the public data nets.

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Dorlen Products

DP Eases Drug Discovery

(Continued from Page 1)

tools" Apple is using at the University of California Medical Center were provided under a grant from the National Institutes of Health (NIH). Known as Prophet — one of the few names in computing that is not an acronym, according to an NIH spokesman — the system allows a researcher to draw a single molecule of the drug being tested on the screen of a CRT terminal.

Apple uses a Tektronix, Inc. CRT, he said. He then calls up computer programs maintained on a Digital Equipment Corp. PDP-10 at First Data Corp. in Waltham, Mass., to do the rest.

Computer programs draw and redraw the molecule "in three dimensions with all the known interatomic bonding angles," Apple explained. "Then another program determines the molecule's lowest energy conformation in space.

The next phase is manipulation. Apple "manipulates the structure by taking out and putting in atoms," he said. "This gives me a projection of how much more or less energy it would require for the next simulated model drug to do the same DNA receptor binding."

Apple is testing molecules of chemicals "that have some known affinity to the receptor sites I'm after" and "simply remaking them to enhance that affinity."

Work on the Prophet system has been substituted for time-consuming laboratory procedures in which materials are manually synthesized, Apple said. With the latter approach, it might take a researcher a year to test the properties of six or eight drugs; with the computer, the same six or eight drugs can be tested in a single morning, he pointed out.

Now that the initial tests have "suggested a high activity against mouse cancer," the drug must be tested for toxicity in a variety of animal species, he explained.

At this point no one knows whether the drug will work on people or even be safe to use on humans and "there are no progams that predict toxicity very well," Apple said.

Trends Bucking Worker Ills

(Continued from Page 1)

worry of management, is perhaps most vexing, Morin commented, since there is no commonly accepted measure of productivity — "except the doubtful lines of code per day" — and no agreement on what is adequate productivity even if it could be measured.

Dramatic Countering Trend

The most dramatic trend countering these problems, in Morin's view, is the appearance of non-DP-experienced managers in top DP slots. These people typically have financial control backgrounds or M.B.A. degrees and their purpose in moving into DP is to bring stability to situations that are potentially or actually out of control.

Agreeing that managers without DP experience are being moved in, one observer commented later, however, that the DP technicians have already learned how to "snow the hell out of them," killing any chance for the new chiefs to pick up the DP knowledge they need to combine with their management skills.

Teamwork is increasing as the complexity of current projects is recognized. There is no way that one technician can grasp, much less work effectively with, all the aspects of today's systems so the teamwork approach is developing even when it isn't getting strong management support, the survey found.

Related to the awareness of how complex systems are, the surveyed sites told IDC they are using more external training; they aren't trying the "do-it-yourself" route. In some cases, outside trainers are being brought into user facilities, Morin said, but the training expertise is still external to the DP organization itself.

Nominated to Head Agency

Geller Happy: Struggle to Establish NTIA Over

By Edith Holmes
CW Washington Bureau

WASHIGTON, D.C. — Henry Geller is a happy man. After six frustrating months of infighting among federal agencies determined not to lose their influence in the information and telecommunications action, the National Telecommunications and Information Administration (NTIA) was signed into existence by President Carter last week.

And Geller, who for six months has been the rumored Carter nominee for the new post of assistant secretary of Commerce for communications and information and head of NTIA, saw his name sent to the Senate Commerce Committee and received assurances that confirmation hearings will be held by the middle of April.

In an interview here just before Carter signed the executive order establishing the agency, Geller expressed the feeling that the six months spent haggling over the merger of the White House Office of Telecommunications Policy (OTP) and the Commerce's Office of Telecommunications (OT) was "a waste and a shame.

"I took this job because of the substantive telecommunications and information questions involved," the former Federal Communications Commission (FCC) general counsel said. "I feel very bad about the time not spent on those issues."

But with the struggle to get NTIA established behind him, Geller is looking forward to fulfilling the promises he recently made to the House Appropriations Subcommittee reviewing the new agency's fiscal 1979 budget request.

With his coat off and his sleeves rolled up, the attorney talked about the overall mission of NTIA: to forge long-range national telecommunications and information policy.

High on Geller's priority list and demanding a sizable chunk of the agency's budget request of $11.98 million for the coming fiscal year will be a thorough study of competition in the communications industry. If Congress approves this budget, more than $1 million will be spent on common carrier issues such as intercity transmission competition and cross-subsidization of unprofitable services by the cream of the carriers' service offerings.

NTIA proposes to initiate a multiyear study that would delve into questions about the communications industry's structure and make recommendations to the FCC and to Congress in its efforts to rewrite the Communications Act of 1934, Geller said.

"The ground rules need to be laid so the industry knows how to proceed. The government should make it clear where it will intervene and where it will leave well enough alone," he stated. "We hope to be helpful to the FCC," Geller said.

Problem Marriage

Still another troublesome area in communications policy issues is the marriage of computer and communications technologies. This wedding makes it difficult to distinguish between the regulated data communications and unregulated DP industries, Geller noted. NTIA will take an active part in the FCC's Second Computer Inquiry, assessing the filings now before the commission.

While much of its mandate, which Geller feels is very broad under the sixth and final major version of the executive order [CW, March 27], covers much of the FCC's ground, he doesn't foresee conflict between the agencies. The FCC has all short-term responsibility for the industry and, although NTIA can formulate long-range policies, the commission and Congress are in charge of implementing them, Geller said.

Geller brings to NTIA a real understanding of the FCC and its operation. He served as its chief lawyer from 1964 to 1970 and has been studying the nation's communications policy at the Aspen Institute and elsewhere ever since.

Other Priorities

Other issues considered priorities of the new agency are the development of U.S. international telecommunications policies and domestic information policies, specifically in such areas as electronic mail, electronic funds transfer (EFT), international data flow, the economics of information and the privacy considerations of information, Geller said.

(Continued on Page 6)

Henry Geller

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For Own Sake as Well as Firm's

Communications Managers Urged to Fix 'Mess'

By Marguerite Zientara
CW Staff

TORONTO — Communications is among the worst managed disciplines in North American industry today. As such, it offers the telecommunications manager an enormous opportunity to enhance his own career, save his company money and boost its earnings by straightening out the "big mess," according to Harry Newton, president of the Telecon Group of New York.

In an entertaining presentation at last week's Data 78 telecommunications conference here, Newton said 90% of all companies overspend on communications. Ten percent to 15% of their communications bills and as much as 20% of long-distance charges is "fat."

U.S. industry wastes $3 billion to $4 billion on communications, and usage is rising fast, he pointed out.

CW
At Data 78

Further, he said, telecommunications economies of scale and technology are aborbed by overhead. While most firms spend more on communications than on DP, they spend much less on managing communications than on managing DP.

Discussing the problems facing communications departments, Newton noted that they lack top management's ear, are pressured to cut costs and are understaffed.

In addition, they have no time for planning, are not in step with the corporation, have no "bottom-line" thrust and are too labor-intensive, according to the consultant.

Elements of Success

Two communications skills are needed to make a success of the department, Newton said. One is, the "political/managerial/entrepreneurial/-psychological" skill necessary to deal with Bell and Bell lobbying, and the other is the quantitative/analytical skill needed in networking/traffic engineering, voice and data integration and in understanding tariffs. The quantitative/analytical skills also help in effecting the necessary complex financial and tax trade-offs, Newton said.

The telecommunications manager should not try to take over voice communication without having two sets of staff, time and energy, computer time and some budget. He also should not repair voice without having the responsibility, or he won't get the credit. He should not offer suggestions to the voice manager, the consultant said.

In order to take over voice, according to Newton, one should first ask for it and then take the modems, the data lines and then some voice.

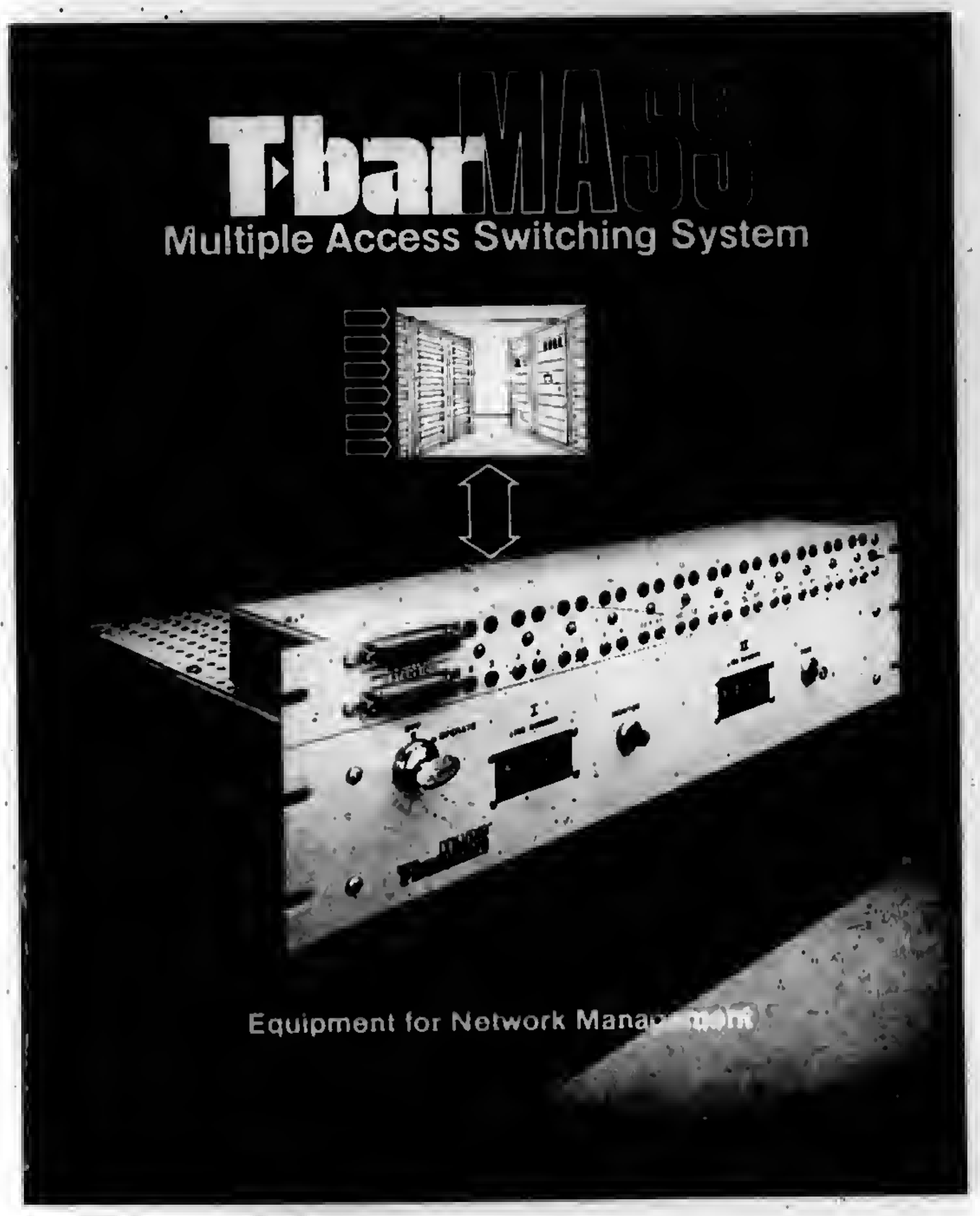
Next, he advised, the manager should argue for integrated nets and use an outside consultant to corroborate his viewpoint.

Finally, the telecommunications manager should make the voice manager "look like a fool" and then should "go to distant locations and make changes for a better system," Newton said.

'Go After Usage'

The typical manufacturer's communications bill allocates 30% to 35% for equipment and the rest for intracompany calls, branch calling and incoming calls (service, Wats). The telecommunications manager must therefore go after usage, Newton said.

The essence of good communications management, he said, is in calculating costs exactly, making them visible and scheduling both usage and facilities. As one guideline for success of the telecommunications manager within his company, Newton suggested using zero-base budgeting. Managers were advised to check what they have, check their branches, set standards, centralize and institute per-unit costing to maximize trade-offs.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Geller Happy Struggle Over

(Continued from Page 5)

The new agency would oppose the U.S. Postal Service's extension of the Private Express Statutes to exclude competition in the new field of electronic mail, Geller said. The post office may find some benefit in wedding electronics to its physical delivery system, he added, but beyond that he isn't sure what the Postal service would add to competition in this field or how electronic mail would benefit the Postal Service.

The issues in EFT will take a back seat at the moment to the privacy issues of which they share a large part, Geller indicated. NTIA's budget stressed its active role as co-chairman with the White House Domestic Policy Staff of the Privacy Coordinating Committee that plans to present an Administration position on privacy to President Carter late this spring.

The flow of data across national borders will also command NTIA's attention, Geller said. He noted the role of the agency's predecessor — OTP — on the interagency task force chaired by the State Department and mandated to develop a U.S. position in this area.

Returning briefly to the executive order, Geller said the jurisdictional fights over it were chiefly between the Office of Management and Budget (OMB), the Department of Defense and Commerce.

Under the executive order, NTIA will advise OMB on procurement policies for the federal government and in all other areas will be principle advisor to the President on telecommunications issues.

NTIA will be in a better position in Commerce than OTP ever was in the White House, Geller asserted. "We will lose the White House clout," he conceded, "but we represent a consolidation under one master of OTP and OT, and we will be able to grow when the issues warrant expansion.

"OTP never consisted of more than 40 or 41 people. It was too small to handle an area in which one area alone — the common carriers — constitute a $120 billion a year business and a growth rate of between 10% and 13% annually."

Judge Thwarts IBM Motions

(Continued from Page 1)

1270 terminal control unit. This motion, too, was denied.

A third motion, based on Memorex's claims that IBM shut the firm out of the computer systems market by preventing Memorex from raising capital needed to advance its System 40 and 50 business, was also denied.

A fourth motion was based on Memorex's claims of a direct-attachment strategy on the part of IBM in the disk drive area. Memorex contended that by integrating what had been separate controllers with disk storage units, IBM acted anticompetitively. This motion, too, was denied.

The judge did uphold one motion, throwing out of court Memorex's claims on the Winchester fixed-head disk drive. Memorex had maintained here that IBM put two products into one for the purpose of requiring customers to buy both from IBM.

Conti found IBM's Winchester design provided enough customer benefits to justify it as a single product, and this claim was upheld.

Computers Seen 'Extension of Nervous System'

By Marguerite Zientara
CW Staff

CW At Data 78

TORONTO — The computer age addresses and encourages development of the left hemisphere of the human brain, according to Marshall McLuhan, well-known author and director of the Center for Culture and Technology at the University of Toronto.

McLuhan expounded upon this theory as a guest speaker at last week's Data 78 telecommunications conference held here.

Speaking to about 250 banquet attendees, McLuhan suggested that computers are an extension of our central nervous system.

Quoting from the Feb. 20 *Time* magazine article "The Age of the Miracle Chips," McLuhan also said that while computers have provided previously unrealized services as well as a great job market, a by-product of the technology has been nostalgia for the old days and the fear that computers may be used for evil purposes.

According the McLuhan, a new technology such as computerization tends to enhance things, as in the number and quality of new services. But it also tends to "obsolesce" things, as the "instant replay" of software information obsolesces hardware. It also enables people to retrieve things as the computer age has retrieved the "primitive data hunter."

The development of the phonetic alphabet in the Fifth Century B.C. by Phoenician busienssmen, out of a love for efficiency, split off the visual power governed by the left hemisphere of the brain from the other human senses, he said.

This alphabet of meaningless symbols is translatable by the brain's left hemisphere, just as computer programs are written using the left hemisphere, utilizing logic, classification and sequential order, McLuhan said.

In a speech filled with literary, historical, psychological and artistic allusions, McLuhan briefly traced the development of education from the "acoustic education" of the classical Greeks to the "visual education" of today.

Whereas in the "old world" cause preceeded effect, today — in advertising, for example — one determines the desired effect and manufactures the cause that will produce that effect, McLuhan said.

In the computer age, when technology moves at the speed of light, the primitive hunter becomes the espionage man, McLuhan said. Businesses and governments are run by manhunters and information seekers; espionage is the main business of mankind, he asserted.

"Having no physical body is where it's at," McLuhan said in describing communication over wires between two distant points. Not only does one have no body, McLuhan said, but one also has no private identity, no relation to natural law and therefore no morals.

Telecommunications has brought with it a new politics where politicians trade on charisma rather than policies, he said. McLuhan defined "charisma" as "looking like a lot of other people" and commented that "those who have it will rule the world."

Because of a technology that functions at the speed of light, hardware becomes software — man is doing more and more with less and less, McLuhan said, attributing the idea to R. Buckminster Fuller.

Tennessee Stops Software Tax

NASHVILLE, Tenn. — Gov. Ray Blanton last week signed into law a bill that excludes software from the definition of "tangible personal property," thereby exempting it from sales-and-use tax.

H.B. 2026 was passed by both the state senate and house of representatives on March 20 and was sent to the governor on March 28. He signed the bill on April 3, according to legislative aide Nelson Biddle.

The Tennessee Supreme Court ruled in 1976 that software was intangible and therfore not taxable in the case of Commerce Union Bank vs. George M. Tidwell. In April 1977, Gov. Blanton signed into law S.B. 224, which included software in the definition of tangible personal property, therefore making it subject to Tennessee's 5% sales-and-use tax effective July 1, 1977.

Deleted from S.B. 224's definition of tangible personal property in H.B. 2026 was the sentence: "It specifically includes customized or packaged computer software, which is defined to mean information and direction loaded into a computer which dictates different functions to be performed by the computer, whether contained on tapes, disks, cards or other device or material."

According to Bob Goldstein, legal counsel for the Association of Data Processing Service Organizations (Adapso), which lobbied heavily in Tennessee for passage of the bill, it remains to be seen whether Tennessee will conduct audits for the nine-month period between the effective dates of the two bills.

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IRS System Aging Rapidly as Returns Mount

(Continued from Page 1)

system includes a terminal as well as a keyboard to ease error correction. HIS has maintained the GE system for the IRS ever since GE left the computer business in 1971, the IRS official said.

First Major Patch

The HIS 2050s and 2050As have received the first major patch the IRS has put on its computer system since the agency learned in January that, because of privacy concerns, its plans for an advanced distributed computer system — called the Tax Administration System (TAS) — would not be approved for funding [CW, Jan. 16].

Just over a week ago, Centennial Systems, Inc. completed the installation of $1 million worth of Cambridge Memories, Inc. add-on units for HIS Series 2000 processing units. This patch will add two modules of core — 256K — to each of the IRS' 2050s and 2050As, Dubroof said.

"Good number adders, subtractors, multipliers and dividers," these machines will complete the data entry process for your return by verifying your computations and picking up any math errors you may have made, Dubroof continued.

At this point in the tax return process, too, all significant elements of the return are given a score determined by formulas developed by the IRS and an outside mathematical consultant.

The important bits of data are scored for such elements as their accuracy as you reported them and their proximity to the standard IRS has set for that piece of information for someone with your income and family size. The formulas used for scoring returns are known to only a small number of IRS people and changed frequently, Dubroof said.

For example, if you itemized your deductions on the Form 1040 and if your deduction for contributions to charities and other worthy causes appears too large in comparison with the formula's average for your income and family group, the system may flag your return for an audit.

Unusually large deductions are not always audited. An IRS agent may be convinced by the supporting evidence you file with your return and restore it to the natural flow of processing.

The significant information from your tax return then moves in machine-readable form to the national computer center in West Virginia, where it will be processed on IBM 360s and 370s.

The national computer center will capture the information on your return and match it with your past file, seeking to determine, for example, whether you owe taxes from a previous year. The search of your corner of the master file, in short, is made to discover whether there is anything important about your return that is not obvious on its face, Dubroof said.

If all goes well with your return and the final score of all the important elements in it makes it eligible for posting and the government owes you money, your tax statement will be included on a magnetic tape for refunds to be sent to one of seven Treasury Department disbursing offices in the U.S. If you owe the government money, on the other hand, your return will become part of a magnetic tape sent back to the service center, where invoices are printed and issued to taxpayers.

Audited Returns

Seventy percent of those who file returns receive refunds, Dubroof said. Ninety percent of the time, returns proceed through this processing system without being audited, he added.

The 10% of the returns that are audited or that show money is owed go back to the service centers and are entered into the integrated retrieval system, a real-time operation based on Control Data Corp. 3500 mainframes.

Each of the service centers has one CDC 3500, and the system these machines support permits the IRS to maintain unresolved returns in an active file that can be accessed immediately in communications with the taxpayers involved, Dubroof said.

The CDC 3500s are "barely serving their purpose because they too are running out of capacity," Dubroof noted. The next major patch to the IRS tax processing system will be to add another 3500 to each of the system's service centers, he said.

Until then, the IRS will continue to operate the CPUs of the integrated data retrieval system around the clock on weekends. "Additional 3500s for the service centers would keep us together, hopefully until 1984," Dubroof stated.

By then, the IRS technical advisor hopes the IRS will have a long-range procurement plan under way that will replace all of the equipment the agency uses now. By that time, the entire system will be obsolete.

What does the IRS' computer system do when it isn t processing your return? Well, the agency uses its DP operation in the months after April to handle all the filing requirements made on corporations, banks, employers and the like that don't fall due on April 15.

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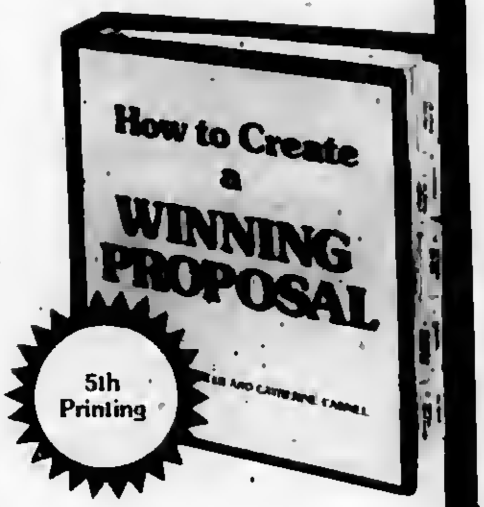

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Keydata Adds Unity Series For In-House or Net Use

(Continued from Page 1)

"That's why hardware manufacturers have traditionally shied away from providing application support for their customers, particularly their smaller customers."

The Keydata product line consists of four systems that can be installed in any of 11 configurations. All members of the Unity series family are built around 64K- to 256K-byte Novas with 700 nsec MOS memories and include Control Data Corp. 125- to 1,100 line/min printers and 10M- to 320M-byte disk drives in "a wide variety of models," a Keydata spokesman said.

The product line, which communicates through IBM 3780 emulation at speeds up to 9,600 bits/sec, also comes with an assortment of Hazeltine Corp. and Infoton, Inc. 24-line by 80-character CRT terminals.

At the low end of the series is the Unit 1/Model 10, which consists of a CPU with a 64K-byte main memory, 1,900-character CRT terminal, 10M-character random-access disk storage unit and a 70 line/min printer.

A typical Unity 2 system — the Model 32 — incorporates a 64K processor, 32M-byte disk drive unit, three CRT terminals and a 70 line/min printer. A typical Unity 3, meanwhile, consists of a mini with a 128K-byte main memory, 160M-byte disk drive, 10 CRTs and a 300 line/min printer.

At the high end of the hardware series, the Unity 4/Model 160, incorporates a CPU with a 256K-byte memory, 320M-byte disk storage unit, up to 20 CRT terminals and three printers.

The Unity series' disk-resident operating system consists of five interacting software modules: a multiaccess editor, data base control module, batch processing manager, resident multitasking executive and utility function executive, Keydata said. Languages accommodated by the systems are reportedly Form Program Generator and Report Program Generator, and RPG-II-like language.

Applications software for the Unity series includes packages for the standard business functions like order entry, invoice preparation, inventory control, accounts receivable, sales analysis, purchase order processing, accounts payable, general ledger and payroll. The applications software also allows users to prepare an assortment of management reports including customer statements.

Prices for the Unity series' 11 configurations range from $48,000 to $290,000. Keydata is at 20 William St., Wellesley, Mass. 02181.

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Fine Arts Applications Extended

Choreography for TV Designed by Computer

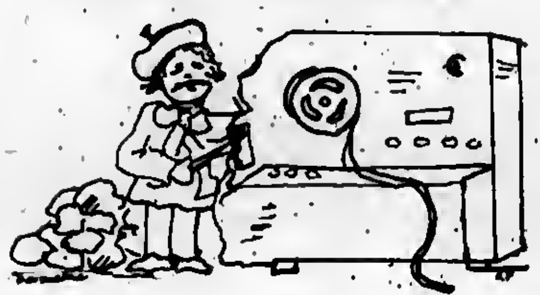
By **Brad Schultz**
CW Staff

NEW YORK — A Brazilian woman living here is working to extend the scope of fine arts computer applications to choreography, using television as the choreographic "transmission channel" and the computer as an instrument to design both the choreography and its transmission.

Before beginning this work, "I made a few choreographics for television. The quality of these dances was not satisfactory to me because television did not transmit the message as I had planned it," Analivia Cordeiro recalled.

"Given the primitive condition of television in Brazil, I decided the way to obtain best results would be to use an analytical system of dance design," she explained.

New Masters



Cordeiro uses the phase "analytical system" in the sense of a procedural, systematic approach, she indicated.

The idea of an "analytical" approach emerged in Brazil, where it is not practical to hold enough rehearsals of a televised dance production to allow interaction between the dancers and the television crew to develop Cordeiro explained.

"I chose an analytical system [to plan this interaction] because the design of both the choreography and its TV transmission requires specifications for very small intervals of time. This [level of detail] is almost impossible to achieve through verbal [instructions] or grapic sketches," she said.

The choreographer's father, Waldemar Cordeiro, introduced her to an "analytical" approach to art, beginning research in computer graphics art, at about the time she commenced her TV experiments in 1970. However, he died before they could discuss her early results in 1973, she explained.

"Since dance is communicated through human movement, and since it has a syntax, one can divide the dance language into its syntactical elements. Therefore, one can compose a dance message structuring the relationships between these elements," Cordeiro said.

Studied von Laban

Cordeiro noted that she improved her approach by studying the works of Rudolph von Laban, a German engineer who in 1928 invented the system of dance notation said to be most widely used in America today.

To communicate choreographic directions to dancers and the TV crew, Cordeiro specifies such elements of the production as the dancer's displacement in space, positions of the body, camera angles, planes of focus, visual effects and camera changes. All of these elements correspond to prescribed time intervals and speed of action.

While working at the State University of Campinas in Brazil, Cordeiro used Fortran IV programs implemented on a Digital Equipment Corp. PDP-10 CPU to formulate her dance models, for example, plotting the trajectories of dancers responding to her choreographic commands.

Cordiero emphasized, however, that some aspects of dance — such as the emotional element communicated by the dancers to the audience — cannot be mechanized.

Do some members of the dance community resent efforts at computerization of dance as dehumanizing? "This is a very meaningful resentment," Cordeiro said, noting that such efforts have had a mixed reception thus far.

Man has several ways of understandings his surrounding reality, she said. Emotion, lyricism and the sense of beauty all are means of understanding that coexist with the rational one. If technological applications intend to eliminate a form of understanding reality, they will have a dehumanizing effect, she explained.

"Any attempt to rationalize the emotions, with the aim of reproducing or simulating them . . . will dehumaize. If emotion does not have the function of grasping reality, its meaning is lost," she concluded.

DPMA Selects Exposition Sites

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has announced the locations of its International Conference and Business Exposition through 1984.

They are San Diego, 1979; Philadelphia, 1980; San Francisco, 1981; Chicago, 1982; New York City, 1983; and Houston, 1984.

Site selections for the 1985 and 1986 conferences will be announced at the February 1979 meeting of the DPMA executive council.

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Misapplied Instruction Puts Nielsens on Blink

By Brad Schultz
CW Staff

NEW YORK — Misapplication of a single computer program instruction and the Blizzard of '78's temporary freeze on mail caused A.C. Nielsen Co. to err recently in figuring the network television ratings that are a factor in setting television advertising prices.

The overall effects of Nielsen's goof were described as "minimal" by an NBC-TV source. Although some shows were rated up to five points off their actual position, most shows affected — such as "Laverne and Shirley" and "Three's Company" — were off by "insignificant" tenths of a Nielsen point, according to a Nielsen spokesman.

Subsequent corrections of the errors has generally been to the detriment of NBC's rivals, ABC and CBS, he noted.

The programming error effectively put eastern U.S. cities in the Pacific Time Zone, according to NBC's research/corporate planning vice-president, Bill Reubens. Philadelphia's midnight viewing audience, for example, was polled as if it were a prime time 9 p.m. audience, even though the Eastern Time Zone is three hours ahead of the Pacific.

Role of Blizzard

The software problem was compounded by the blizzard's temporary disruption of mail delivery in New York. Nielsen normally starts each day with a listing of TV shows for that day provided by each network, but in the storm's aftermath these listings could not be delivered, Reubens explained.

Standard procedure in such cases is for Nielsen to rely on the preceding week's listings, usually a good indication of the current week's offerings. Nielsen did so — without noting NBC's unusual two-part telecast of the motion picture "Midway" on successive nights during that week.

The audience tuned to NBC's telecast of the World War II battle epic were thus interpreted as viewing what NBC had shown in those time slots during the preceding week, Reubens indicated.

NBC's telecast of the first part of "Midway" earned a Nielsen rating of 34 points, but the film's second part registered 29 points, Reubens said, noting this drop aroused NBC's suspicions about the ratings' accuracy. The second part of the movie is considered more exciting and should have earned more points, he indicated.

Point Total

Furthermore, the sum of ABC, CBS and NBC points during that night's "Midway" telecast came to 91 points, though this figure is normally 95 or 96 points.

The Nielsen spokesman said the firm regularly estimates total U.S. channel-by-channel TV usage by sampling about 1,200 U.S. households. One Nielsen point is supposed to represent 1% of the nation's 73 million TV sets, so a particular TV show's Nielsen rating is the estimated percentage of the total viewing audience tuned to that show.

Selection Process

Nielsen press relations director Bill Behanna said the sample households are selected primarily on the basis of geographic location. The firm concentrates on household sites rather than the families living within those sites, he added, noting there is an annual turnover of about 20% in households polled, entailing a turnover in families involved of about 33%. Nielsen does not follow families as they move about.

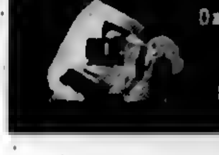
A device called an Audimeter is placed in each household and is connected with Nielsen facilities via a private telephone line. The Audimeter functions as a remote terminal capable of storing information and monitoring usage of all TV sets in the household, Behanna said.

Nielsen publishes its ratings 24 times per year — with some exception, one report every two weeks. The late January-early February report has been reissued with 206 of its 425 program ratings corrected, Behanna said.

The extent of correction was .3 Nielsen points or less for three-quarters of the 206 ratings revised, he added, noting that the standard error allowed for in rating prime time shows is at least one point.

Bill Drake, assistant to the group manager at Nielsen's Florida DP facility, site of the foul-up, said DP personnel did not want to discuss the specific nature of Nielsen's system with the press. But Drake did note that Nielsen relies on an IBM 360/65 CPU.

There is some dispute as to whether NBC or Nielsen first discovered the rating errors. The effects of Nielsen's corrections are said to have raised NBC's position the first week, but lowered it the second week. However, competitors ABC and CBS were cut for both weeks of the rating period.



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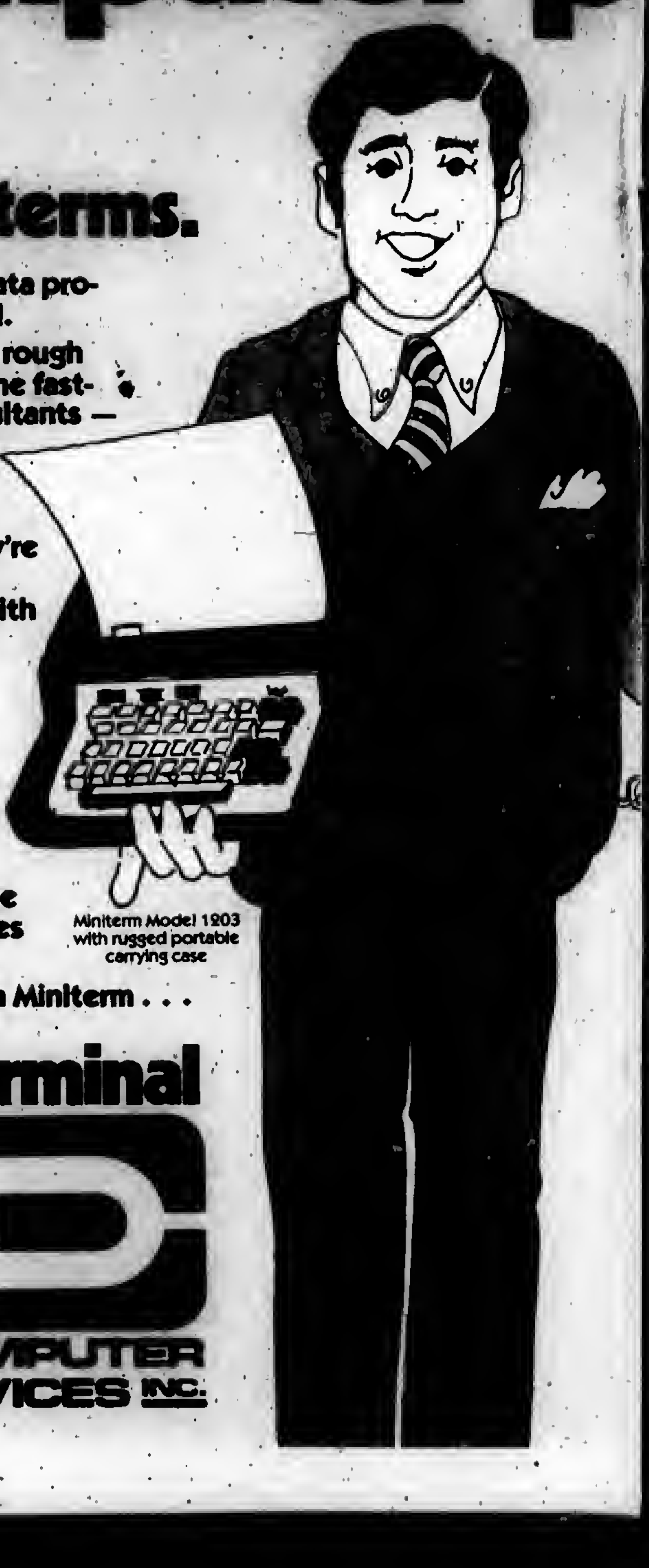

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'Computer Vans' Aid Search For Radioactive Satellite

EG&G Photo

Van with minicomputer aboard rolls off Air Force transport hours after Soviet satellite crashed in Canada.

By Brad Schultz
CW Staff

EDMONTON, Alta. — Only hours after a nuclear-powered Soviet satellite crashed to earth in northern Canada, a joint U.S.-Canadian team set up a command base here and began searching more than 15,000 square miles of frozen wilderness for the fallen craft's radioactive debris with minicomputer-based tracking equipment.

Since the late January crash, Canadian military and energy specialists had worked with a U.S. Department of Energy (DOE) Nuclear Emergency Search Team (Nest) comprised of personnel from DOE, EG&G, Inc., Lawrence Livermore Laboratories, Los Alamos Scientific Laboratory and the Environmental Protection Agency.

Dubbed Operation Morning Light, the effort is said to be the largest of its kind since 1966, when the U.S. tried to recover an H-bomb accidently dropped by a B-52 bomber off the southern coast of Spain.

However, Canada has just pulled its military forces out of the project, leaving Nest and other technical groups to investigate for perhaps another year the possibility of radiational aftereffects in the crash region.

Although many small radioactive fragments have been removed, there has been no sign of the satellite's nuclear reactor. Investigators are now speculating that the reactor either burned up during reentry from space or now lies at the bottom of one of the region's numerous ice-covered rivers and lakes.

DP Labs on Wheels

When Morning Light began, no one knew precisely where the Cosmos 954 satellite had come down; how many pieces of the craft were strewn about the tundra; whether the nuclear fuel core had been jettisoned in space, as it should have been; or whether the debris posed a lethal, large-scale hazard to people and animals in its vicinity.

Two "computer vans" — mobile DP laboratories — were airlifted here for use in conjunction with airplanes to pinpoint sites of major radioactive emissions. The 500 mile-long, 30-mile-wide search zone was divided into equal areas, and planes equipped with gamma-ray detectors zigzagged at low altitudes across each area while three people aboard watched a monitoring console for a "hit" — an abonormal spike in radiation levels.

When a hit was indicated, its location was marked for a follow-up flight, since planes never doubled back. Location coordinates of substantiated hits were radioed from the planes to either computer van.

The vans rushed to hit vicinities around the clock, pinpointing sites of radioactive debris with their mini-based detection and plotting equipment. They radioed exact positions of debris finds to the Edmonton command base, which then dispatched teams by helicopter to remove the debris.

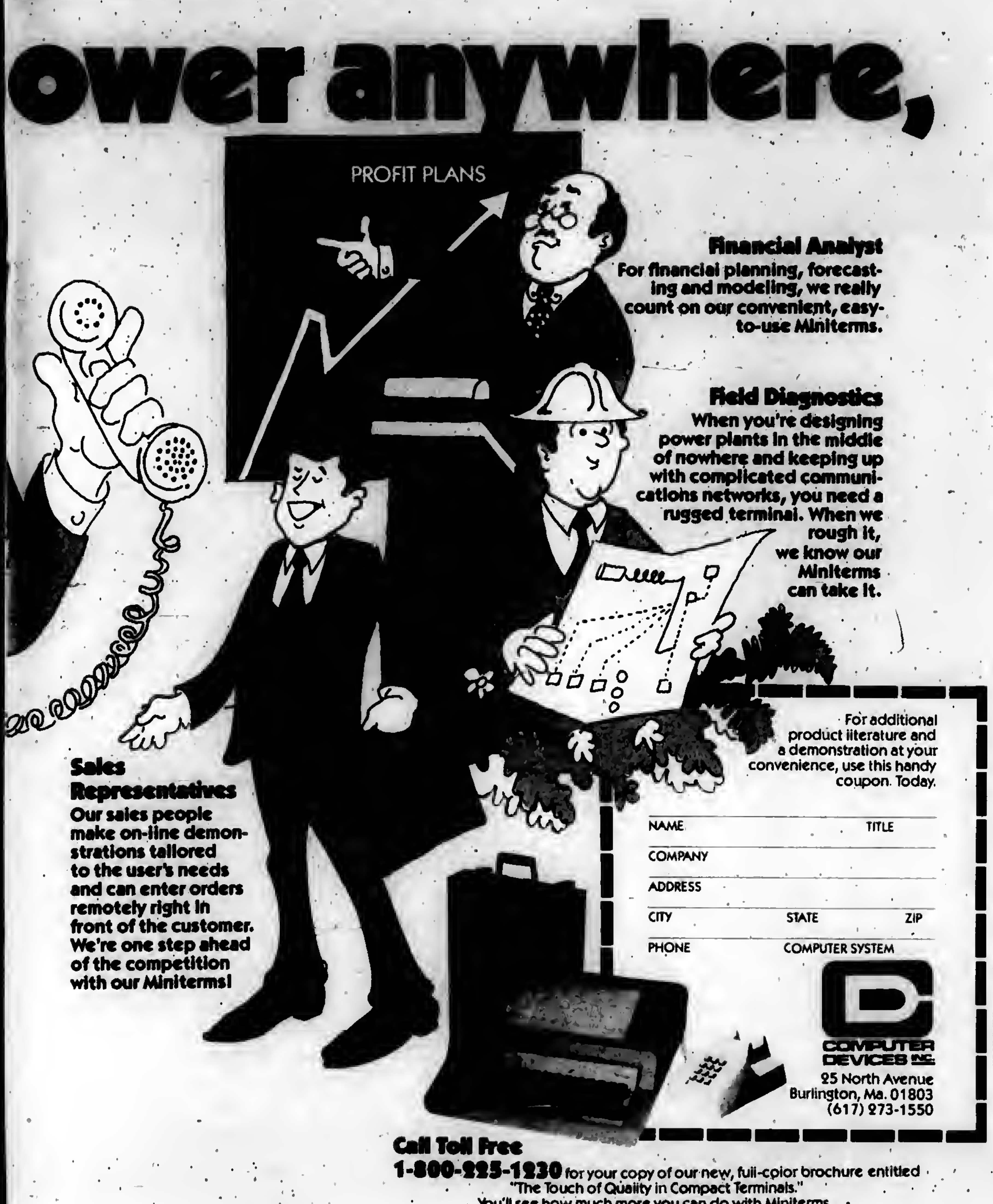
Independent Systems

Each van contained a complete, independent computer system capable of plotting the radiological signature and the geographic locations of pieces of the satellite. The system was driven by a Data General Corp. Nova 840 minicomputer with 32K words of core and a floating point processor, according to E. Jack Story, deputy general manager of EG&G Inc.'s Energy Measurements Group in Las Vegas.

EG&G is a DOE contractor that has conducted routine aerial radiation surveys of nuclear power plants and laboratories for the department and contributes expertise and equipment to Nest whenever incidents such as the one in Canada occur.

The data was originally recorded on 800 bit/in. NRZI 9-track magnetic tapes, and each van was equipped with

(Continued on Page 12)



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Outdated NCIC Record Leads to False Arrest

By Ann Dooley
CW Staff

STOWE, Vt. — Police here stopped and arrested a driver and four passengers recently after a check of the National Crime Information Center (NCIC) system indicated the car was stolen. That information, however, turned out to be inaccurate and out of date.

The occupants of the Mercedes Benz were members of an all-black band called "Hawkeye" who were enroute to a musical engagement when they were stopped.

State police said they spotted the Mercedes on a major interstate highway and ran a "routine check." Upon learning the car was stolen, they informed local authorities who reportedly stopped the group with "guns drawn."

Second Check

When Robert Sumler, owner of the car, produced his license and registration, Stowe police made a second check with the police in Providence, R.I., where the car was registered. The second check showed the car had been stolen last summer in Providence but was recovered in Boston some time later and returned to Sumler.

But Providence police apparently never purged the registration number and theft report from the NCIC file when the car was recovered, Vermont state police claimed.

"The system is no better than the people feeding information into it," according to Lt. Edward Fish, head of that state's police unit.

Providence police, however, claimed that since the car was recovered out of state, they had no way of knowing it had been returned to its owner. Boston police never informed the Providence department of the vehicle's recovery, and it's difficult to tell what happened since Boston has so many stolen car reports that it doesn't keep records very long, a Providence police spokesman claimed.

Hawkeye members could not be reached for comment.

'Number of Reasons'

All of the law enforcement agencies agreed there could have been any number of reasons why the theft report didn't get purged from the system. The large volume of paperwork and the lack of communication among all the agencies makes these incidents possible, one officer said.

In fact, a Stowe police officer mentioned he had recently noticed a vehicle on the stolen vehicle list that had been returned to its owner. The officer noticed the error only because Stowe has only "about half a dozen" stolen vehicles to record, he said.

Vans With Minis Aid Debris Hunt

(Continued from Page 11)

two such drives from Data General and Cipher Data Products, Inc. to read them, Story said.

"A recently-designed microprocessor-based data acquisition system normally writes on DC300A-type cartridges, [so] two drives were provided in one of the vans to handle those cartridges," he explained.

Results Plotted

The results of the data reduction were presented as plots from Tektronix, Inc. 4010 interactive graphics terminals with Tektronix 4610 hardcopy units and from California Computer Products, Inc. 30-in. Model 563 and 10-in. Model 565 drum plotters in each van, Story noted.

"A variety of in-house Assembly language programs could be loaded from the 9-track drives, from the dual Data General 'Philips' cassette decks or from single 2.5M-byte [Diablo Systems, Inc.] disks.

"Batching of jobs was achieved via a Data General high-speed paper tape reader, and paper tape punch, and tables were provided on a Texas Instruments KSR 743 Silent 700 thermal terminal. Software modifications were accomplished in the field using Data General's Real-Time Disk Operating System on the 25M-byte disk," Story added.

Still Some Uncertainty

Search officials have said they are fairly sure they have recovered all of the very large radioactive pieces exposed on the ice and snow, but have also said they will be lucky to recover half of what came down from space and may never be certain whether all of the satellite's uranium core has been found.

Morning Light is the first all-out deployment of Nest since the unit was formed, another EG&G source said, noting that previous Nest actions involved small numbers of people in searches for lost radioactive materials used in hospitals and in industry.

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Standard Oil Chairman to Give NCC Keynote

MONTVALE, N.J. — Computers and energy will be the major theme of this year's National Computer Conference (NCC), scheduled for June 5-8 in Anaheim, Calif.

In keeping with that theme keynoter Harold J. Haynes, chairman of the board of Standard Oil Co. of California, will speak June 6 on the present and potential role of computers in helping both to alleviate the world energy shortage and to analyze energy problems, according to the American Federation of Information Processing Societies (Afips), the NCC sponsor.

Haynes' speech will include a discussion of energy needs and priorities both in terms of national interests and the worldwide supply. He will also survey those efforts now being developed that are related to finding new energy resources and techniques.

Haynes will be followed by a special symposium on "Developing Energy and Computing Technology" featuring experts from government, industry and the academic world. They will focus on the ability of existing computer technology to assist in the problem.

Panelists will also discuss and analyze existing conditions, policies and expected trends and make analogies between the development of the computer industry and the need for new developments in the energy industry.

Among the panelists will be Dr. Arthur G. Anderson, president of IBM's General Products Division; Rep. Peter McClosky (R-Calif); Prof. Henry D. Jacoby, professor of management and director of the Center for Energy Policy Research at MIT; Thomas J. Davis Jr., managing partner of Mayfield II, a firm specializing in venture capital with an emphasis on high-technology areas; Dr. Marjorie W. Evans, an attorney, scientist and advisor to the Bank of America in California; Dr. William F. Miller, a computer scientist and vice-president and provost at Stanford University; and Dr. John Stephens, president of Excel-Minerals Co.

Chairman for the symposium will be Dr. Cuthbert C. Hurd, president of Solar Energy Research Associates.

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Calendar

April 25-27, St. Louis — **Gateway Computer Expo '78**, sponsored by The Conference Co. Contact: Kathy Quinn, Computer Expo '78, 60 Austin St., Newton, Mass. 02160.

May 9-12, Los Angeles — **Computer Graphics: State-of-the-Art Techniques and Applications**, sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

May 10-12, Washington, D.C. — **Product Training Seminar for PC/70 and SDM/70**, sponsored by Atlantic Software, Inc. Contact: Atlantic Software, Lafayette Building; Fifth and Chestnut Streets, Philadelphia, Pa. 19106.

May 10-2, Dallas, — **Computer/Microfilm Interfaces Seminar**, sponsored by the U.S. Civil Service Commission. Contact: Michele Adams, Dataflow Systems, Inc., 7758 Wisconsin Ave., Bethesda, Md. 20014. Also held May 15-16 in San Diego, Calif.

May 10-12, Atlanta — **Fundamentals of Finance and Accounting for the Non-Financial Executive**, sponsored by The Wharton School, University of Pennsylvania. Contact: The Wharton School, University of Pennsylvania, Dietrich Hall, Locust Walk, Philadelphia, Pa. 19174. Also being held May 17-19 in Chicago and St. Louis, May 24-26 in New York and May 31-June 2 in Chicago and Houston.

May 10-12, Ellenville, N.Y. — **Conference 78**, sponsored by the Empire Region of the Data Processing Management Association. Contact: John G. Kinberlin, Exxon Corp., P.O.Box 153, Florham Park, N.J. 07932.

May 11-2, Los Angeles — **Computer Systems — Defense and Other Government ADP Programs**, sponsored by the American Institute of Aeronautics and Astronautics (AIAA), the Data Processing Management Association and Technical Marketing Society of America. Contact: AIAA Conferences, Suite 1010, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

May 11-2, Rochester, N.Y. — **Sigir 78**, sponsored by the Special Interest Group for Information Retrieval. Contact: James Iverson, Xerox Corp., Xerox Sq. 128, Rochester, N.Y. 14644.

May 11-13, Urbana-Champaign, Ill. — **Fourth Illinois Conference on Medical Information Systems.** Contact: Julie Garrett, Conference Coordinator, Regional Health Resource Center, 1408 W. University Ave., Urbana, Ill. 61801.

May 12, Columbus, Ohio — **22nd Annual Symposium of the Central Ohio Chapter of the Association for Computing Machinery.** Contact: G. Pat Graham, Growth Centered Enterprises, 1120 Morse Road, Columbus, Ohio 43229.

May 14-17, Washington, D.C. — **25th Annual Meeting of International Business Forms Industries (Ibfi).** Contract: Joseph M. Aquilla Jr., Ibfi, 1730 N. Lynn St., Arlington, Va. 22209.

May 14-17, Chicago — Share Interim Meeting 50.5. Contact: Share, 1 Illinois Center, 1111 E. Wacker Drive, Chicago, Ill. 60601.

May 15-19, Atlanta — **16th Annual Association for Educational Data Systems (Aeds) Convention.** Contact: Convention Registrar, Aeds Headquarters, 1201 16th St., N.W., Washington, D.C. 20036.

May 15, Chicago — **Distributed Processing for Today and Tomorrow**, sponsored by SBS Publishing. Contact: Larry Dietz, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129. Also being held May 18 in New York.

May 15-16, Dallas — **1978 International Association of Hospitality Accountants' Computer Conference.** Contact: Edwin Lederman, Laventhol & Horwath, Suite 2550, 2001 Bryan Tower, Dallas, Texas 75201.

The CW Calendar generally appears in the first and second issues of each month; events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

Call for Papers

1979 INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH AND SIGNAL PROCESSING, Washington, D.C., April 2-4, 1979.

General signal processing topics will include spectral analysis, filter design, structures and quantization and high-speed algorithms; speech processing topics will include analysis, wideband and narrowband speech communication and evaluation and aids for the handicapped; underwater acoustics, seismic signals and radar topics will include theory and experimentation, adaptive filtering and beamforming and simulation; and psychoacoustics and electroacoustics topics will include loud speakers, environmental noise and recording and reproduction.

Two copies of a 100-word abstract should be sent by Sept. 12 to Dr. G. Robert Redinbo, Electrical and Systems Engineering Department, Rensselaer Polytechnic Institute, Troy, N.Y. 12181.

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NATIONAL –SPECIAL LEAR SIEGLER ISSUE–

INFORMER

April 10, 1978

THE PEOPLE WANT TO KNOW:

WHY IS LEAR SIEGLER TRYING TO HUSH UP PROJECT X?

The Ballistic Printer: The Printer That Changed the Industry

Page 10

★ ★ ★

Project X Investigation Hampered by Lack Of Informants

Page 37

★ ★ ★

How to Tell If Your Life is Being Influenced By Project X

Page 21

★ ★ ★

The Dumb Terminal And Ballistic Printer Play Well Together

Page 8

Top-ranking LSI engineer attempts to conceal face while emerging from hastily called, top-secret emergency meeting. Meeting is rumored to be directly concerned with Project X. INFORMER PHOTO

Despite mounting evidence to the contrary, Lear Siegler continues to play down its hush-hush Project X as relatively unimportant, INFORMER sources indicate.

Why is Lear Siegler trying to dismiss what rumors say is the biggest computer industry coup of the year? What are they trying to hide? And why are they trying to hide it?

The INFORMER sent a reporter to Lear Siegler, Inc. HQ in Anaheim to interview a high-ranking officer/engineer. To our surprise, the engineer volunteered little information about Project X, and nothing new, saying only that Project X was "...definitely not harmful to life as we know it."

This mysterious statement has stirred further controversy in the computer industry as to just what Lear Siegler is trying to accomplish—and hide—via Project X.

INFORMER sources indicate that, at the very least, Project X is in the process of developing new smart terminals, astonishing intelligent terminals, unbelievable printers, and even a mind-boggling terminal controller. All these new lines are, to the best of our knowledge, for the purpose of totally dominating this year's National Computer Conference (NCC). What else Project X may be attempting can only be guessed at, and Lear Siegler's strange unwillingness to reveal the aims of Project X is causing pressure to mount against further secrecy.

Rumors of a cover-up at Lear Siegler have, as yet, been unconfirmed. But interest and speculation in this area have gained new impetus with Lear Siegler's protracted insistence of absolute and total secrecy regarding Project X.

What strange and marvelous new devices are undergoing testing behind the closed doors of Project X? What wonders does Lear Siegler have planned for this year's NCC?

Until (and if) INFORMER sources have anything substantial to report, educated hypotheses remain our only recourse: Leading scientists in the computer industry are, at this very minute, busily projecting the probable and possible thrust of Project X, and several reports are purportedly already under preparation.

There is even a confidential report filed with The INFORMER that Lear Siegler has gone so far as to actually (Please turn to Page 4, column 2.)

In Gas and Electric Bills

Ventilator Control Saving Hospital $90 a Day

WOODLAND, Calif. — Energy costs are down and maintenance efficiency on the way up at Woodland Memorial Hospital, 20 miles from Sacramento, thanks to an equipment control system installed here.

The system, designed by the Energy and Data Management (EDM) Division of Welco Electric has reportedly brought enormous energy savings to the hospital through control of the hospital's massive ventilators, each of which is now turned off for several minutes every hour.

The EDM 1020D which includes a CRT terminal and high-speed printer, looks fairly unobtrusive in the corner of a basement office at the hospital, but the first utility bills received since its installation are attracting plenty of attention.

"Between the gas and electric, our energy costs are $90 a day less than last month," according to Al Rice, director of plant operations at the 114-bed facility. At that rate, Woodland Memorial can expect to save approximately $32,000 a year in energy bills, Rice predicted.

Prior to the installation, the air handlers were controlled manually, and complex scheduling would have been impossible. Now, with the touch of a few buttons on the terminal, Rice can select one of 19 hourly schedules preprogrammed on the EDM 1020D's dual floppy disk unit.

For example, each air conditioning motor can be shut off for five, seven and a half, 10, 15, 20, 30 or 40 minutes — up to 60 minutes each hour — on schedules determined in accordance with required air changes. A total of 53 hourly schedules are available with the 1020D.

EDM Chief Russ Evensen explained the substantial savings: "If we turn off a 50 horsepower fan for 10 minutes each hour, then we've knocked one-sixth of our hourly kilowatts for that unit off the monthly electric bill.

"That's about 30 cents an hour, based on current local rates, or about $2,600 a year, just for turning off one motor for a few minutes each hour."

Rice also expects to find considerable savings in a less dramatic, but equally important area — preventative maintenance. The EDM 1020D includes a program that keeps track of the maintenance history of each piece of equipment under plant operations staff's jurisdiction.

The preventive maintenance program will not only help Rice keep the equipment in better repair, thereby avoiding unnecessary breakdowns, it will also indicate problem areas before they reach the critical point, he said.

Rice anticipates savings of $15,000 a year from the benefits of better routine maintenance and more efficient trouble-shooting techniques, or about the same as the savings on electricity costs provided by the motor control program.

Energy Audit

Evensen said his firm required two or three days to run an energy audit on the 91,000 sq-ft Woodland facility before wiring the computer to the various motor control centers in the hospital. That took about three weeks after the arrival of parts.

Wiring was done by EDM's parent firm, Welco Electric. No new lines or circuit breakers were required to install the 12V system, which uses solid-state relays and consumes about as much power as a television set.

Woodland Hospital eventually hopes to control at least one elevator through the EDM 1020, according to Rice, so that it can be shut down automatically after visiting hours.

Rice noted that one considerable fringe benefit to having large mechanical equipment wired through the computer is increased safety.

During a fire, for example, the plant operations staff has complete control of all exhaust and supply fans.

In the event of a power failure, the EDM 1020D goes through a power-down sequence that turns all equipment off and will not allow it back on until the plant operations crew initiates the start-up procedure.

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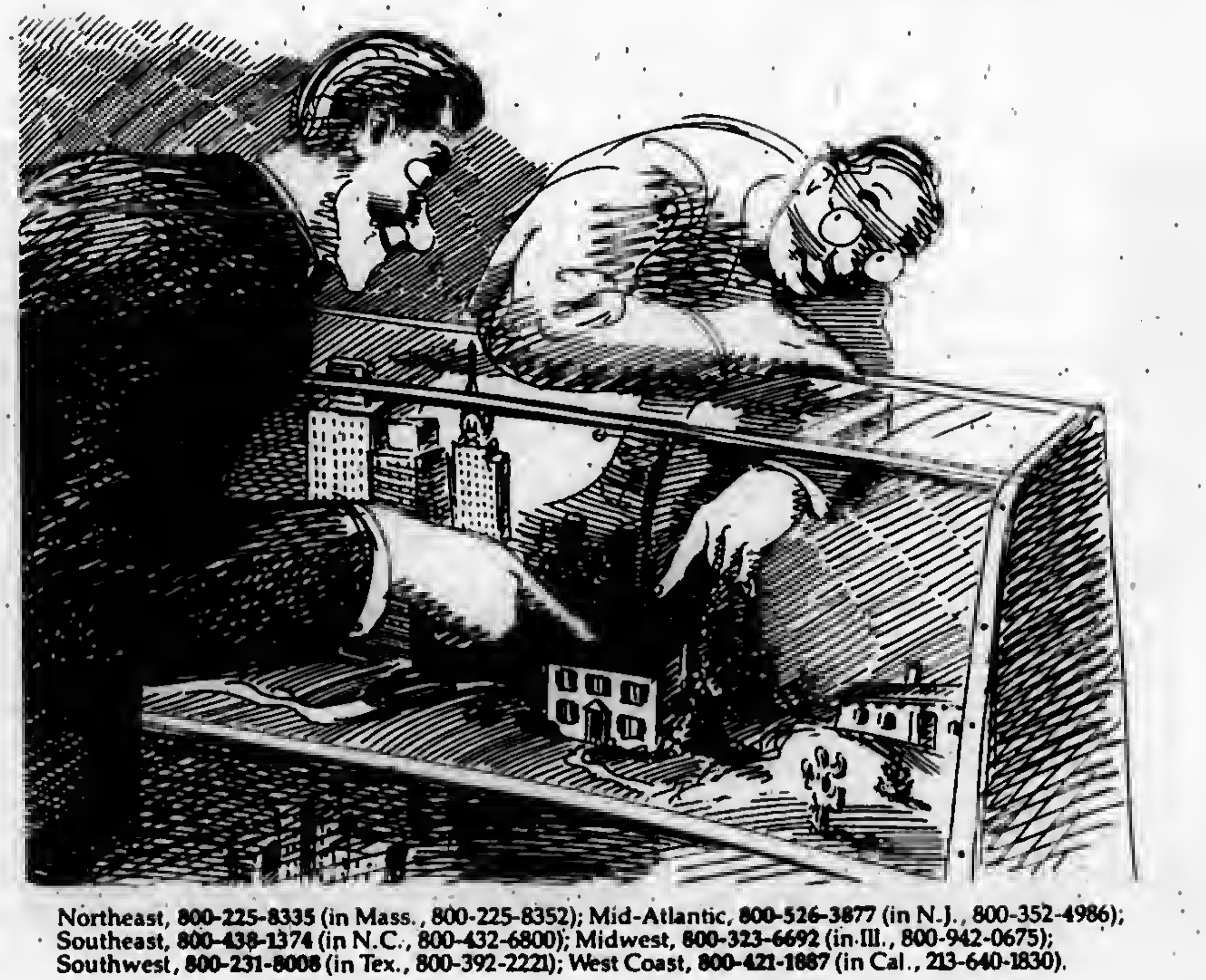

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Editorial

Back to Old Price Formulas?

After a year and a half of price cutting, the new stiff price tag for the IBM 3033 in a multiprocessor (MP) configuration |CW, April 3| comes as somewhat of a shock.

For 18 months now, IBM has been leading the parade of price cutters in the medium- and large-scale computer market and prices have plummeted drastically, benefiting users able to take advantage of those price drops.

But now IBM seems to be acting in what has been its more traditional role of price leader for the industry.

Having little competition in the very large systems area, except from the superior Amdahl Corp. product in this market, IBM is charging a stiff price for its multiprocessor configuration with the 3033 MP tagged at $400,000 more than two stand-alone 3033 processors.

Although users gain only 60% to 80% in instruction execution rate with the MP configuration over a uniprocessor, they do get several other significant advantages for the extra cost.

The model 3038 communications control unit, which accounts for the price increase, allows the user to address the total memory on either system (up to 16 million characters) and to use the channels on either system (up to 32). In addition, one processor can be taken off the air while the other supports a "major portion" of the workload of the MP configuration.

These are clearly user benefits, and the fact that IBM is charging more for them is only a surprise because the firm has been cutting prices in the past 18 months.

Perhaps IBM is now back to the old pricing formulas under which users will have to pay dearly for any new benefits.

Congress Does It Again

Ever notice how at election time you suddenly seem to be getting a great deal of mail from your local congressman? Of course, these communications take the form of surveys of voter opinion or newsletters on the congressman's activities during the previous months and are not all blatant appeals for votes.

Because of the nature of these communications, the congressman is allowed to send them to you free.

However, if the legislator has an opponent, that challenger cannot send you material free since it would be purely political.

Well, the same thing seems to be happening with computers or computer services that are provided to congressmen with taxpayer money.

During the course of the year, congressmen use their computers to build lists of constituents and of the subject areas in which they are interested. Then, come election time, incumbents' campaign committees are permitted to purchase those lists for mailings. An opponent, naturally, has to develop his own list of voters.

This gives incumbent congressmen a built-in advantage, just as does the use of "franked" (free) mail, even though there is nothing illegal about the practice.

But now someone is going to come up with "ethical" guidelines for such practices — and, guess what, those guidelines are going to be developed by the present 435 incumbent congressmen.

It's like letting the fox plan chicken coop security.

Data Past

Five Years Ago
April 11, 1973

MONTVALE, N.J. — The myth that there is, or will be, a shortage of trained people to meet the needs of computer users was laid to rest in a study by the American Federation of Information Processing Societies (Afips). Within a decade, the study indicated, formal college and high school education programs in the computer field "should be able to fill the needs of the computer industry for new entrants even if industry requirements grow at a rate of 10% per year."

— — —

WASHINGTON, D.C. — The Antitrust Division of the Justice Department is "outmanned and outgunned" when it comes to prosecuting cases like the current action against IBM, Senate investigators were told here last week. In addition, witnesses before the Senate Antitrust and Monopoly Subcommittee stated that often the division cannot do its job properly in such cases because of political pressure from the White House.

Eight Years Ago
April 15, 1970

BOSTON — The director of the Massachusetts Consumer Protection Division said he would "close every computer school in the state, if necessary," to stop misrepresentation and fraud. Arnold Epstein said that false claims were creating a "field day" for some computer schools and forcing schools in Boston and New York to close without warning or consideration for the students.

— — —

WASHINGTON, D.C. — Computerized data banks should be licensed and a public hearing should be held before each license is issued, Prof. Alan Westin urged at hearings on the Sullivan Credit Bureau Bill.

Letters to the Editor

Better Ask Consultant

It seems Robert Yount is taking a much too lighthearted view toward computers |"Small Systems Vendors Better Learn English," CW, March 13|.

He implied that if the vendors were to tell him all the steps for his system, then everything would be fine. In fact, it seems he wants to put the job of consultant on the vendor's shoulders. Since he wants to know things like what type of system he should use, its expandability and software available, he is looking up the wrong alley.

My suggestion to Yount is to hire a consultant who will assess all his needs and set up a system. Sure, he'll charge a couple of thousand dollars, but it will cost a lot more if Yount or his employees try to set up the same system.

I'm just trying to stress the point that system design, setup and programming aren't the job of the vendor, just as it is not the responsibility of a supermarket to tell you how to cook your food.

Jonathan M. Zaid
Chicago, Ill.

Tight Control in Designs

I take exception with the contents of "Internal DP Controls Aid Divided Management," |CW, March 13|.

In my experience, proper systems specifications have consisted of source, input, processing, output and control requirements, prepared in detail so a programmer could code from them. This approach has been trained into several organizations and the auditor normally was one of the "buy off" approvers of the specifications prior to implementation.

Some systems personnel design with controls that are defined within specifications in conjunction with users and auditors.

Competent organizations perform post-implementation audits using the originally approved systems specifications to determine thorough compliance prior to authorizing production usage.

James S. Moyer
Westminster, Calif.

Couldn't Believe Starkman

When I read "Any Advice for DP Grad Looking for Job?" |CW, Feb. 13|, I could not believe Barry Starkman was serious.

My wife and I both went through the job-hunting cycle when we graduated with computer science degrees a little more than a year ago. Neither of us had any experience, although we had done fairly well in school. Our only problem was finding two jobs in the same location, but in all, we had over 25 actual offers between us.

Naturally, it came as quite a shock to learn that the job market had taken such a turnaround in a year. I called Starkman and tried to answer some of his eight questions, but found they were only the tip of the iceberg.

During the conversation, I became aware of several points I would like to mention here. Starkman had heard of resources like *The College Placement Annual* that would help him find a job, but had not obtained any of them. He knew his school placement office sponsored job interviews with companies, but did not request any appointments.

He had not asked for guidance from teachers, placement office workers or personnel people as to how he should handle an interview for a job.

Starkman wanted me to say that it was easy to get a job after two or three years' experience, but I could not. All I know is that it is not hard to get a good job with no experience if you are organized in your search:

William Kramer
E. Chicago, Ind.

'On Patrol' One Night

Writer Sees DP's Value to Police Firsthand

By Jack Stone
And Ida Mason
Special to CW

Crime prevention and law enforcement are far more complicated than in the days of Elliot Ness, and computers are now integral components of the American criminal justice system.

To gain some insight into how DP is used to support police field operations, Ida Mason recently spent an evening as an observer riding in a police car as it cruised the streets of Miami. The opportunity was provided by the Dade County Sheriff's Public Safety Department, which has developed numerous citizen participation programs over the years.

For DPers who run payrolls, produce reports and support corporate decision-making in the cozy confines of a computer center, Mason's report, which follows, should provide a lot more feeling and respect for the people behind police badges and the computers behind the people.

Officer Wes Plath and I had been on the road for only five minutes when he was ordered to a gas station that had just been robbed: I began to wonder if I shouldn't have stayed home and watched Kojak. At the station, the attendant said he'd been held up, at gunpoint, by two men and a woman who had taken about $100. But he had gotten the license of the getaway car.

Plath called the data center in the Miami Hall of Justice, where motor vehicle records are kept, and before you could say "fully compatible on-line function," the name and address of the car owner were given to us and another police unit that was closer to the owner's location. The first step toward catching the crooks had been taken.

A short time later, we got involved in a situation that started with a traffic accident but was taking on the qualities of a riot.

It seemed a man driving one car had hit another parked in front of a bar and then, in trying to get away, hit another half dozen cars also parked in the area. A large number of angry bar patrons/car owners were out in the street where they had cornered the man responsible.

They might have strung him up from the nearest lamp post, but Plath's skillful flip-flops between courteous concern and menacing macho kept the crowd under control while we waited for police reinforcements. The backup unit came soon enough, but in the meanwhile I gained a new appreciation of what some people may really need when they look for "immediate response time."

The Human Connection

The offender was carrying a very substantial pistol — a Smith & Wesson .357 Magnum — but a check through the Florida Criminal Information Center confirmed his claim that he was authorized to have the weapon since he was a bona fide private security officer.

The relief unit took over and we went our way, but I had barely recovered my aplomb when Plath stopped a late-model Cadillac with out-of-state plates that was weaving all over the road. Now that I was a seasoned pro in police business, I felt there'd be no problem here.

But then Plath pulled his revolver, and I wasn't sure what was happening. I kept out of the way while the officer contacted the computer at the National Criminal Information Center in Washington, D.C., to check for interstate warrants on the driver before he hauled him in.

A little later, I watched Plath question an attractive woman waiting at a bus stop. It quickly occurred to me that transportation might not be her primary interest since bus service had long since ended. After checking a computer for a local record or warrant on her, Plath found the woman had no "priors," and we continued our tour. She took off in the opposite direction.

Next, we spotted a car with one occupant, parked in an alley in a remote area of the business district.

The driver explained he was new to Miami and had stopped to try to remember the name of his hotel. In calling up the police computer this time, we found the car was registered with one of the car rental agencies. And a quick call to the agency manager and his check of the agency's computer showed that the driver's story was legitimate. Cleared of suspicion, he finally recalled the name of his hotel, and we went our respective ways.

The sun was coming up as we returned to the police station, and Plath checked in at the end of his tour of duty. He appeared to be only slighted tired. Although I was weary, I felt uplifted having seen firsthand how a number of different DP systems were available to the cop on the street to help him in his work.

Ida Mason, a professor of DP at Lehigh (Pa.) Community College, is currently on sabbatical doing research on women in management.

A Question of Time

Are Millions in DP Tax Refunds Vanishing?

The question of whether DP people have been paying unnecessary sales-and-use taxes has come to the front of the news fairly frequently in the last few months, largely as a result of the personal efforts of Nova Computing Services, Inc.'s president, Bob Sherin. Florida got Bob riled when it sent him a bill for $50,000 for taxes on work he had sold years before.

The Taylor Report
By Alan Taylor CDP

Then lawyers riled him by not knowing what to do to get him off the hook. Getting Bob riled like this was not a very safe thing to do, particularly when there were laws that allowed ordinary citizens to challenge tax assessments quite easily. When Bob found this out and found that it worked, he made his information available to DPers in other states and offered to help them, particularly when they faced retroactive tax bills.

However, winning cases is one thing and getting money back promptly is another matter entirely. And getting refunds is what this column is about. Not everyone is in Sherin's position of not having paid the taxes. In many cases, the sales-and-use taxes have been paid — and have been paid for years and years. They may have been paid directly, but it is a lot more likely they have been paid indirectly, as some add-on percentage to an invoice for the lease or installment payments on the software. This way it looks valid and will get through almost any accounting system I know of without challenge.

And that is the problem. Suppose the tax payment is not valid, even though it appears to be? Then what?

Millions Refunded

The authorities in a couple of states can tell you to some extent. In Florida, over $1 million was refunded to taxpayers. In New York, the amount was over $2 million (and is still climbing). But compared with the amounts the taxes were expected to raise, this seems small — much les than one would expect.

In New York, for instance, the decision that software was not subject to the sales-and-use tax was estimated to involve over $30 million per year. Yet the refunds were estimated at only $2 million. The figures don't add up.

The secret is that much of the tax that has been collected just won't go back. The state will simply hold on to it, whether it had a legal basis for the tax collection in the first place or not. So DPers will lose millions in unwarranted tax money.

There are two basic reasons for these losses, one of which is under each DP installation's control and one of which isn't.

Not Assessed, Volunteered

First, tax money is rarely assessed. It is volunteered, in this case often by the vendor who is doing busines throughout the state (and frequently with the state itself). Under the laws of the various states, taxes voluntarily paid, even if wrong, are not returned automatically. The state has no duty to return the money unless asked. Nor does the vendor who actually collected the tax from the DPers have any duty to try to get it back for its customers. The user must ask for it himself.

This is normally done in some fairly precise manner, such as by listing all tax amounts and dates. Sometimes there are special forms to be filled in. But in any case, the sooner the user acts, the better.

Second, you don't have a right to the money if you don't ask for it quickly. Most of the money that had been paid before Bob Sherin got involved is now gone forever. Generally, there is a two- or three-year time limit that works backward from the time you file the refund request.

You can easily find out about your state's statute of limitations on refunds of sales-and-use taxes.

I would suggest that you review your payments on software for the past three years, starting with the oldest. If there were any taxes taken, then make a list and start moving on getting the forms. Then file for a refund whether or not the tax in your state has yet been declared illegal. This is simply to protect your position.

At the same time, see that any tax assessments on bills are struck off and find out the amount of money involved in your installation.

Check with the other installations in your area. Use the Data Processing Management Association (DPMA) for information and get copies of the appropriate tax regulations, laws, administrative procedure acts and appeal methods.

Explore State Situation

Currently, we know the state of affairs in some states like Tennessee, New York and Florida. We are discovering what the situation is in others — particularly Rhode Island. But in the great majority of the states we don't know whether sales-and-use taxes are being collected; whether they are thought to be legal or whether they are being challenged.

Tax offices, DPMA and other such sources can help here. If you get nowhere, then let me know and I may be able to help. Write to me c/o *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Let's stop more millions from vanishing out of DP budgets.

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Micro Retailer Contends

Yount's Problem? He's Seeking the Unavailable

By Bruce A. Barker
Special to CW

"Balderdash!" is the reply of us here at The Data Group, Inc. (d/b/a Byte Shop) to the recent reader commentary by Robert S. Yount ["Small Systems Vendors Better Learn English," CW, March 13].

Yount should not have condemned the entire industry just because he could not find someone with whom to talk about microcomputer-based business systems after sampling an extremely small number of, computer stores.

Saying there is no intelligent effort to capitalize on the business market after having looking at two stores is like saying — on the basis of one or two bad meals — that there is no intelligent effort to serve good food in restaurants. There is a very serious, almost frantic, effort among manufacturers, software houses and many retailers to approach the small business market with software, hardware and service capable of performing the simple tasks which Yount listed in his commentary.

Perhaps a brief history lesson might help Yount understand why the stores he visited were unable to help him. The microcomputer market is still very much in its infancy. You can count on the fingers of one hand the number of years the first microcomputer of the class we are discussing has actually been available.

You can count on fewer fingers the number of years since the opening of the first retail computer store.

You can count on your fingers and toes the number of months that mass storage devices capable of handling reasonable business processing demands have been available. You can count on fewer fingers and toes the number of months that reasonable software capable of business processing has been generally available.

You can count on your fingers the number of months that delivery on these items has generally been any where near reliable. Even today delivery on some products is between two and six months.

So why were the stores Yount visited not ready for him? The reason is because, in general, that which he seeks is not available off the shelf.

Take It Easy . . .

Now, before anyone's dander begins rising, let us state that there is some hardware and software available for business uses. The hardware available now is often quite capable of business processing, but there is a severe lack of good business application software for microcomputers:

Some of the software which is available now is at best OK; most, however, seems to us to be quite deficient from the standpoints of ease and use and proper use of accounting principals. For about the next year or so, the buyer of a microcomputer for use in business should be prepared either to roll his own software or at least be prepared to work with his local computer store to assist in the design of software to fit his needs.

Given the current state of the market, it is our opinion that microcomputers for business purposes should not be considered by everyone. Those who buy microcomputers today are the pioneers of a new and exciting adventure in computing. Like the pioneers of past advances in technology, those who choose to be the leaders in microcomputing must, for the next one or two years, be willing to meet and conquer the inevitable problems which will occur.

Hardy People

Those who buy microcomputers today for use in business should be hardy people who do not mind a little challenge. Buyers of today's microcomputers should not mind taking some reasonable risks, although with a properly designed system the risk of a substantial loss of investment is quite small.

Further, the leaders in business microcomputing should not be afraid of "getting their hands dirty" by learning a little about what they are buying.

Some people need the security which the massive computer companies offer. We sympathize with this need without necessarily agreeing with it. Remember, even the so-called giant killer is a giant to those of us in the microcomputer industry.

Reader Commentary

If a user needs the security of slick salesmen with slick brochures backed up by many programmers and design engineers, he feels better knowing that a little man in a white shirt with a thin black tie will be out in a few hours to fix his computer if it burps — if this is what he needs to feel secure in his investment, then he should either go to the giant computer companies and pay and pay and pay for their security blankets or wait for a year or two and go back to his local computer store, where we bet he will find a considerable change in the modus operandi.

However, if anyone else out there is serious about purchasing some first-quality computer hardware at a price considerably less than most of the giant computer companies even dream of, there are many computer stores across the country which would like nothing better than the opportunity to sit down and speak with him, either in English or Accounting about his business computing needs.

By the way, in answer to Yount's question about a business computer system, here are our recommendations:

(1) An 8080 or Z80-based, S-100 bus microcomputer.

(2) A dual drive 8-in. floppy disk or a high density 5-in. floppy disk.

(3) Between 32K and 56K bytes of random-access memory.

(4) An industrial-quality CRT terminal.

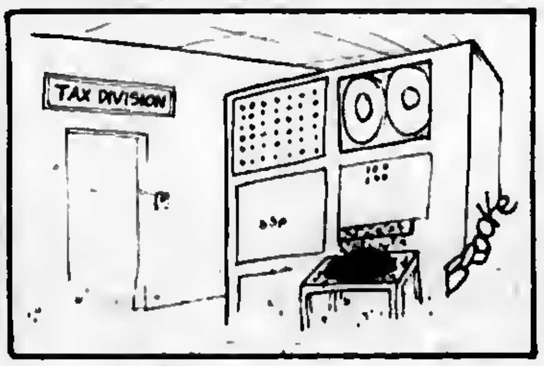
(5) A small monitor program in 1K or 2K bytes of programmable read-only memory (optional with front-panel computers).

(6) The appropriate interface board(s) depending on the type of video terminal and printer.

(7) A medium-speed dot matrix printer.

The above system is certainly not the only possible configuration. However, from our experience, we feel that a system similar to the above provides the maximum in reliability and flexibility.

Barker is president of The Data Group, Inc., based in Indianapolis.



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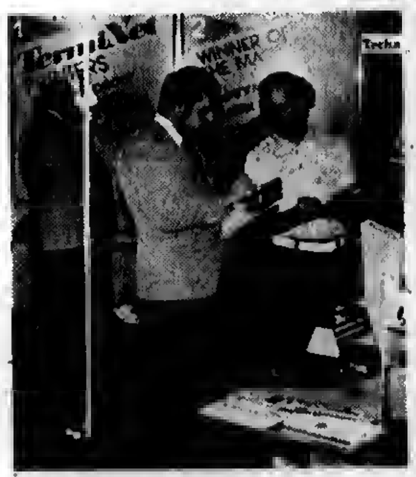

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Towner Stands Firm: Codasyl DBMS Vital

By Larry E. Towner
Special to CW

Stephen L. Robinson's reaction |CW, March 13| to my Feb. 6 reader commentary was most interesting. It would appear that, in the interest of brevity, I made a serious mistake. I failed to communicate that DP professionals must understand what their management understands: Planning for the future is as important as living for today.

This is particularly true of the world of data base management systems (DBMS). The cost of correcting today's mistakes makes planning for tomorrow even more essential.

My analogy to Cobol *was* relevant. The managers who adopted Cobol in its early days recognized the advantages of rising above Assembly language. They were willing to suffer writer's cramp to achieve even a small measure of future advantages.

As for today's "structured Cobol compilers," I am sure few vendors of such packages have ignored the availability of the Ansi standard as a design model. I frankly cannot picture a Cobol vendor advertising his product as "nonstandard."

Still Much Room

But that's getting away from our real subject, DBMS. And, to be more specific, Codasyl DBMS. Robinson was probably correct when be cited a 2% figure for the Codasyl DBMS installations. However, he should also have pointed out that IBM's IMS and Cincom Systems, Inc.'s Total, the two most used non-Codasyl systems, were around many years before the first Codasyl system arrived on the scene.

Of course there is room for non-Codasyl packages. Unusual situations often dictate unusual solutions. My point was that management must be aware of present and future costs of purchasing a non-Codasyl package.

If management approaches DBMS selection weighing both present and future consequences, the chances of buying the right package are improved considerably. Every DBMS package on the market has at least one feature that is better — and one that is worse — than all the rest.

It all depends on what you want, what you can afford and what compromises you have to make. Just because a system is Codasyl doesn't mean it is the best, as Robinson obliquely pointed out. Conversely, this doesn't mean that it is the worst either.

Reprogramming Analogy

I'm going to draw another analogy to discuss reprogramming which, I am sure, will draw more fire. When IBM announced the 360 line, there were 12,000 of its 140 series computers in use. IBM wanted to get these users on the 360, so it offered emulation as the way to avoid reprogramming costs.

There are a lot of shops still running 1401 emulation programs on the 360. They're not too happy about it, but economics and pressure for new applications have kept the old programs running. They aren't, however, writing the new applications in 1401 Autocode.

The same holds for DBMS. It's true that one can emulate Total on

Reader Commentary

most Codasyl DBMS packages, as Robinson noted (some vendors even offer a conversion package). But would a user really want to? If the advanced network structures defined by Codasyl were available, wouldn't the user take advantage of them?

What is really important is that DBMS gives the user the opportunity to integrate all organization into a cohesive resource of immense value. IBM 1401 Autocoder programs can run side-by-side with 360 Cobol programs because each represents a separate entity and, usually, separate files.

The same is not true of DBMS. When you integrate and take advantage of the improved data structuring capability, the older data base structures, and the programs supporting them, must be revised to accommodate the overall data base plan.

Promised Benefits

Back in Cobol's early days, few could find its demonstrable advantages either. Few, that is, except those farsighted managers who knew standardization and the promise of hardware semi-independence was worth the boos and jeers. There were few visible advantages then; the benefits were those promised, not necessarily those in hand.

Over the years Cobol has adapted to changing needs by adopting features of other languages. Can we expect less of the Codasyl DBMS standard? Its benefits, too, are more promised than visibly demonstrated at this early stage in its life.

Changes will occur to the Codasyl DBMS standard, just as they have with Cobol. I agree with Robinson that "upgrade" was not the proper term for the non-Codasyl DBMS vendor's reaction to standardization. Perhaps "adapt" would have been a better term.

It is interesting to note, however, that the specter of Codasyl standardization is clear enough that the vendors of the two most used DBMS packages, IBM and Cincom, are members of the Codasyl Data Definition Language Committee (DDLC), which is the producer of the Codasyl DBMS specifications.

Their crystal ball may not be any clearer than mine or Robinson's, but it is a sure thing that these vendors, at least, are covering their bets — and their investments — by participating in DBMS standardization.

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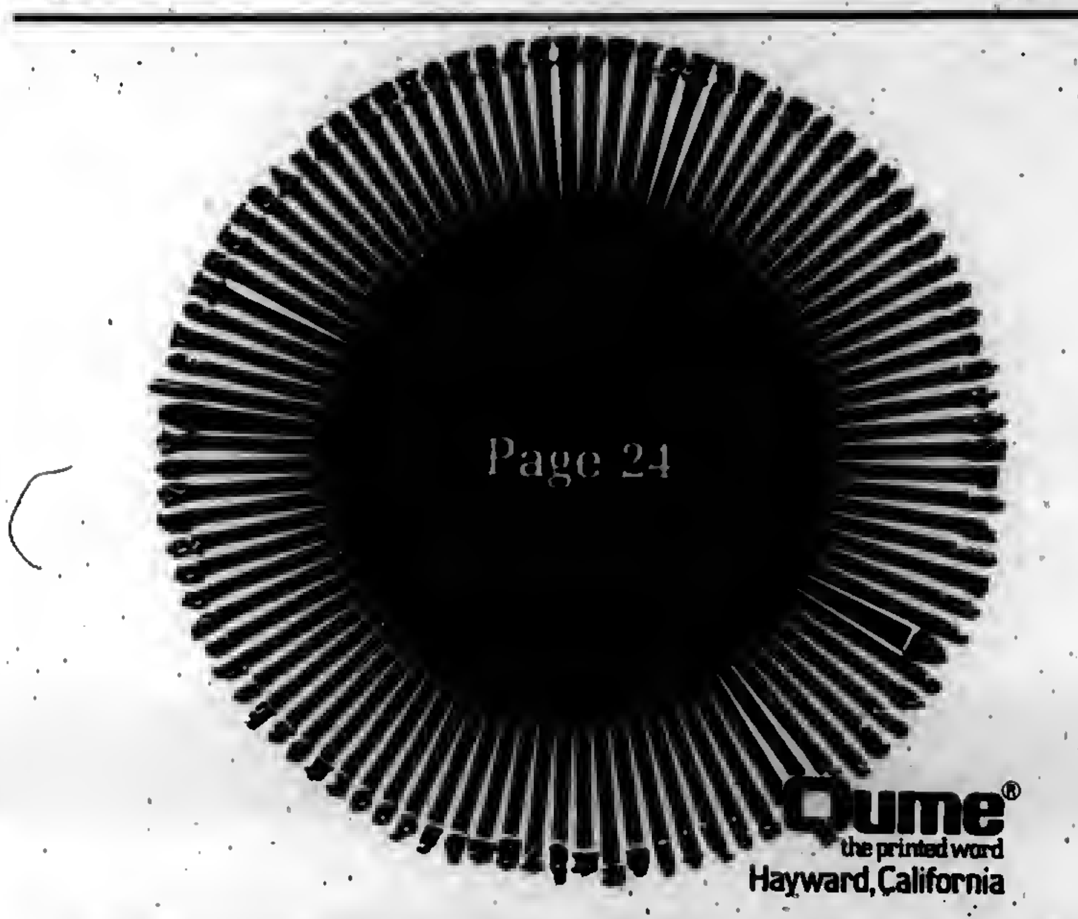

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Job-Hunter Must Realize He Must Compete for Job

By J. Stephen Schiavo
Special to CW

I'd like to offer the following suggestions to Barry Starkman ["Any Advice for DP Grad Looking for Job?" CW, Feb. 13]:

Dear Graduate:

As a recent grad seeking that first position, you must evaluate your attitude toward working, and toward success, very carefully. Fourteen to 18 years of expensive education can distort your perception of the world more than it can clarify it.

To begin with, come to grips with the fact that the world does not owe you a job. You must compete for it, just as you have competed throughout your schooling. Your educational record and background are important, but by no means are they the only qualities at your disposal.

Reader Commentary

You should identify with the goals of the organizations to which you apply. Try to see how your personal qualities will contribute to those goals. Show the interviewers you are genuinely interested in achieving those goals.

Appearance is still important. Although many DP organizations are very informal, do not assume you may dress informally for the interview. A prospective employer is much more likely to get a poor impression of you if you are less formal than he expected rather than if you are more formal — regardless of how he himself is dressed. Adopt the style of the office only after you get the job.

Be active rather than passive in your search for a job. Write to employers whose goals you identify with and who appear to employ people with your skills. Follow up with phone calls and ask for an early interview.

Being aggressive without being offensive is a skill you'll have to learn early in your career anyway, so you'd better start now.

Entry-level positions are often 90% learning and 10% production. Stress your ability and eagerness to learn and to be productive early.

Meet people already employed there and find out what the day-to-day requirements are really like, then address those things in any subsequent interview or correspondence. The prospective employer doesn't expect you to be a know-it-all about the business, but often some particularly naive assumptions on your part can cause an interviewer to underestimate your maturity.

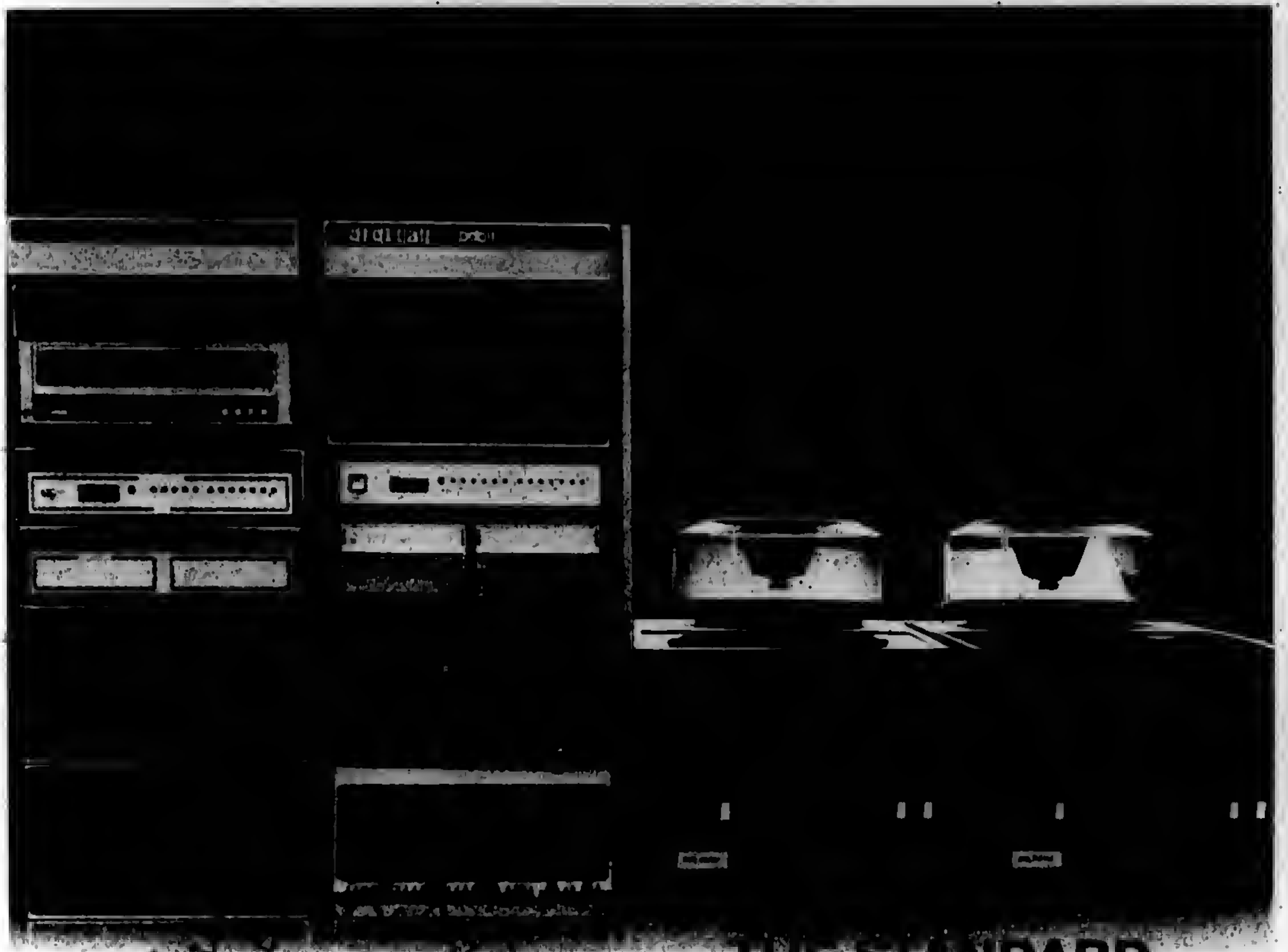
Give an impression of stability. The prospective employer expects to invest considerable time and money in your development on the job, so he needs to feel confident you are not just passing through.

Ask questions and display interest regarding the organization's long-term plans and how you might be involved in them over coming years. Try to assess whether you would like to work and grow with the firm for three years or more.

In summary, whether you are headed for the public or private sector, you are selling a product, and the product is you. Assess the features of that product and the needs of the customer, then sell the benefit of those features in satisfying those needs.

Now get out there and go for it — and good luck.

Schiavo is senior marketing representative at SDL International in Arlington, Va.



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Reader Commentary

'Don't Call Me' Laws And Consumer Protests Can Deter Robot Phones

By Robert Higgins
Special to CW

In his recent column on robot phone calls [CW, March 27], Jack Stone suffered from a distressing narrowness of thinking, coupled with an uncertainty as to whose interests he really wants to serve.

Item: Stone's idea for the junk-call-rejection electronic attachment was classical technological/organizational overkill. At noticeable expense to individuals, the attachment would maximize the efficiency of the robot-callers by allowing them to step rapidly past the rejectors. Whose side is he on?

Item: If we want to deter Megadial, we must seek to destroy its efficiency rather than maximize it. One obvious approach is Ida Ruben's answering machine, since it maximizes the time wasted by Megadial in talking to a deaf ear. A useful enhancement for the answering machine would be an "advance to end of message" button, so the owner could skip the "junk calls.'

Item: The Maryland legislation outlawing automatic dialing is also overkill, reminiscent of recent anti-Universal Product Code state laws. I wonder if the legislators worded the law carefully enough to avoid outlawing automatic calling unit (ACU) modems (widely used for night-time polling of branch-office terminals.) In any case, did they consider that some lonely shut-in people might welcome any call, no matter how "inhuman" it is?

Item: I would suggest taking the Postal Service's "antiobscene-mail" regulations as a productive guide. By means of federal and uniform state legislation, individuals should be allowed to forbid automatic callers to call their numbers.

Also, I would require every operator of automatic calling equipment to announce a short human-level identifier, twice, at the beginning of their messages. The equipment and overhead required to obey this law will shake out the frivolous users of this equipment, possibly leaving behind a worthwhile service.

Item: If "everybody" hates automatic callers, let them tell the users. If the use is promotional, the protester should call the advertiser and tell it he won't buy because it uses a caller.

If the use is harassing, protesters should check existing federal and state laws and bust the users. A telephone answering machine would be useful here too. But beware the fallacy of extension: "Everybody else feels/reacts the way I do."

Item: A person feeling really nasty could talk to a phone-phreak phriend and see if he can cook up a way of jamming any Megadial that dares to disturb him.

I personally expect Megadial will enjoy an initial flush of success, followed by a rapid decline as operators study its overall effectiveness (ill-will and counter-harassment included). If the decline doesn't happen, I recommend the "don't call me" legislation because it properly places the heaviest burden on the originators of these calls.

Now, if Stone could come up with a solution for that interference on my TV set : . .

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For Large Manufacturers

NCR Releases Top Application Package

By Brad Schultz
CW Staff

DAYTON, Ohio — NCR Corp. has unveiled an on-line system for manufacturers which the firm called its most comprehensive application software package to date.

Manufacturing Information System Support Integrated On-Line (Mission) consists of various application modules for use with NCR Criterion and Century CPUs and was developed to meet production and inventory-control requirements of the nearly 3,500 U.S. manufacturers employing more than 500 persons, according to G.P. Williamson, vice-president in NCR's U.S. Data Processing Group.

Mission can be used as a single- or multiple-plant system, Williamson said. Files are updated immediately as data is entered into the system via CRTs or batch input devices, keeping data and reports as current as the last entry, he added.

The system incudes 11 application modules said to work together and draw upon common resources. Three such resources are NCR's Total data base management system, Transaction Processing System (Tran-Pro) and Data Dictionary.

Developed by Cincom, Inc., NCR's Total is said to support and optimize the integration of all Mission application subsystems and data resources.

Tran-Pro is described by NCR as a full-service transaction-processing support system having terminal presentation services that provide complete device independence from all communications terminals. Tran-Pro allows for the direct processing and real-time updating of all files as transactions enter the system and has features that enforce system security and establish check points for system recovery and restart procedures, the firm added.

The Data Dictionary is a reference index for all data elements used in Mission, indicating where they are used (what files, reports and programs) and by which applications. The dictionary also provides the discipline to achieve improved documentation, control and management of a company's data resources, NCR maintained.

Application Subsystems

"Bill of Material" is an on-line application subsystem of Mission that includes both engineering and manufacturing product configurations and records, an unlimited number of product structures, exploded into components or imploded into products, according to Williamson.

The "Material Management System," another Mission subsystem, is said to maintain close and accurate control over an installation's inventory. Stock receiving, locating and disbursement activities are recorded internally, and locations for stock storage at multiple sites are recommended, while records of on-hand status are produced.

The "Inventory Management System," a third on-line subsystem, was designed to provide real-time inventory analysis and control. It files each inventory transaction, making current and historical information available for inquiry. Reports include Stock Status, Unplanned Issue Analysis and Inactive Part Reviews. This subsystem also performs analysis of inventory and incorporates safety guidelines, Williamson noted.

A subsystem called "Material Requirements Planning" permits ordering or production of components in closely calculated quantities to minimize inventory, maximize plant efficiency and deliver on schedule, Williamson said.

The smallest NCR CPU system that can support Mission is the N-8450, according to another NCR source.

To obtain Mission, users can either pay a one-time or a monthly license fee. The monthly fee for the basic module and four subsystems is $2,400, and the one-time fee for the same is $88,000 with an annual maintenance charge of $3,360. Discounts are provided for users of multiple systems.

ANS Fortran 77 Introduced For Mini-, Microcomputers

SANTA CLARA, Calif. — A Fortran version said to meet and exceed the ANS Fortran 77 language subset specification and to be the first ANS Fortran 77 offered by any mini- or microcomputer vendor has been announced here by Intel Corp.

Fortran 80 is a high-level programming language and compiler that translates Fortran statements into relocatable object modules. When the object modules are linked together and located into absolute program modules, they are suitable for execution on Intel 8080 and 8085 microprocessors, the firm's Intellec Series II/220 and -230 CPUs and its previous generation MDS-800 and -888 development systems, Intel said.

On the MDS models, the Fortran 80 compiler functions under Intel's Isis-II disk operating systems; and the compiler is compatible with Intel's PL/M-80 language facility and its 8080/8085 macro assembler modules, the firm said.

Furthermore, Fortran 80 supports symbolic debugging with Intel's Ice-80 and Ice-85 features and contains code optimization to ensure that compiled Fortran programs are efficient and memory is conserved, the firm added.

Fortran 80 features IF . . . THEN . . . ELSE IF . . . END IF constructs, said to facilitate structured programming; and a CHARACTER data type is provided, permitting alphanumeric data to be handled as strings rather than characters stored in array elements, Intel noted.

Fortran 80 supports logical operators .EQV. (logical equivalence) and .NEQV. (logical nonequivalence) and allows string variables so that assignments of alphanumeric data can be handled in the same manner as those of numeric variables.

The compiler reportedly includes the following features:

- Multiple compilation units in a single source file.
- Optional Assembly language code listing.
- Cross-referenced symbol attribution and error listing.
- Compatibility of compiler controls and directives with other Intel language translators.
- Optional reentrancy.
- User-defined default storage lengths.
- Optional Fortran 66 DO loop semantics.

Fortran 80 is said to require 64K bytes of random-access memory, either single- or double-density dual diskette drives and either a CRT or hard-copy interactive device in its system console.

The language and compiler costs $1,250 from Intel Corp. at 3065 Bowers Ave., Santa Clara, Calif. 95051.

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Buyer's Guide to Business Packages Released

By Brad Schultz
CW Staff

CHERRY HILL, N.J. — Business people who size up application packages now have available a *Packaged Software Buyer's Guide* published by Management Information Corp. (MIC).

The guide is comprised of "how to buy" sections on small business computer, accounts receivable, accounts payable, payroll, general ledger and inventory control packages.

In the section on small business computer software, the guide notes that "as activity in the market has increased, stress on predesigned and tested software packages has also accelerated." Software packages are now normally purchased at the same time hardware is obtained, it added.

According to the guide, the small user needs prepackaged software for the following reasons:

- Packaged software may represent most, if not all, of the applications; the larger user will purchase software to supplement his own programming.
- The small user has limited knowledge of software and may overlook software incompatibility problems.
- Packaged software may very likely be the deciding factor toward a small business computer purchase.
- The number of software package vendors is increasing drastically, and, consequently, the decisions for obtaining cost-effective programs are becoming more difficult.

Packaged Software Valuable

Packaged software is of value to the DP world because the number of creative and skilled system programmers is small relative to the total programming population, the guide said. This elite group develops general programs modifiable by each user, resulting in significant DP cost reductions at a time when hardware costs are dropping and programming labor costs are rising, the guide explained.

One advantage of in-house development of small business system software packages is that a package can be customized to very specific needs and demands. Also, the in-house developer owns the package and can sell it, the guide noted.

But the in-house package maker must find experienced system programmers to design, test and document the package while paying for a CPU only partially used, the guide pointed out.

All small business system vendors supply software with their CPUs that includes an operating system, assembler and compiler, but only a few supply a significant number of application packages, the guide said.

"Most manufacturers employ affiliated software companies that have developed specific application packages or will develop a set of programs. Some manufacturers have a complete turnkey system directed towards a specific industry . . . Don't acquire a computer with the condition that the software package will follow. Get both together," the guide warned prospective users.

Packages bought from software houses can sometimes be of poor quality and ill supported. "It is one thing to develop a program and quite another to provide user assistance and to back up software problems," the guide said.

For users who do not know where to look for packages, software brokers are available that market first rate products, the guide said.

User-written packages, sold from one firm to another in the same industry, may appear to be a bargain, yet not run on the customer's system nor permit adequate maintenance, the guide continued.

User Group Packages

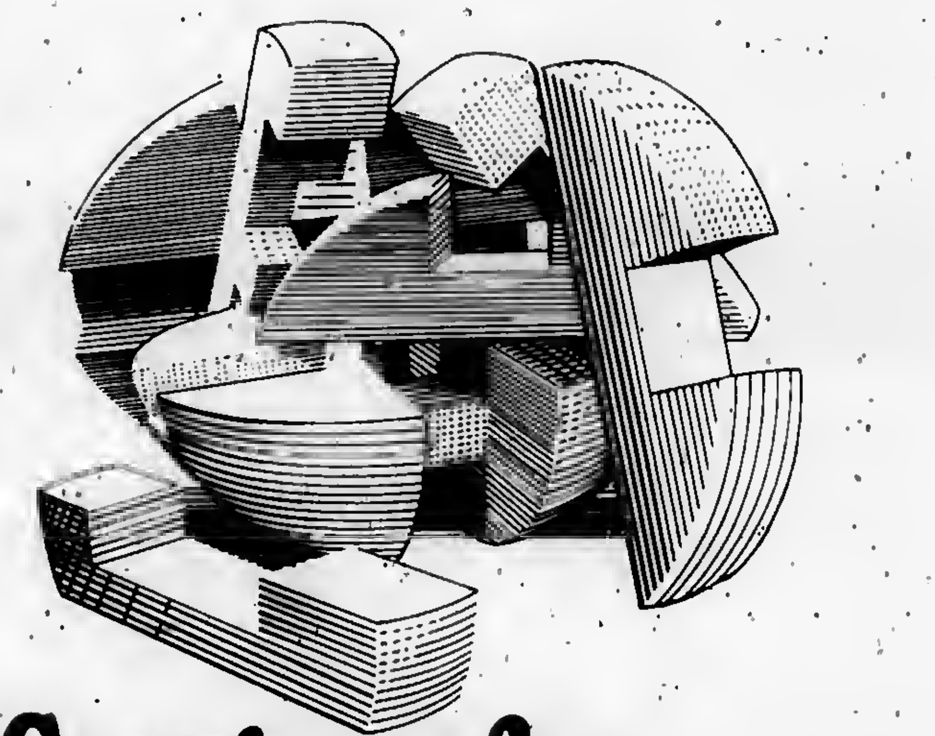
Another source of packages is user groups. These products may not be well documented nor fully tested, the guide cautioned.

"The average small businessman usually has not had time to study the computer field in any depth. Therefore, it is our belief that the first-time user should consider purchasing the initial programs from the computer manufacturer.

"If the software is to come from a software house, have the equipment vendor be the coordinator. For the more seasoned user, this is not a necessity," the guide said.

The prospective customer should have a good understanding of his needs and demands, and he can receive valuable input on this score from his firm's departmental supervisors who are involved with information and DP, the guide noted.

(Continued on Page 34)



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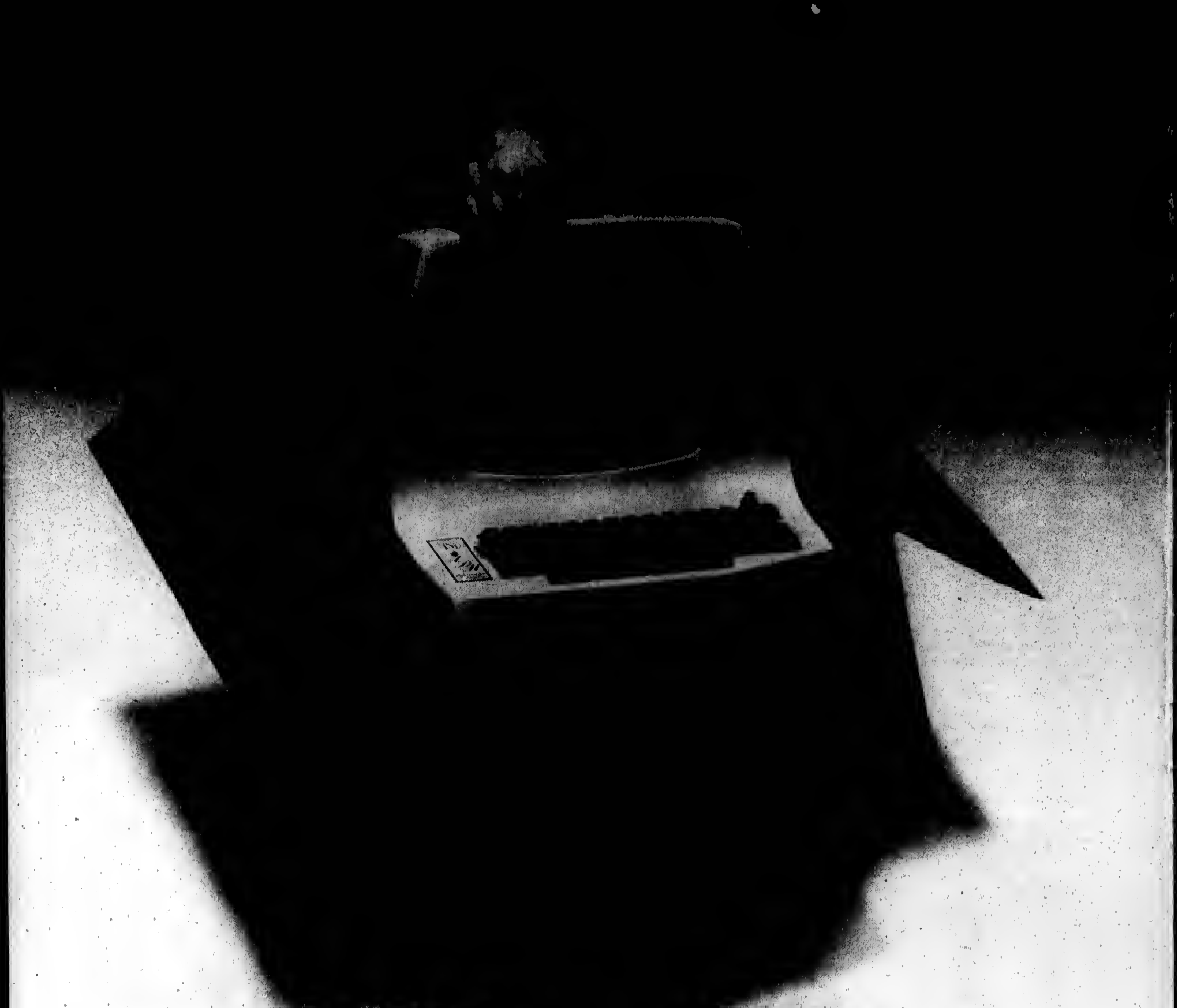

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New York ACM Chapter Offering Spring Seminars

NEW YORK — The New York City Chapter of the Association for Computing Machinery (ACM) has announced the following seminar schedule for this spring:

- "Methods of Systems Design." Speaker: Bill Plauger on April 19, 26.
- "Fun With Performance Techniques in Cobol." Speaker: Dwight Minkler on April 20, 27.
- "Engineering Human Performance in Computer-Based Systems." Speaker: Evelyn West on April 24.
- "A Tutorial on PL/M Programming." Speaker: Daniel D. McCracken on April 25.
- "Selling Skills for Data Processing Management," Speaker: Joel Banner on May 1 and 8.
- "Interactive Systems." Speaker: Hal Lamster on May 2, 9.
- "Maintaining Telecommunications Networks." Speaker: Rudy Anderson on May 3, 10.
- "Installing Structured Methodologies." Speakers: Ray Isenstark and Andy Pinkowitz on May 4, 11.
- "Microprocessors." Speaker: Robert G. Wine on May 15, 22.
- "Data Base Design Techniques." Speaker: Leon B. Smith on May 17, 24.
- "Software Engineering." Speaker: Martin Schumann on May 18, 25.
- "Planning Business Systems." Speaker: Cecil L. Wade on May 23, 30.

All sessions are to be held at the Roosevelt Hotel in New York. Requests for additional information should be directed to Leo Petrover, Registrar, P.O. Box 245, New York, N.Y. 10017.

Array Processors Get FPS Chainer

PORTLAND, Ore.— The Vector Function Chainer links Assembly language array processor routines so a long series of array processor computations can be initiated by a single Fortran call from a host CPU, rather than by separate calls for each routine, according to its vendor, Floating Point Systems, Inc. (FPS).

This software product allows a user to chain together FPS math library routines and user-created routines, reducing host overhead, and permits development of array processor routines using Fortran syntax, a spokesman noted.

The VFC is intended for use with FPS AP-120B and AP-190L array processors, which typically work in parallel with minicomputers or large CPUs, and are claimed to enhance mini computing power 200 times and large CPU power 10 times, although FPS did not explain how this enhancement has been evaluated.

The FPS array processor architecture is optimized for vector DP with seven independent data paths, floating-point add and multiply, integer arithmetic unit, memory and interface, the spokesman added.

The Vector Function Chainer costs $1,750 from the firm at P.O. Box 23489, Portland, Ore. 97223.

NC Users Get Added Support

DALLAS — Numerical control (NC) remote services customers can now augment their use of University Computing Co.'s (UCC) Automatic Program Tools (APT) package with the firm's Cinturn II preprocessor.

Developed by Cincinnati Milacron, Inc. for use in programming its NC turning equipment, special features of the Cinturn II module reportedly include:

- The "corner concept" to define parts by diameter and length dimensions taken directly from a blueprint.
- Built-in machining technologies to automatically enter good machining practices into the part program, such as speeds, feeds and finish cuts which are computed by the module.
- Standard APT statements which can be intermixed with Cinturn II statements.
- Built-in error diagnostics to display errors in the computer output listing.
- Tool and material technology packages that utilize information about nose radius, depth of cut, feed per revolution, length and width of tool and surface feet per minute and horsepower to calculate material removed.

The cost of the product depends on the customer's particular situation, UCC said from 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

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Diablo 1620 CRT Users Get Graphics Package

ATLANTA — A graphics package for users of Diablo Corp. CRTs has been announced by Escape Ltd. The package is said to enable graphic representations of data in scientific, engineering and business applications.

Escape Plot is intended for use with Diablo 1620 terminals and consists of Fortran IV routines that reportedly eliminate time-consuming manual charting or the inconvenience of using a remote plotter. The package allows text to be printed with the 1620's daisy wheel during output of a plot and permits convenient annotation of axis lines and titling of graphs, the firm said.

Escape Plot can draw 59 alphanumeric characters, plotting them as small as one-third of an inch in width to as large as 12.5 in. Both the daisy wheel and plotted characters can be printed horizontally, vertically or at any angle on the page, the firm added.

The user writes a Fortran main program that calls the Escape Plot subroutines. The primary subroutine, called "plot," allows the print head to be positioned at a given X,Y coordinate with or without drawing a line to that point, the firm explained.

More Subroutines

Other Escape Plot subroutines position characters on the plot, draw annotated axis lines and select from multiple ribbon colors. A single call to subroutine "factor" increases or reduces the size of a plot, the firm said.

Escape Plot is available on punched cards or paper tape for $200 from the firm at Box 18797, Atlanta, Ga. 30326.

Accounting System Aimed At Insurance Companies

WOODBURY, N.Y. — The Data Systems Division of Philips Business Systems, Inc. has released an insurance management accounting system that prints out on individual as well as continuous forms.

Visual I is said to handle insurance billing, cash receipts, statement printing, aged trial balance, sales analysis, monthly statement, expiration lists and notices and monthly inactive customer reports.

System hardware includes 24,000 bytes of core memory, a visual display unit, two buffered alphanumeric keyboards, a high-speed matrix printer and file storage on a flexible disk.

"We've developed this software/-hardware package to provide insurance companies with a single, easy-to-operate system that can increase productivity and efficiency and thereby cut operating costs," James Hume, a Data Systems vice-president, explained.

An insurance billing program is said to allow as many as three policies to be billed on one invoice. All invoices are on a cut form, and sales journals are prepared simultaneously on a continuous form as an audit trail.

The cash receipts program in Visual I offers insurance agencies open-item balance; open-item current; or balance forward open-item balance, retaining only unpaid invoices.

End-of-the-month statements with dunning notices or finance charges are prepared on continuous form, a spokesman explained.

Visual I also has an aged trial balance feature that records balance movement on a 30- or 60-day basis. Sales analysis reports and company monthly statements can be run at the end of the month, the firm noted.

The system can provide annual cost savings that approximate the total cost of the system itself," Hume said.

The Visual I Insurance Management System costs less than $24,000 or can be leased for a five-year period for $540 per month.

The Data Systems Division of Philips Business Systems, at 175 Froehlich Farm Blvd., Woodbury, N.Y. 11797.

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Adapter Runs on IBM 5110

CHARLOTTE, N.C. — A package adapter for IBM 5110 CPUs is now available in two models, one for financial simulation and the other for report generation, according to Tradestreet Research (TR).

TR's financial model produces balance sheets, cash flow statements, income statements and 14-key rations along with details of the base data. The model is interactive and error-protected and requires no special programming skills to run, a TR spokesman claimed.

Furthermore, this model is said to be parameterized and adaptable in less than four hours to almost any type or size of business.

Features of the financial adapter include listings of sales and expense items, state and federal income tax rates, deferred taxes and automatic minimum estimated tax payments, optional inventory levels, fluctuating interest rates and automatic investment of excess funds under short-term debt.

The report generator model is also interactive, and both models reportedly require 48K of core capacity and are available on paper tape or disk.

The financial model costs $5,000 and the report generator model costs $1,000 from the firm at 3570 One NCNB Plaza, Charlotte, N.C. 28280.

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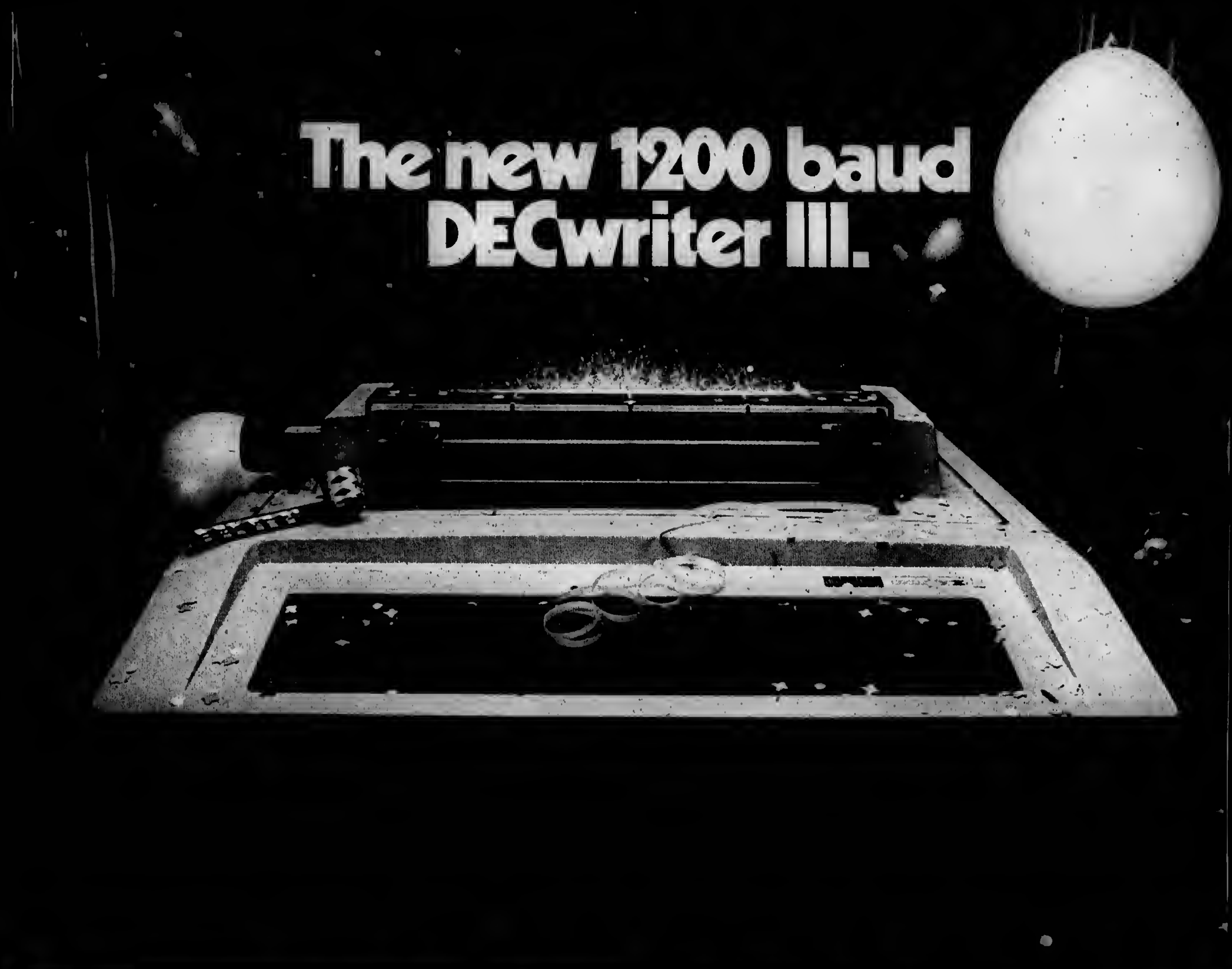
Course to Cover Cost Controls

LOS ANGELES — A seminar on the design, implementation and validation of cost/schedule control systems will be presented here on May 15 and 16 and in the San Francisco area on June 8 and 9, State-of-the-Art Seminars (SAS) has announced.

The seminar will deal with the latest requirements of performance measurement systems (PMS), cost/schedule control system criteria, cost/schedule status reporting and similar systems employed by the Departments of Defense and Energy, the National Aeronautics and Space Administration and other federal government agencies and their prime contractors, according to SAS.

The fee per registrant is $225; or, for government and university personnel and members of teams with more than three members, the fee is $185 each.

The Los Angeles seminar will be held at the Pacifica Hotel, and the San Francisco area seminar will take place at the Cabana Hyatt House in Palo Alto, Calif., SAS noted. Additional information and registration forms can be obtained from the firm at P.O. Box 91295, Dept. C/SCS, Los Angeles, Calif. 90009.



It already looks like a success.

Not only does the new 1200 baud interactive DECwriter III hardcopy terminal look like the successful DECwriter II on the outside, it also looks a lot like it on the inside.

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That means you receive data four times faster than conventional printers. And phone line charges can be reduced by as much as 75%. The 1200 baud speed of the DECwriter III also means you can combine the functions of a line printer and a CRT. Which saves you money and available office space without losing a bit of efficiency.

But the DECwriter III is more than fast and efficient, it's also very flexible.

For example, you can set operating modes — including four baud rates — at the touch of a finger. Plus, optional forms handling capabilities, including margins and tabs which can be set with typewriter-like ease. And because you probably handle different size forms, it can handle different size forms — up to six parts and 132 columns.

The DECwriter III.

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For more info, call 800-225-9220. Or write, Components Group, Digital Equipment Corporation, One Iron Way, Marlborough, MA 01752. Canada: Digital Equipment of Canada, Ltd. Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva, Switzerland. tel. (022) 93 33 11.

digital
COMPONENTS
GROUP

Guide Stresses Small Business

(Continued from Page 29)

How does the customer narrow the field of package possibilities? The guide suggests he obtain relevant facts from trade publications, trade associations, user associations, system manufacturers and MIC's own publications.

Evaluating Points

The customer should consider the following points when evaluating performance benchmarks, according to the guide:

- "How does the data get into the system?
- "What specific information must be produced by the user in order to generate input to the system?"
- Are single sources of input able to generate multiple output and reports?
- Are file protection, back up and timings explained thoroughly?

The guide also offers tips on negotiating contracts for small business packages including:

- "Negotiate a contract that is equitable," specifying in detail every module of the package being purchased and the delivery schedule. An attorney should look it over.
- Installation and maintenance should be spelled out.
- There should be no cost to the user if the package proves totally unacceptable after a reasonable period of time.
- The documentation provided and how it is to be updated should be specified.
- The amount of training needed should be specified.

The guide also approaches the subject of shopping for accounts receivable and accounts payable packages by defining what these packages should do.

In the section on payroll software packages, the guide asks the businessman reader to look at his requirements, stressing the uniqueness of a given user's situation.

In this section, the guide noted the best time for conversion to a computerized payroll is always the end of the year, with quarter-end being the second best time.

The guide also applies the "What should it do?" approach to its sections on general ledger inventory control packages and ends with this maxim: "Just remember, *plan, implement* and then *utilize.*"

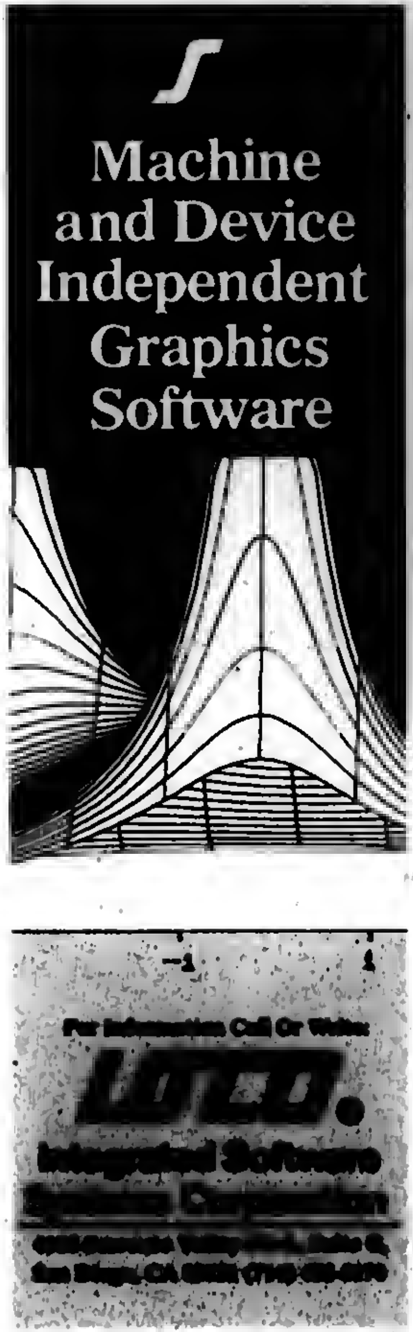
The *Packaged Software Buyer's Guide* costs $15 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

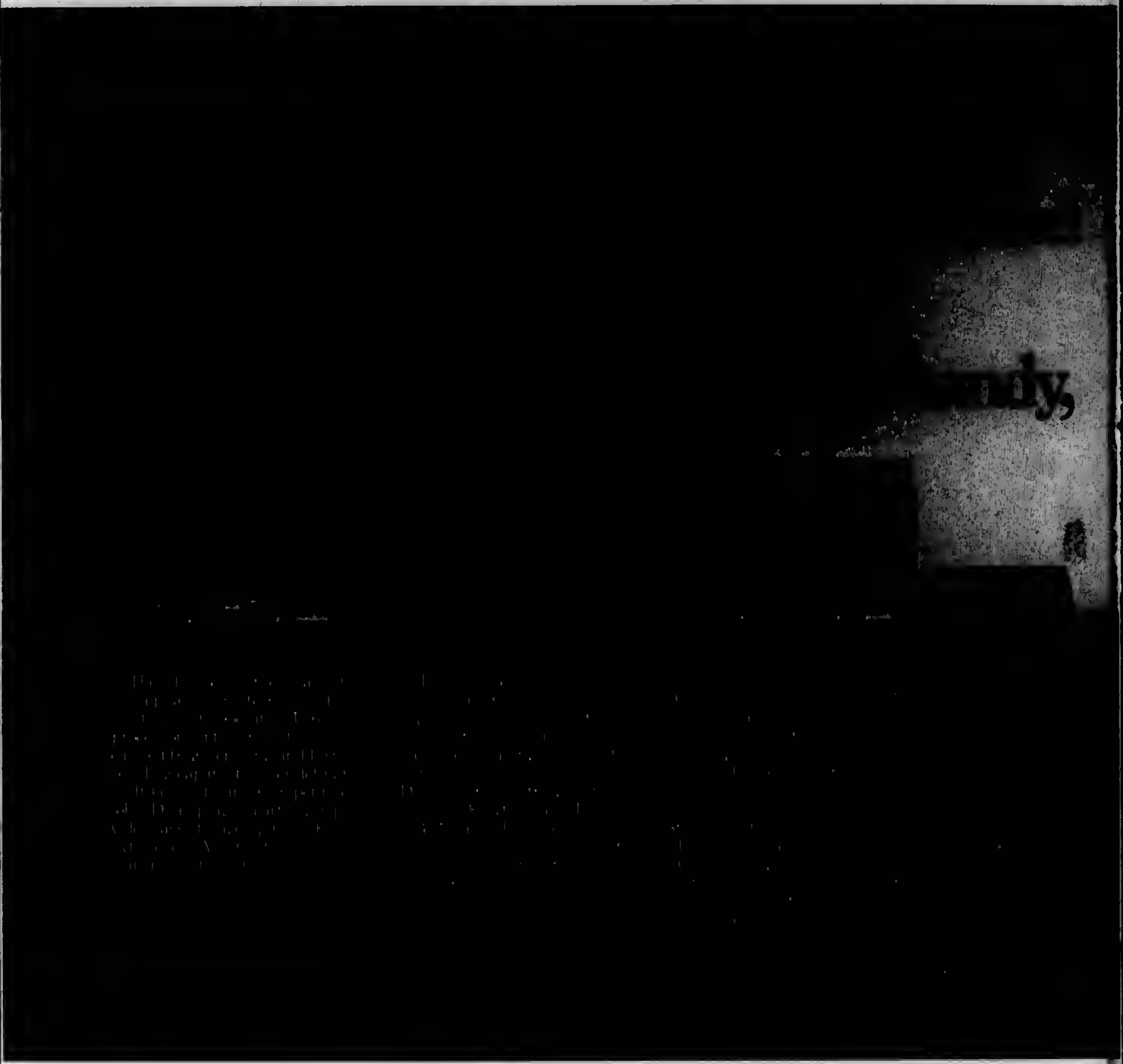
Cobol Interpreter Offered

LISLE, Ill. — A Cobol interpreter that translates short codes and special functions into ANS Cobol source code, processing programmer-written code before it is sent to the compiler, is being offered by Technics, Inc. Programming Services for IBM 370 users.

Technics' Cobol II is claimed to offer three major advantages over IBM full ANS Cobol: clerical effort in the identification, environment and data divisions is reduced by about two-thirds; relative addressing and substring functions have enhanced power, but reduce need for explicit data definitions; and the suggested pseudo-code forms for structured programming can be used as real code.

Cobol II costs $1,800 from the firm at 4715 Old Oaks Drive, Lisle, Ill. 60532.





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Offers Much Interactivity

IBM 5110 to Enhance Distributed Data Bases?

By Brooke Tompkins
Special to CW

The recently introduced IBM 5110 exceeds what is necessary in a distributed DP (DDP) system, offering a high degree of interactivity to the small business user. It is a conversational animal, speaking two of the best languages yet devised for computer conversations.

With its nearly 5M-byte online random-access storage capacity and its synchronous communications capabilities — both are new features rather than updates of the tapebound 5100 — the 5110 opens up another world of applications and utilization. Data base systems are now feasible, and the 5110's impact on DDP could be considerable.

Compatibility has been built into the system, both hardware- and software-wise. The implications for DDP are obvious.

"Distributed data processing" is such a commonly used term these days that its very meaning has become somewhat distributed. Originally DDP meant the distribution of computing power between geographically separated processors, linked or not linked by telecommunications lines.

More recently, the meaning has evolved to imply also a geographic distribution of a data base or data bases within a system.

In terms of the 5110, DDP means the distribution of processing power and data between geographically separated minicomputers linked in a telecommunications network which may include a centralized mainframe.

The significant parts of this definition are:

- The distribution of a data base or data bases.
- The telecommunications network of which the central processor, if any, is only a single node.

Distributed Data Bases

Whenever interrelated data elements are stored at multiple locations, there is a distributed data base. Similarly, whenever processing at one location within a DDP system requires access to data stored at another location, there is a distributed data base.

A partitioned data base exists when a data base is divided into subsets that are stored separately at distributed sites. A replicated data base is one that is stored, in whole or in part, at two or more distributed sites.

A DDP system may include either or both of these types of data bases. For example, a system might use a basically partitioned data base, but replicate certain of the distributed subsets of the overall data base.

Again, when a DDP system includes a number of data bases, a common phenomenon, some of these might be partitioned, some replicated and some hybrid. Moving toward very fuzzy lines of definition and to another level in an implied hierarchy, some of the distributed sites might well have their own data bases that are not partitioned subsets of the overall data base but, on the contrary, are in no way related to it.

The point is that there can be as many ways of distributing data within a DDP system as there are DDP systems. The nature and needs of the distributed processing determine the structure of the data bases involved.

The 5110 offers the choice of

(Continued on Page 36)

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Automated Fingerprint Project
Department of Justice
3301 'C' Street
Sacramento, CA 95813
(916) 445-7926

IBM 5110 May Impact Distributed Data Bases

(Continued from Page 35)

asynchronous and/or bisynchronous communications. In asynchronous mode, the system emulates a 2741 terminal at both 134.5- and 300 bit/sec; the bisynchronous capability allows emulation of either a 3741 or 2770 at speeds up to 4,800 bit/sec.

With these capabilities, the 5110 can link up to a host mainframe or it can interact with another 5110. Within a single DDP system, a remote-site 5110 could be linked through telecommunications lines to both a central mainframe processor and to any or all other 5110s in the system.

It cannot, however, talk to more than one of these at a time. Nor can it function as more than an intelligent terminal when it is in asynchronous mode.

However, it can collect data from the central processor and store it until it resumes its processing mode, at which point it starts acting like a relatively powerful stand-alone computer again.

Bisynchronous communication to and from the 5110 involving another 5110 or a mainframe host can be concurrent with either APL or Basic processing; the communications lines are never closed. The switch-controlled auto-answer feature permits an unattended 5110 to "pick up the phone" and receive data transmitted in bisynchronous mode.

This concurrent processing/-communications capability is probably the most significant aspect of the 5110 design, particularly when considered in the context of distributed processing.

Strangely enough, at this point in computer time, there is nothing in any definition of DDP that demands interactivity. Indeed, the non inclusion of terminal-based systems tends to downgrade the relative importance of interactive capabilities within a distributed system.

However, it would be naive not to recognize interactivity as a desirable and increasingly demandable attribute of an effective DDP network.

Once again, the 5110 offers built-in satisfaction of such a requirement. It is by nature conversational, speaking two languages well suited to computer conversations.

IBM 5110 Basic has been considerably extended over its 5110 counterpart. Although any syntactically valid 5110 Basic will be syntactically valid on the 5110, it probably will not be executable in a real-life transport situation. However, 5110 Basic is considerably stronger and more flexible.

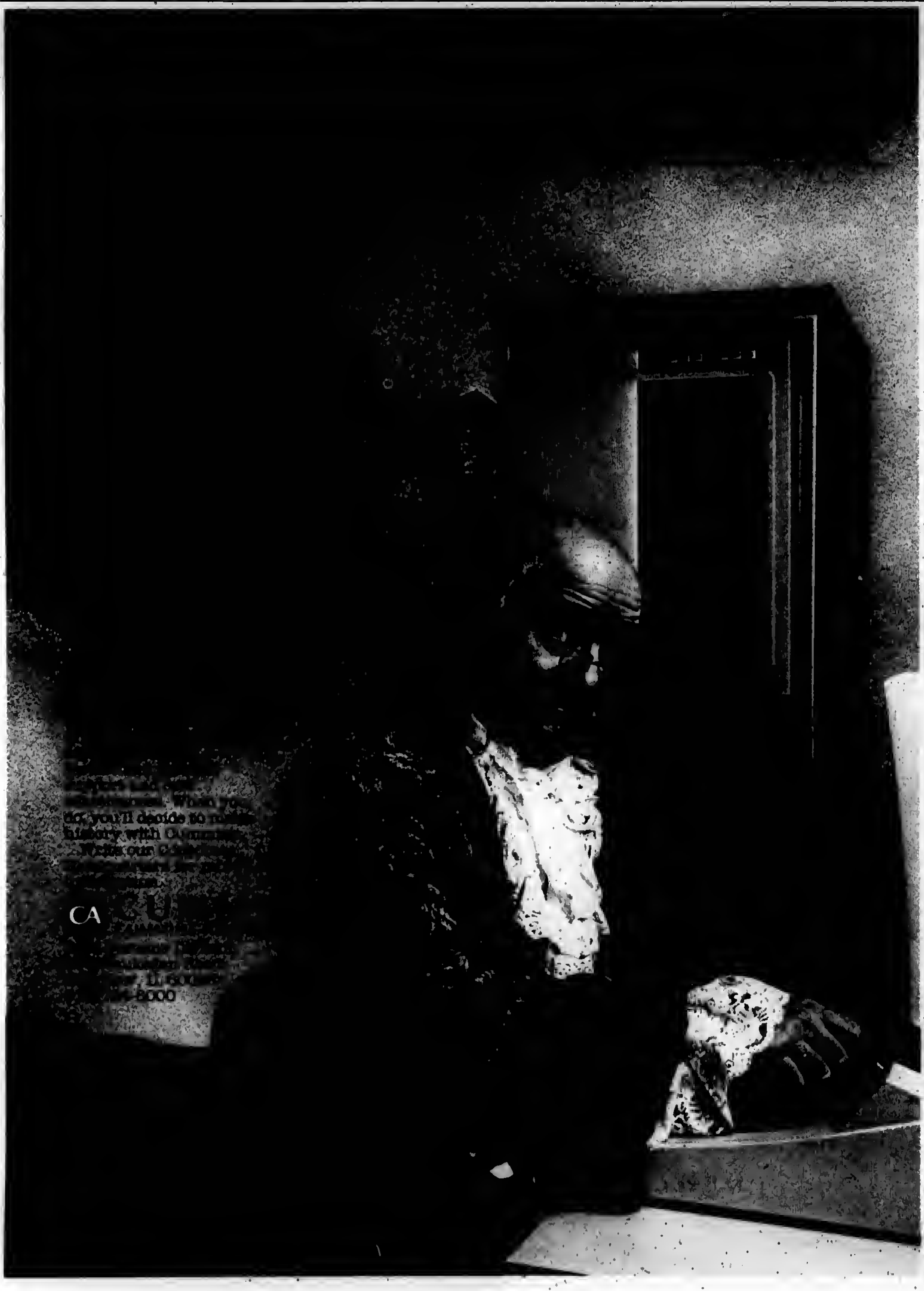
While APL was not enhanced as much, this is not surprising. APL is an inherently powerful, flexible and — most significant in the context of distributed processing — compatible language.

Professor E.T. Irons, acting director of the Yale University computer science department, recently emphasized this transportability in a New York talk, where he described how a program he had written for the 5110, using several of the more intricate and demanding functions of APL, has slid onto a Digital Equipment Corp. system and run with no coding modifications.

This is not typical of APL and, given the broad scope of DDP systems, provides the 5100 with yet another formidable asset as a node in a DDP system.

The 5110 looks like an exciting addition to the world of DDP. Like most newcomers to the world of computer hardware, it could easily be misrepresented and/or misundersttod; this is even more of a danger in its implementation within such an "in" thing as DDP, which itself is dangerously open to misrepresentation and misinterpretation.

Tompkins is on the technical staff at Think, Inc., a New York City firm that develops and markets software for the IBM 5100 and 5110.



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Bought From Private Phone Company

Hospital Sees Cables Saving $2 Million

By Marguerite Zientara
CW Staff

NEW YORK — St. Vincent's Hospital here expects to save between $2 million and $2.5 million over a 12-year period because it purchased its own cables from a private telephone system vendor.

And Ignatius Giorgio, the hospital's telecommunications manager, called that estimate "conservative."

Telecom Equipment Corp. installed an 8,800-wire-pair cable under Seventh Avenue to connect St. Vincent's in-house telephone switching system with the major portion of the building complex. The cable, laid in October 1976 over a span of three weeks, carries 98% voice transmission at the present time.

"We will be utilizing the cable for data more and more as the needs arise," Giorgio said.

According to John Moore, DP manager for St. Vincent's, only a few pairs of those wires are used to connect the hospital's Modular Computer Systems, Inc. Modcomp 4/25 CPU to three remote data entry terminals used for patient-related clinical information. There are two Applied Digital Data Systems, Inc. 920 CRTs running at 9,600 bit/-sec and one Digital Equipment Corp. Decwriter 2 running at 300 bit/sec, Moore said.

The printer is using two borrowed M12 Corp. modems now because of a noise problem, and the hospital will probably acquire short-haul modems on a permanent basis, Moore said.

Bruce Breeger, vice-president of Telecom's PBX Sales Divison, believes Telecom is the only company in New York that installs private cables. It has installed cables for only two other companies: Alexander's Department Store and Wells, Rich & Green Advertising.

Breeger estimated that over a 10-year period, Alexander's will save in the area of $1 million and Wells, Rich & Green will save about $500,000. The cables laid by Telecom are used to connect separate buildings within a single company, he explained.

Much Red Tape

According to Joe McAffee, construction engineer for Telecom, there is a lot of red tape to cut through before any cable can be laid, and this usually takes a minimum of two months. The process involves going to several interrelated city agencies to submit requests and blueprints. These agencies have meeting times set up already, and one must wait until the appropriate meeting is held, McAffee said.

The agencies in chronological order are the City Board of Estimates; the Bureau of Franchise, which is made up of the sewerage, gas and electric and highway departments; and City Planning, made up of the Community Board, borough president and the Mayor's office.

When the appropriate legal documentation is obtained from these agencies, then an agreement with the owner (such as St. Vincent's) is drawn up, signed and sent back to the Bureau of Franchise legal department. It is up to the Building Department to issue the permit after considering the requests and documentation, McAffee said.

If Empire City Subway, which is a separate entity under the auspices of New York Telephone Co., concerned with underground cables, does not have duct facilities available to run the cables through, then the ducts must be provided by Telecom or rented from Empire City Subway, if the cable is interconnecting with Empire's duct line, McAffee said.

Neither Telecom nor St. Vincent's encountered any problems with New York Telephone Co. in the process of laying the cable, spokesmen from each said. According to St. Vincent's Giorgio, "Certainly it was cooperative. I'd be the first to knock the Bell System when it goofs, but it was most cooperative."

Breeger, in discussing Telecom's relationship with Bell, said "We [Telecom] are a viable entity. They [Bell] take us much more seriously now than seven or eight years ago."

Telecom customers receive maintenance under a one-year warranty. In subsequent years, a service contract is written. Telecom provides around-the-clock service seven days a week, "just like the phone company," Breeger said.

Ky. County Claims Multiple Benefits Without IBM 3270s

By Howard Karten
CW Staff

LOUISVILLE, Ky. — Reduced costs and system downtime, improved employee morale, increased public confidence — all these were achieved in the Jefferson County Clerk's Office here when county officials replaced their IBM 3270s with a subsystem of Four-Phase Systems, Inc. CRTs and minicomputers for its automobile registration system, according to Philip Bronstein, director of systems for the office.

The Four-Phase units are costing Jefferson County 30% less than the 3270s. Further, in the eight months since the conversion, the system has been operating "beautifully," Bronstein said.

No downtime has been traced to the terminal system, he noted, but a minimum of one failure per day (lasting anywhere from five to 30 minutes is experienced on the host IBM 360/65. As a result, one of the upgrade plans under consideration is replacement of the mainframe with a network of minicom-

(Continued on Page 38)

WU Service Gets Nod From FCC

UPPER SADDLE RIVER, N.J. — Rates for Western Union's (WU) latest family of data services became effective March 10 after review by the Federal Communications Commission (FCC), marking the first time transmission speeds above 150 bit/sec were categorized and priced as subvoice grade services, WU said.

Known as Western Union Private Wire 75, 150, 300 and 600/1200, the data service replaces the previous Series 1000 services ranging up to 150 bit/sec and the previous Series 3000 services at 300-, 600- and 1,200 bit/sec.

The two-way Private Wire service and price structure is based on the subdivision of an ordinary voice-grade circuit into several data channels. The tariff also established a separate rate schedule for one-way transmission channels up to 150 bit/sec and at 300 bit/sec.

There are 360 cities across the country in which Private Wire 75, 150 and 300 are directly accessible. Extensions from all other cities to the nearest direct-access city will cost slightly more, the firm said. There are direct-access cities for Private Wire 600/1200, with extensions available.

The impact of the Private Wire rates on existing Series 1000 and Series 3000 customers will vary with their own network configurations and traffic patterns, but is expected to result in a decrease in costs for many customers, according to WU.

Typical monthly rates are New York to Los Angeles at 75 bit/sec, $869.40; New York to Los Angeles at 1,200 bit/sec, $1,047.05; New York to Boston at 75 bit/sec, $196.71; New York to Atlanta at 150 bit/sec, $385.60; and Chicago to Dallas at 300 bit/sec, $457.15, a spokesman said.

Details on the service are available from WU at 1 Lake St., Upper Saddle River, N.J. 07458.

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UDOS

It's sad but true — O.S. or V.S. "upgrades" of the 360 are costly alternatives to improving the 360's performance. UDOS enhances DOS to expand its capabilities and improve system performance by 20% to 50%. Now your 360 can be expanded and enhanced — efficiently — with the new core-saving, disk-saving UDOS system. Other systems tend to introduce overhead and waste resource capacities. Or they are cumbersome and complex to use. UDOS is different: it takes the direct, efficient approach by incorporating its features within DOS — and in some instances, by revising DOS to achieve desired limits of acceptable performance and operation familiarity. UDOS components are all field proven. They include two winners of the Datapro Honor Roll award. Look what the UDOS features include: Spooling . . . Relocatability . . . Automatic Volume Recognition . . . Device Equates . . . Job Accounting . . . Partition Balancing . . . Resident Directories . . . RJE . . . Improved Maint . . . ISAM Replacement . . . Improved LNKEDT . . . Procedure Libraries . . . Automatic Disk Space Allocation . . . Disk File Accounting . . . System Library Accounting . . . Blocked Fetch . . . Logical Unit Equates . . . JCL Exit . . . Abbreviated AR Messages . . . up to 12-Partition Availability. Plus more features. Write or call for full facts on UDOS . . . the SuperDOS of 360 software!

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Series 1, 360/370 Linked

SANTA BARBARA, Calif. — Associated Computer Consultants is offering a unit it said connects the IBM Series/1 minicomputer to IBM 360 or 370 I/O channels. The Series/1 Channel Attachment (S1/370) permits the Series/1 to emulate "virtually any" IBM control unit as a function of the software running in the Series/1, the firm said.

3272 Emulation

Applications include emulation of the IBM 3272 display system controller and the 3705 communications controller in either native or 270X emulation mode, interfacing with the host system's Btam, Qtam or Vtam packages.

The S1/370 can connect to the byte multiplexer, block multiplexer and selector channels and can be configured to respond to any set of contiguous addresses from one to 256 (channel maximum), the vendor said.

The S1/370 appears as a single device to the Series/1 I/O channel, and since more than one channel attachment can be plugged into the Series/1, connections and operations to more than one 360/370 channel may be supported concurrently, a spokesman added.

The S1/370 costs $9,500 with first deliveries scheduled for the fourth quarter. Associated Computer Consultants is at 228 E. Cota St., Santa Barbara, Calif. 93101.

Replacement of IBM 3270s Brings Multiple Benefits

(Continued from Page 37)

puters.

The problems with the IBM system were apparent almost from its installation in 1973, Bronstein said. In that year the County Clerk's Office replaced a manual automobile registration system with the Computerized Automotive Registration System (Cars), based on an IBM 370/135 with IBM terminals.

According to Bronstein, the problems that showed up were a "classic textbook case" of computer difficulties — poor response time, poor reliability, software loops — and a continuing source of headaches to the clerks who used it, the programmers who had to deal with its problems and the public, which was subjected to lengthy delays.

Compounding the problem was the fact that Jefferson County registered all passenger cars in January and February and all trucks in March. The law has since been changed to provide for staggered registration, but Bronstein expects that it will take at least five years before the load smooths out.

Service Bureau Tried

To deal with these problems, the County Clerk's Office decided a bigger system was needed and approached a service bureau which used an IBM 360/65. This system was running under OS/MVT using the Task Master communications monitor from Turnkey Systems Inc., County officials hoped the service bureau would improve its service to the public and it would gain better cost control of the system.

However, no performance specifications were written into the contract with the service bureau, which was prepared by lawyers working for the bureau. The result, according to Bronstein, was that the county received essentially the same poor level of service on the larger system.

When Bronstein took over a year ago, his first task was to try to improve the performance of the sytem. In looking at various alternatives, he said, he hit upon the idea of bringing in five Four-Phase Model IV/50 minicomptuers to operate as intelligent terminals with Four-Phase 7111 CRT units and Four-Phase 8121 printers to replace the IBM 3270s.

Three Advantages

This configuration, he explained, had three advantages over the previous system of nonintelligent terminals: it had 3270 emulation, it allowed some software functions to be distributed over the terminal network and it removed some of the telecommunciations burden from the mainframe.

In addition, he said, Four-Phase offered a 30% overall reduction in price over the IBM terminals and the vendor could provide strong local support. "Four-Phase gave us beautiful support on both hardware and software — the best I've seen of any company," Bronstein said.

A final bonus was the fact that, although the Four-Phase printers were rated slower than the IBM printers used once installed they operated faster than IBM's units.

Distributed Functions

Under the newly configured system, a failure of the mainframe has a minimal impact on operations becaue the software functions are distributed across the five minis. In addition, if one of the minis goes down, lines and functions can be rearranged rapidly to maintain service.

"Failure of one part of the network, including the mainframe, can be made to have limited or no effect on total network operations because the minis can operate alone and apart from the main computer. This 'fail-soft' capability justifies the system in serving the public because of our better ability to deliver service despite a host failure," Bronstein said.

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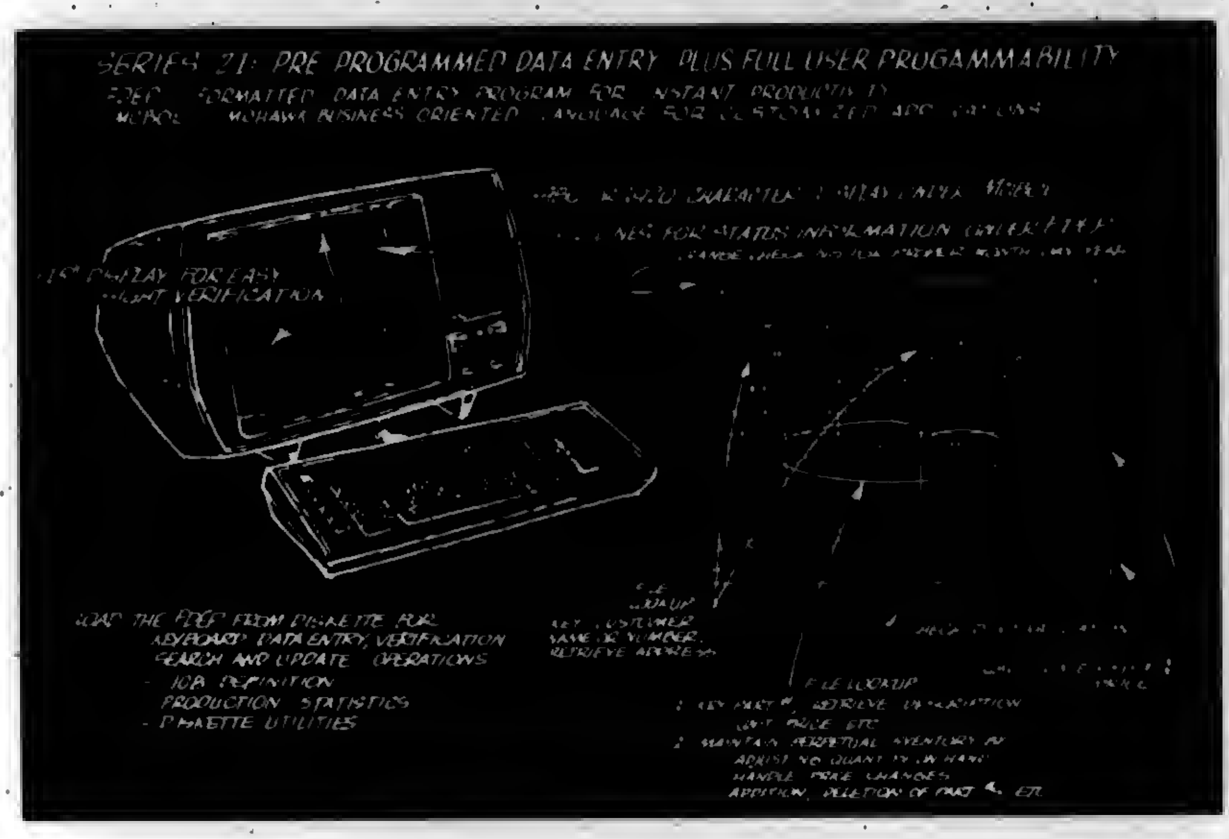
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HOUSTON Southwestern Computer Expo	April 11, 12, 13 Astrohall
ATLANTA Southeastern Computer Expo	April 18, 19, 20 World Congress Center
ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

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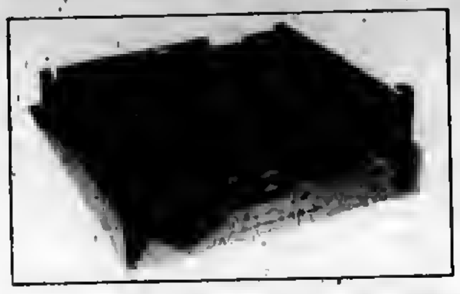

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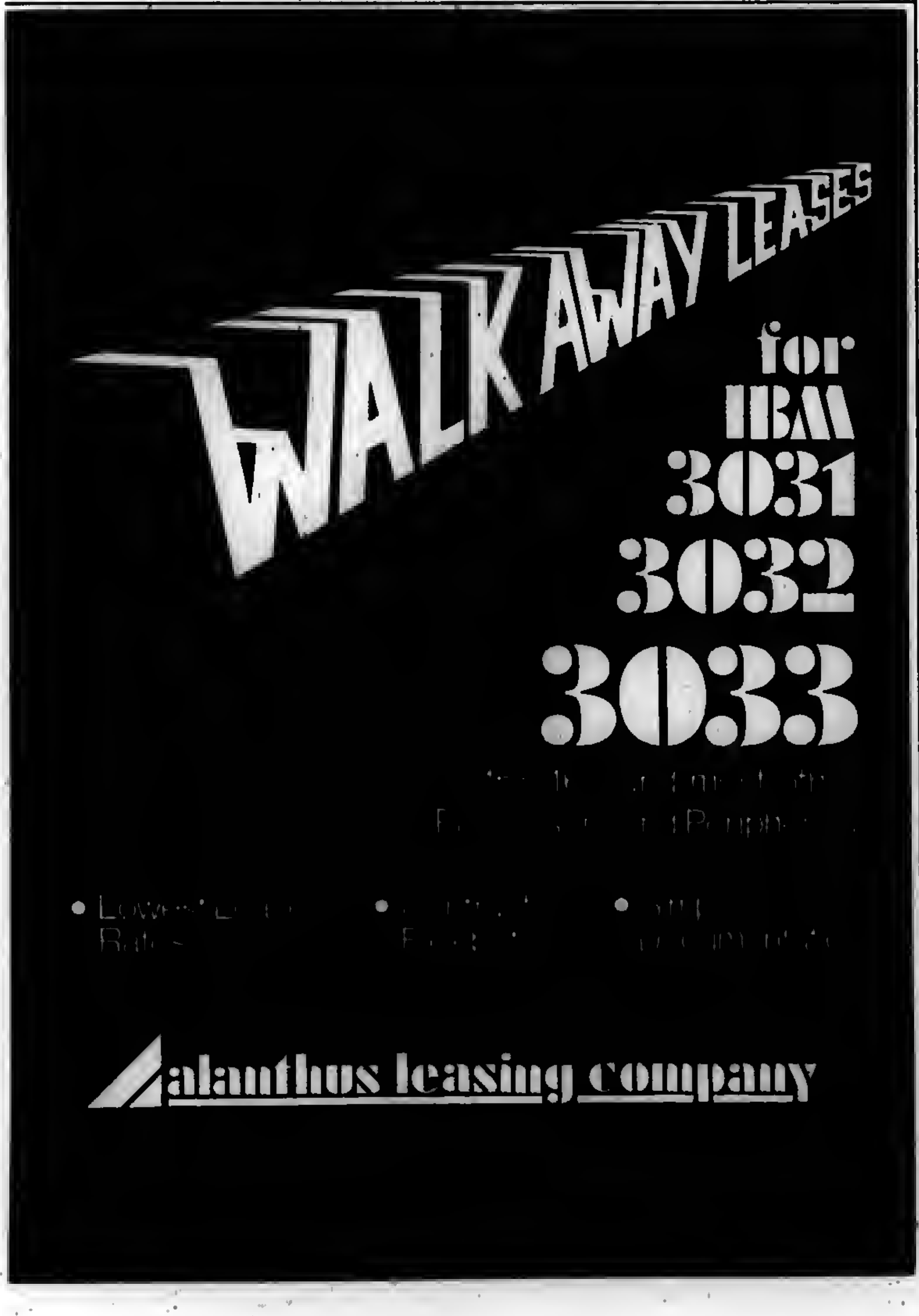

Qume Printer Produces 'Letter Quality' Output

HAYWARD, Calif. — A microprocessor-controlled daisy-wheel printer terminal has been introduced by Qume Corp.

Designated the Sprint 5, the terminal reportedly features "letter quality printing." The Sprint 5 is available as a keyboard send-receive (KSR) data terminal or as a receive-only (RO) printer, with printing speeds of 45- or 55 char./sec, the firm said.

By using microprocessor control and eliminating the constraints of custom interfacing, the daisywheel printer reportedly is a practical solution to any application in which print quality, cost and ease of use are important.

Standard in all Sprint 5 models is a microprocessor-controlled operating system that provides control over the printing mechanism and paper positioning. This reportedly allows variable character spacing for justified text and plotting commands to generate resolution of 5,760 impression/sq-in. Self-test routines indicate equipment status to the operator or a remote inquiry, and high-speed multidirectional slew rates provide maximum printing throughput, the firm said.

Control Commands

A set of 43 user-oriented control commands permits the data system to specify such variables as vertical and horizontal tabbing, relative and absolute carriage movement and user-defined test sequences.

Twintellect Option

Type style and pitch can be changed using more than 50 different English and international character set printwheels available in both monospace and proportional space pitch. If the user requires a custom character set, Qume offers a Twintellect option. The user must only position the control panel twintellect switch and change the printwheel to print the custom character set, the company said.

The standard control panel offers 11 switch-selectable functions such as automatic line feed, selection of form length and 10- or 12-pitch spacing. Other switches permit the operator to select the transmission rate (110, 150, 300, 600, 1,200 bit/sec), change parity and select full or half duplex. Additional standard features include top-of-form detect, out-of-paper detect and end-of-ribbon detect.

The Sprint 5 standard configuration receive-only printer model (45 char./-sec) is priced at $2,140 and the KSR data terminal at $2,480.

Qume Corp. is at 2323 Industrial Pkwy. W., Hayward, Calif. 94545.

Selector, Remote Control Panel Unveiled for IDS Series 8900R

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has introduced the Model 8935 selector and the Model 8933 master remote control panel as part of its Series 8900R remote control system.

The Model 8935 is designed to address up to 16 cages of Series 8900 A, B switching modules located in a remote tech control center, when used in conjunction with a Model 8933 master remote control panel, according to a company spokesman. Located at the remote site, the Model 8935 selector addresses the cages on a cage-address and an individual switch-address basis, thereby directing encoded information for up to 256 A,B switches. The unit communicates with the Model 8933 via low-speed modems using the dial-up telephone network.

The Model 8935 is microprocessor-based, but in itself cannot initiate any A,B switching. It is capable of detecting and displaying error and alarm conditions occurring during data transmission with the central site, the firm said. In addition, status information is transmitted back to the central site to update the Model 8935's LED display.

Switching Capability

The Model 8933 provides individual remote control and status display for up to 16 channels of A,B switching, from a central site via an asynchronous dial-up link. The unit is capable of switching up to 256 remotely located cages, totaling 4,096 A,B switches, according to a company spokesman.

The unit consists of a CPU and a communications section that integrate to provide two modes of operation. The operation mode is initiated upon actuation of an A,B switch at the central site. The communications section transmits encoded switching information to the Model 8933 selector located at the remote site. A Model 8935 selector then actuates the correct switch in the corresponding Series 8900 cage, the firm said.

Front-panel LEDs indicate the status of the remotely located, 16-channel A,B switching system in a full-duplex mode. When in the status mode, the position of each remote switch is periodically interrogated by the Model 8933 to update the LED display.

The Model 8933 costs $2,500 and the model 8935 costs $2,000. IDS is located at 100 Nashua St., Providence, R.I. 02904.

ADC Unveils Tester, Data Access System

MINNEAPOLIS — ADC Telecommunications, a division of Magentic Controls Co., has introduced the Data Mate system, an EIA RS-232C/V.24 data patching and accessing system. Data Mate provides access to all 24 conductors in the RS-232C/V.24 interface and was designed to access, rearrange or substitute the various data equipment in a network, the firm said.

"Circuitry in the handle" test module allows the user to monitor the critical leads of the data circuit by inserting the test module into the monitor position, according to the firm. Each of the 19 channels can be monitored simultaneously by test modules, if required, it added.

The Data Mate costs $80 from ADC Telecommunications, 4900 W. 78th St., Minneapolis, Minn. 55435.

Without Hurting Response Time

Medical Center's System Has Room for Growth

WINSTON-SALEM, N.C. — A regional medical center here has established a minicomputer-based communications system using Data General Corp.'s Nova 3 mini as a communications concentrator for a Honeywell Information Systems, Inc. host CPU.

Display terminal provides patient information at Bowman Gray School of Medicine/North Carolina Baptist Hospital.

Using the Nova 3, Bowman Gray School of Medicine/North Carolina Baptist Hospital Medical Center has added CRTs at its various clinics without increasing terminal response time, a hospital spokesman noted.

The Nova-based data communications system is said to verify insurance information in a time-sharing environment, print claim forms in batch sequence, provide patient histories from previous admissions and perform accounting, general ledger, accounts payable and accounts receivable functions.

With 55 attached terminals, the host HIS 6000 delivers its response to user input within two to five seconds, according to Ben Haste, the medical center's DP director. The center can add CRTs, cabling and other peripherals without increasing response time, Haste added.

About half the terminals are located in physicians' clinics within the medical center, where they are used for billing, retrieving patient data and confirming insurance claim information. The system must handle 26 clinics, independently billing the patients of 130 physicians.

The center acquired the system in anticipation of growth, Haste said, noting the center chose the Nova 3 concentrator rather than incorporate multidrop hardwired communication lines or direct lines "because its cost was less than half that of the other alternatives."

The medical center plans to add online admissions monitoring, extend its medical record retrieval capability and store dietary restrictions and laboratory test results in the system.

Communications between the Nova 3 and the host HIS 6000 is in synchronous mode on two 9,600 bit/sec lines. The Nova 3 can communicate with up to 75 DG Dasher CRTs and 80 printers, Haste said.

AT&T Releases Desktop Version Of Its 40/4

BEDMINISTER, N.J. — A desktop version of the AT&T 40/4 data communications terminal has been introduced by the Bell System.

Called a "single display station" arrangement, the unit combines the terminal controller within the keyboard display.

The new unit requires only a keyboard display or a keyboard display and printer. It is designed for private-line communications systems and includes a number of options for system flexibility, AT&T said.

It is said to be suited for businesses with remote or branch locations that have space limitations, including the insurance, manufacturing and brokerage industries.

The single display station is designed to permit one message to be prepared on the display while a second message is being received on the printer. The printer is available for local printing under operator control and remote printing from a computer.

An interstate tariff filed with the Federal Communications Commission became effective March 23, 1978. Rates are $171/mo plus $250 installation. Bell System operating companies will file intrastate tariffs soon, AT&T said.

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CTS Portable Terminal Diagnoses Phone Lines

PARAMUS, N.J. — The Execuport Model 3810 Datalogger portable terminal produces a full 136-column printout and was designed for testing communications systems, according to its vendor, Computer Transceiver Systems, Inc. (CTS).

The unit has an operator-switchable character set that allows the printing of normal nonprint characters such as device control codes and vertical and horizontal tabs, a spokesman noted.

The Model 3810 receives and prints a continuous data stream at speeds up to 30 char./sec. Operations normally performed upon receipt of a nonprint character such as carriage return or line feed are not executed. Instead, a special symbol is printed to provide a graphic and permanent record of the data stream.

Printing takes place unconditionally from column 1 to column 136. After the last column has been printed, an automatic line feed carriage return sequence is executed; internal buffering prevents the loss of any data because of carriage return, the spokesman said.

Ascii and APL

The 3810 prints the entire Ascii character set. An APL character set is also available alone or concurrently with the Ascii set and the Datalogger's 32 special symbols for the nonprint characters, CTS noted.

Explaining the Model 3810's operations, CTS pointed out the present method of determining all signals being sent over a line including control signals that operate various peripheral devices is to punch a paper tape and then examine the tape. Program debugging often requires a memory dump to diagnose programs containing various nonprinting characters.

Low-Cost Debugging

CRT units have been developed that display all characters but do not provide a permanent hard-copy record for analyses. The Execuport 3810 provides a low-cost debugging method and hard-copy printout that can be reviewed at any time, CTS said.

Its portability makes it well suited for use in any remote location with telephone service, the firm added.

The Execuport 3810 is said to be compatible with most paper tape and magnetic tape memory units, most other peripheral equipment and major minicomputers.

The unit costs $3,620 or $149/mo on a two-year lease, CTS is at E. 66 Midland Ave., Paramus, N.J. 07652.

Four Terminals Share Modem

FORT WASHINGTON, Pa. — Tele-Dynamics Division of Ambac Industries, Inc. has announced a port rotary selector which permits four separate data terminals to communicate through a single modem on a shared basis.

The Tele-Dynamics 7251 saves both modem and telepone line costs in point-to-point data systems where any three terminals can wait until communications at the fourth terminal has been completed, according to a spokesman.

The four terminals and the single modem connect to the 7251 through EIA RS-232C interfaces. The 7251 sequentially monitors the request-to-send lines from the four terminals.

When a request-to-send signal is received from any terminal, the 7251 automatically selects the appropriate port to connect that terminal to the modem, the firm said. Four front-panel lamps indicate which terminal is controlling the modem, while two other lamps indicate modem carrier-detect and modem clear-to-send.

The unit is priced at $425 from 525 Virginia Drive, Fort Washington, Pa. 19034.

At only $1088, you can't offer your customers a better buy.

Our quantity-50 OEM price for the *Silent 700** Model 743 KSR Terminal is now just $1088†. In larger quantities, the price goes below $1000.

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The 743 features the speed, reliability and quietness that made the *Silent 700* terminal family so popular. Incoming data is buffered, so you get true 30 characters-per-second throughput.

TI's Model 743 KSR

Disturbing noises associated with impact printers are eliminated with the 743's non-impact electronic printing.

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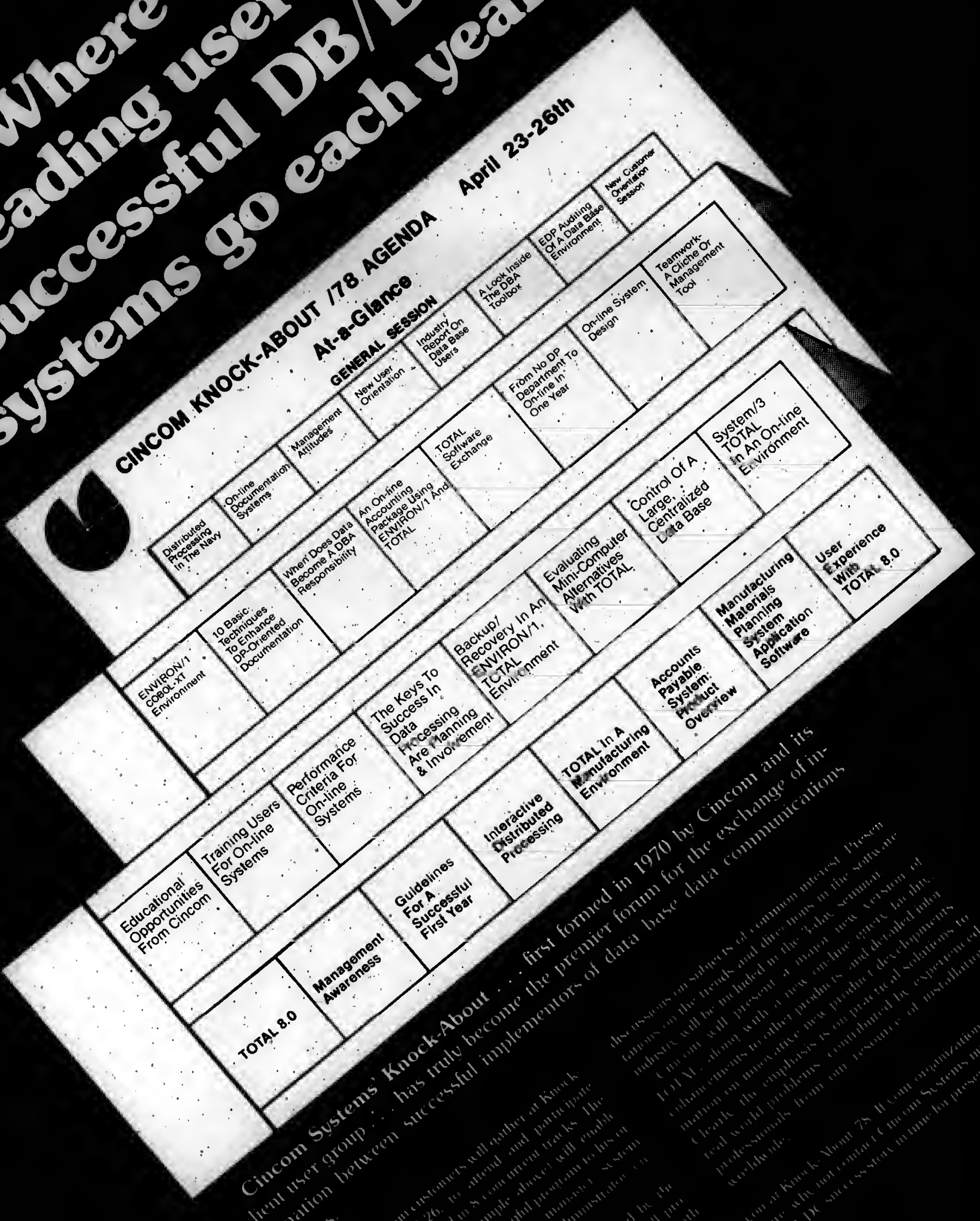

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At-a-Glance

April 23-26th

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Distributed Processing In The Navy

On-line Documentation Systems

Management Attitudes

New User Orientation

Industry Report On Data Base Users

A Look Inside The DBA Toolbox

EDP Auditing Of A Data Base Environment

New Customer Orientation Session

When Does Data Become A DBA Responsibility

An On-line Accounting Package Using ENVIRON/1 And TOTAL

TOTAL Software Exchange

From No DP Department To On-line In One Year

On-line System Design

Teamwork-A Cliche Or Management Tool

ENVIRON/1 COBOL-XT Environment

10 Basic Techniques To Enhance DP-Oriented Documentation

Evaluating Mini-Computer Alternatives With TOTAL

Control Of A Large, Centralized Data Base

System/3 TOTAL In An On-line Environment

The Keys To Success In Data Processing Are Planning & Involvement

Backup/Recovery In An ENVIRON/1, TOTAL Environment

Accounts Payable System: Product Overview

Manufacturing Materials Planning System Application Software

User Experience With TOTAL 8.0

Educational Opportunities From Cincom

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Cincom Systems, Inc.

[illegible]

In 350-Branch Net

System Lets Bank Provide Uniform Service

SAN FRANCISCO — A system of finance communications terminals is helping Crocker Bank provide uniform service to more than 350 branches dispersed throughout 201 communities within California. The system is the basis of the bank's Retail Inquiry System (RIS), a 7,000-mile on-line network linking all Crocker offices, according to Carl Pascarella, Crocker's vice-president of electronic banking.

The RIS system provides Crocker branches with 8-digit LED-display inquiry terminals, activated by magnetic-strip cards. The cards are used both by tellers behind the counter and customers in bank lobbies.

As part of the IBM 3600 system Model 3606 financial services terminals are used for teller- and customer-operated applications. In addition, Model 3614 consumer transaction facilities serve as unattended self-service terminals for customer transactions.

Installed through the wall to be accessible to consumers when the branches are closed, these automated teller machines (ATMS) operate 19 hours a day. Crocker account holders may withdraw up to $150 from checking, savings, Master Charge and Visa accounts; make deposits in checking and savings accounts; make payments; transfer funds from one account to another; and make inquiries on checking, savings, Master Charge and Visa account balances.

Crocker Bank account holders who request Crocker Banking Cards receive a personal identification number (PIN) with the card. The Crocker Banking Card, with a magnetic strip, is required to actuate the 3606 inquiry terminals. To obtain information about checking, savings or Master Charge accounts, the customer can give the card to the teller or use a self-service lobby terminal. To use the 3614 facility, the customer must key in his PIN as well as use the banking card, providing a safeguard against lost or stolen cards being used to obtain cash.'

Terminal Locations

About 650 IBM 3606 terminals are installed in Crocker offices, and 14 of the 3614 ATMs are in selected branches. Every branch office has at least one 3606 terminal behind the counter for teller use, and customer-operated terminals are placed in key locations. The 3606 used by tellers is identical to the one operated by customers, except that tellers can get special information using terminal function keys not accessible to customers.

"In designing the system, we considered that there were at least three ways in which customer-operated terminals might prove advantageous," Pascarella said. "First, many customers may prefer to obtain information about their accounts in a completely private way. Second, plain balance inquiry requests at teller stations are an expensive and unproductive use of the teller's time. And thrid, we looked at the customer-operated lobby terminals as training for our customers. This way they gain some confidence in their ability to do a financial transaction without another person."

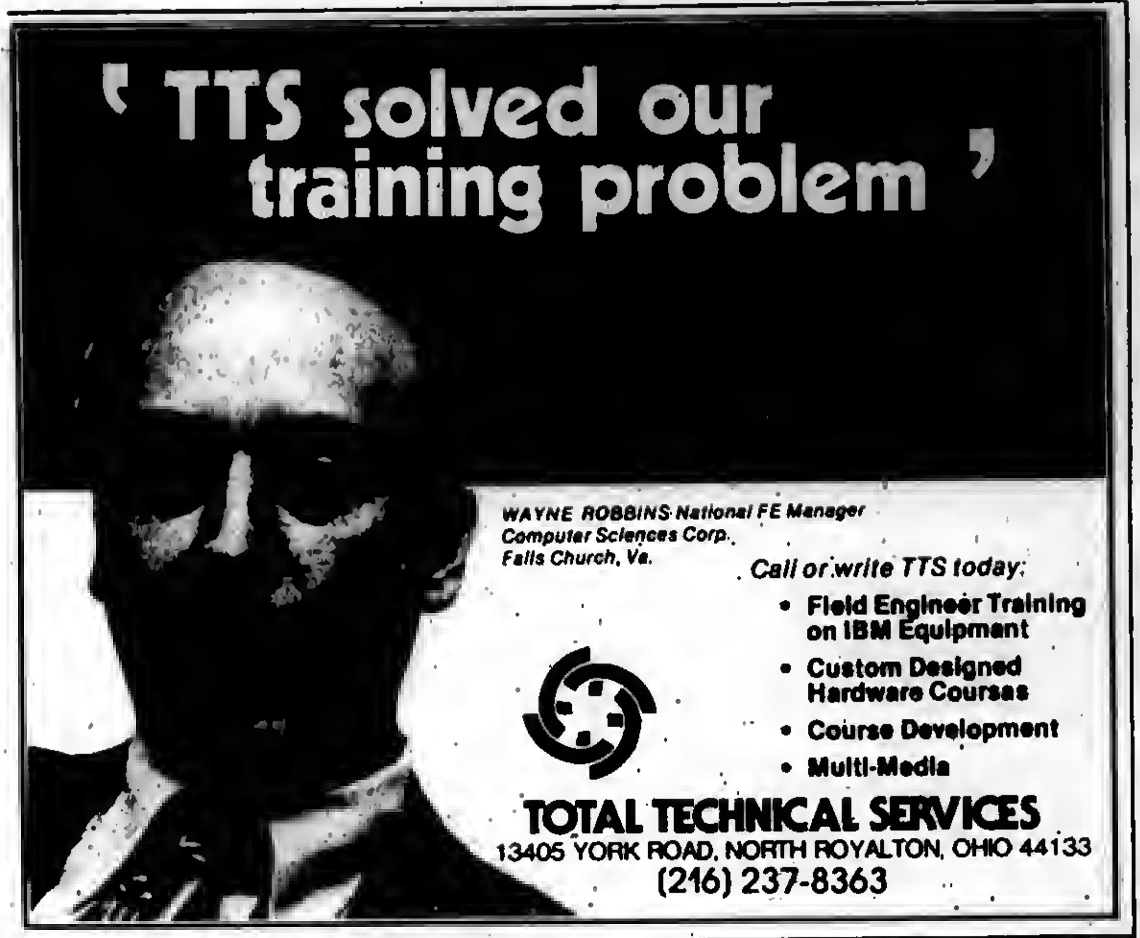
Crocker's 3600 system includes Systems Network Architecture (SNA), MVS and IMS software. Two IBM 370/168s at Crocker's headquarters here run this system.

"We view the 3600 as a foundation, a basic system on which we can build additional functions with only incremental cost," George Rutland, senior vice-president of operations, said. "We must respond quickly and economically to needs for new banking products, including various electronic funds transfer (EFT) options that the changes in banking may call for. We believe the computing power we have, and that we can add, can accommodate future needs."

Expeditious Planning

The 3600 network and the 370/168-based software system supporting it were expeditiously planned and implemented together. "Our first request for on-line equipment in the branches came July 1, 1975," Peter Rosenow, vice-president of DP recalled, "In 90 days, we had installed the first 370/168, brought the SNA, MVS and IMS systems into production and written message-processing programs to support 96 transactions. We had a demonstration of the production system on Oct. 1."

The next 90 days were used to do clean-up work — documenting, tuning and stress-testing the system. By Jan. 19, 1976, Crocker was ready for full-scale installation of terminals in every branch, and by mid-August 1976, more than 300 terminals had been installed in 250 branches. The system was announced to customers and within a month the entire 360-branch network was on-line, Rosenow said. "Our main goal is to serve the customer in the branch, without a lot of people in the branch who aren't customer-related. We'll focus on customer service in the branches and still communicate with our central files. And we hope to reduce the amount of paper sent back and forth," he said.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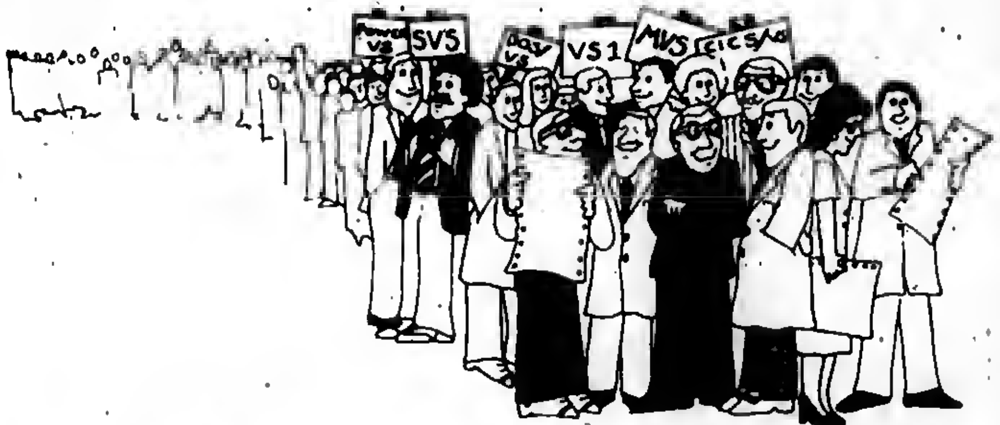

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Vadic 1,200 Bit/Sec Modems Designed for Remote Users

SUNNYVALE, Calif. — Vadic Corp. has announced a series of direct connect, stand-alone modems, specifically designed for remote terminal users who require 1,200 bit/sec full-duplex operation over the switched network or two-wire leased lines.

The VA3455 series switched network modems have been registered for direct connect under Federal Communications Commission Rules, Part 68, so users will no logner have to rent Data Access Arrangements from the telephone company, according to the firm.

The VA3455 is a third-generation version of Vadic's VA3400. Compatible with all previous VA3400s, the VA3455 can transmit and receive at speeds up to 1,225 bit/sec, which permits operation with multiplexers that run overspeed. The modems are also crystal controlled for frequency stability and use Cmos to keep modem power consumption to a minimum, the firm said.

The VA3455 series modems provide originate/answer, with automatic answering, contain diagnostic interface display, local analog and digital loopback and respond to remotely initiated digital loopback.

Three models comprise the VA3455 series. VA3455P offers direct connect to either voice jack or data jack. VA3455S provides direct connect to data jack only. VA3455G is designed for two-wire leased-line operation (point-to-point or multipoint.)

Unit prices start at $825 from 222 Caspian Drive, Sunnyvale, Calif. 94086.

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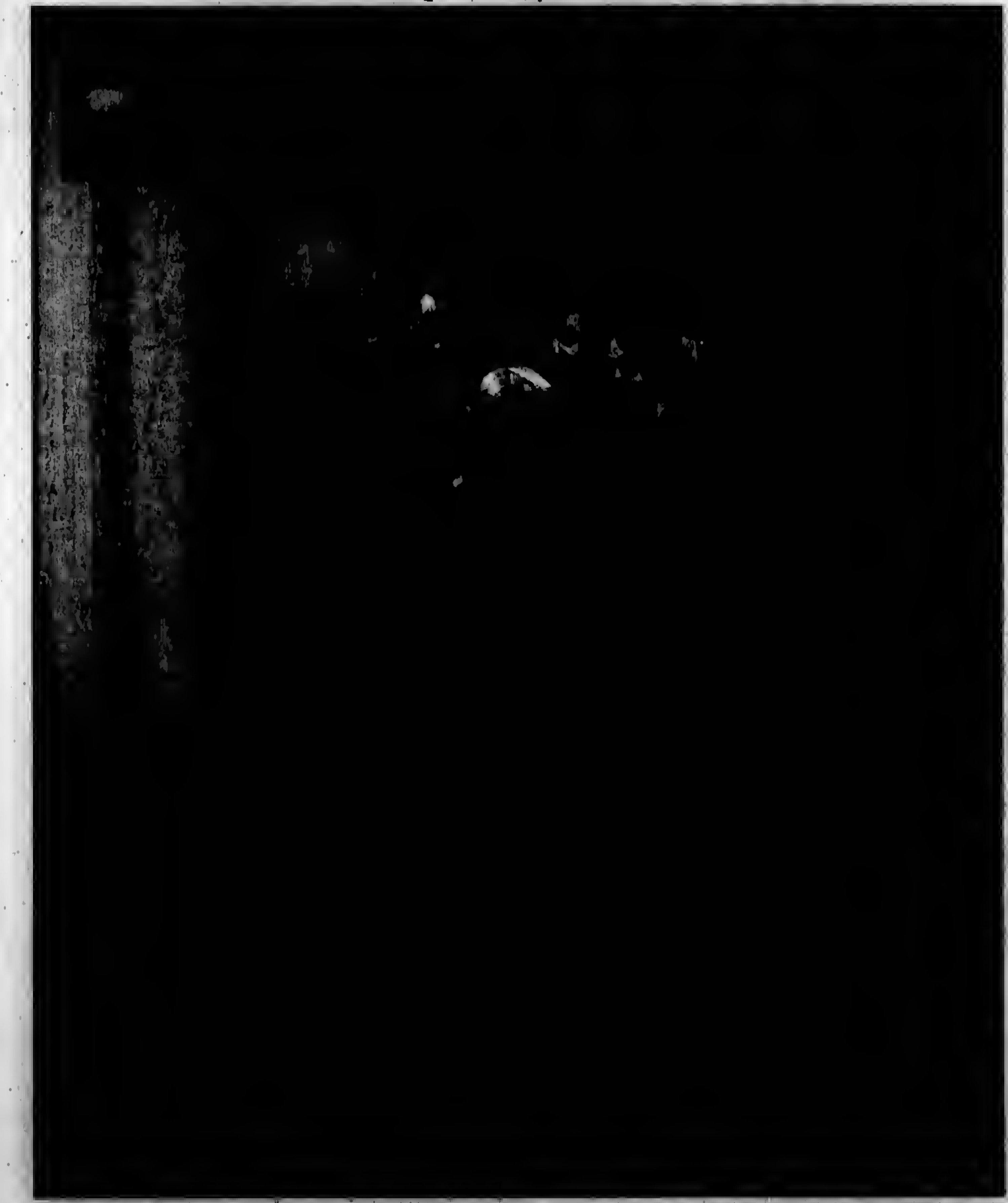

DECstation is Digital's new full-fledged computer system in a configuration so small you could mistake it for a terminal. But make no mistake about it. DECstation means business. Not even a year old, DECstation is already up and running in over a thousand installations. And commercial OEMS across the country are touting it as one of the most successful business investments you can make.

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DECstation fits small jobs in big companies and big jobs in small companies because it's compact, mobile and powerful. Packed into its small volume are an LSI CPU with 16K words of MOS memory, dual diskette drive and a DECscope video terminal. Then comes I/O. Two serial asynchronous ports, a disk port, a parallel port for printers and interfaces. And all of it so simple in its design that it can be hooked up in minutes with just a screwdriver.

The software's good for business.

Digital's new improved OS/78 operating system offers a choice of languages including BASIC, FORTRAN IV, Assembler, and a full feature Commercial BASIC.

DECstation's Commercial BASIC functions include commercial decimal arithmetic to 15-digit precision, a PRINT USING statement for formatted printing of numeric strings, record-oriented random access I/O, three data formats and cursor positioning at specified coordinates for data/entry forms-filing applications. And OS/78 even offers you a multi-function capability that permits parallel operation of tasks while the normal job stream runs. So you can do concurrent printer-spooling, customized real-time jobs, or communications.

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CW4108

IBM Adds 3624 ATM

WHITE PLAINS, N.Y. — IBM has introduced an automated teller machine (ATM) that features a cash-loading cartridge.

Loaded and sealed by bank personnel, the IBM 3624's portable cartridge holds up to 2,300 bills or traveler's checks and fits into the terminal's consumer transaction facility, according to a spokesman. The terminal can count bills as they are dispensed, in either $5, $10 or $20 denominations, permitting an automatic audit of the cartridge contents, IBM said.

Up to eight programmable keys allow special functions such as funds transfer and check reorder.

The 3624 can handle deposits and withdrawals, cash checks and accept loan and bill payments. It encrypts and decrypts personal identification numbers using the National Bureau of Standards' Data Encryption Standard, the spokesman noted.

The terminal, which can be installed in networks with IBM's previously introduced 3614 consumer transaction facility, can be purchased for $13,693 to $29,168, depending on the configuration selected.

The monthly lease charge under a five-year contract period ranges from $545 to $1,091. A six-month Pilot Test Plan for the 3624 also is available. First customer shipments are scheduled to begin in the first quarter of 1979.

Capabilities of ATM Run To Deposits and Biorhythms

SCHILLER PARK, Ill. — Bank Computer Network Corp. (Bankcom) has announced the Bankette line of customer-operated automatic teller machines (ATM). The ATMs were developed to supplement the use of live tellers in offering financial services in financial institution lobbies, vestibules and off-premises in locations such as supermarkets and industrial plants, according to a spokesman.

According to Bankcom, Bankette can be used by customers to:

- Simultaneously receive up to six different currency denominations; each unit holds up to 6,000 individual bills.
- Request any specific mix of denominations.
- Make deposits to any account handled by the bank.
- Make withdrawals from any authorized account.
- Make transfers from any authorized account to any account.
- Purchase traveler's checks or postage stamps.
- Pay any bills, loan payments or installment payments.

Terminal Transactions

- Order checks, deposit tickets or other bank forms.
- Request the balance of all accounts and, if necessary, the last five check amounts that cleared the account along with the dates they cleared.
- Borrow money from any preauthorized account in cash or have it transferred to one of the customer's accounts.
- In supermarkets, preauthorize a personal check based on the supermarket weekly restrictions.
- Ask almost any question with regard to type of savings accounts, interest rates or, if programmed, the customer's horoscope for that day or his biorhythm outlook.

'Money Modules'

The bankettes can be programmed to speak to the customer in his native language and address the customer by name. The unit runs on Bankcom's own microprocessor, based on a Z80 chip, the firm said.

In order to make replenishing the machine as secure and rapid as possible, Bankettes incorporates up to six prelocked "Money Modules" that are locked at remote locations and never reopened until returned to those locations, according to a spokesman.

In addition, deposits are also in a locked module which can only be opened at a remote location.

Customer Interface

The customer interface is through a touch-sensitive 256-character display screen, according to the firm.

Bankettes are available in both limited-security lobby units made of sheet metal and full-security 24-hour units made of stainless steel plates. Prices range from $10,000 to $19,950 or on five-year leases, from $450/mo to $750/mo.

Customer deliveries are scheduled to begin this summer from the firm at 10501 Delta Parkway, Schiller Park, Ill. 60176.

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Doubles 370/145 Memory

IBM User Finds Flexibility With Add-On

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N. KINGSTOWN, R.I. — A 145-year-old manufacturer here whose network of teleprocessing equipment and on-line systems had outstripped the memory capacity of its IBM 370/145 reportedly found a way to add even more equipment — it doubled the CPU's capacity with independent memory.

Brown & Sharpe Manufacturing Co. (B&S) was founded in 1833. Its main plant and corporate headquarters are located here while other facilities are located in Michigan, Ohio, England and Switzerland.

The company employs more than 3,300 people in manufacturing, engineering, marketing and administration of its machine tools, measuring tools and equipment, metal cutting tools, pumps, industrial hydraulics and precision components for the nuclear manufacturing industry.

Problem Defined

"Remote job entry from manufacturing and engineering was too much for our 370/145, with 256K of IBM memory, to handle when coupled with other company inputs. We had also more than doubled the number of CRTs and printers in our system in the past two years," according to DP manager Charles McKellar.

"The most significant measure of this additional workload was a paging rate which ran from 10- to 18 page/sec. In order to provide a minimum level of support to the on-line systems, batch processing was limited to priority work and testing. By installing the add-on memory, the company decreased its paging rate capability by a significant order of magnitude," McKellar added.

In addition to the IBM 370/145 computer, B&S's DP system includes two Itel Corp. 7830 disk controllers with 7330-1 drives spread over two channels, with two IBM 3420 tape drives attached. Also included is an IBM 3704, Digital Equipment Corp. PDP-11/34 and 45, two Harris Corp. 8170 channel interface units, 38 CRTs and six printers.

Six Vendors Considered

The company requested and received six quotations from suppliers of add-on memory and found several of these vendors distribute the same product. The firm also found Electronic Memories and Magnetics Corp. (EMM) marketed and manufactured its own product — "an important advantage over the competition," McKellar said.

There were several other factors that led to B&S's selection of 256K of EMM memory. "When we previously had a memory failure we were down solid with no correction capability. EMM offered a deferred maintenance capability that gives us the ability to dial out a failing increment of memory, whether it was IBM or EMM. This allowed us to maintain support for our on-line system," McKellar said.

The EMM equipment also features static memory. This technology is used by IBM, so total compatibility is assured, he noted.

Also influencing the selection was EMM's contract flexibility, McKellar said. Since EMM carries its own financing, it is in a position to offer customers a wide range of plans that fit future requirements.

B&S felt it was important to write a long-term contract with some flexibility in the event a change of CPUs was necessary. B&S also knew EMM was in a position to provide independent memory for other IBM CPUs.

Combination of Factors

Overall, however, "It wasn't any one of these factors that influenced our decision, it was a combination of all of them," McKellar said.

The vendor-customer rapport has become even more solid since the installation of the EMM add-on memory in early 1977. The installation itself was easy and was accomplished at the user's convenience, according to the DP manager. After 19 hours on a weekend, the systems were up and running without a hitch.

'Better Than Expected'

Service has been better than expected, he added. In fact, there have been only two hits on the memory without loss of operation.

"Our first hit came two months after installation, and we just switched the failed memory out and continued processing. It was fixed by service people within an hour. The second hit, four months later, resulted in the same procedure. This time the memory was down several hours, but we didn't miss a production schedule," McKellar siad.

"By coordinating local and regional support, EMM was able to provide the fast response and expertise needed to keep our production schedules on-line," he added.

Get the Connection?

Bytes and blooms may not seem to have much in common — except at the Michigan Bulb Co., a Grand Rapids mail order plant house that uses a 256K IBM 370/125 to determine the best time to ship flower bulbs for spring planting.

Because of the unusually cold winter, bulbs that blossom into flowers like the amaryllis held by Debbie Hamilton, above, were stuck in 4,000 mailbags. When the weather warms up, the CPU will issue shipping orders.

If the bulbs had been shipped when temperatures were still too low, the bulbs would have frozen and then turned soft.

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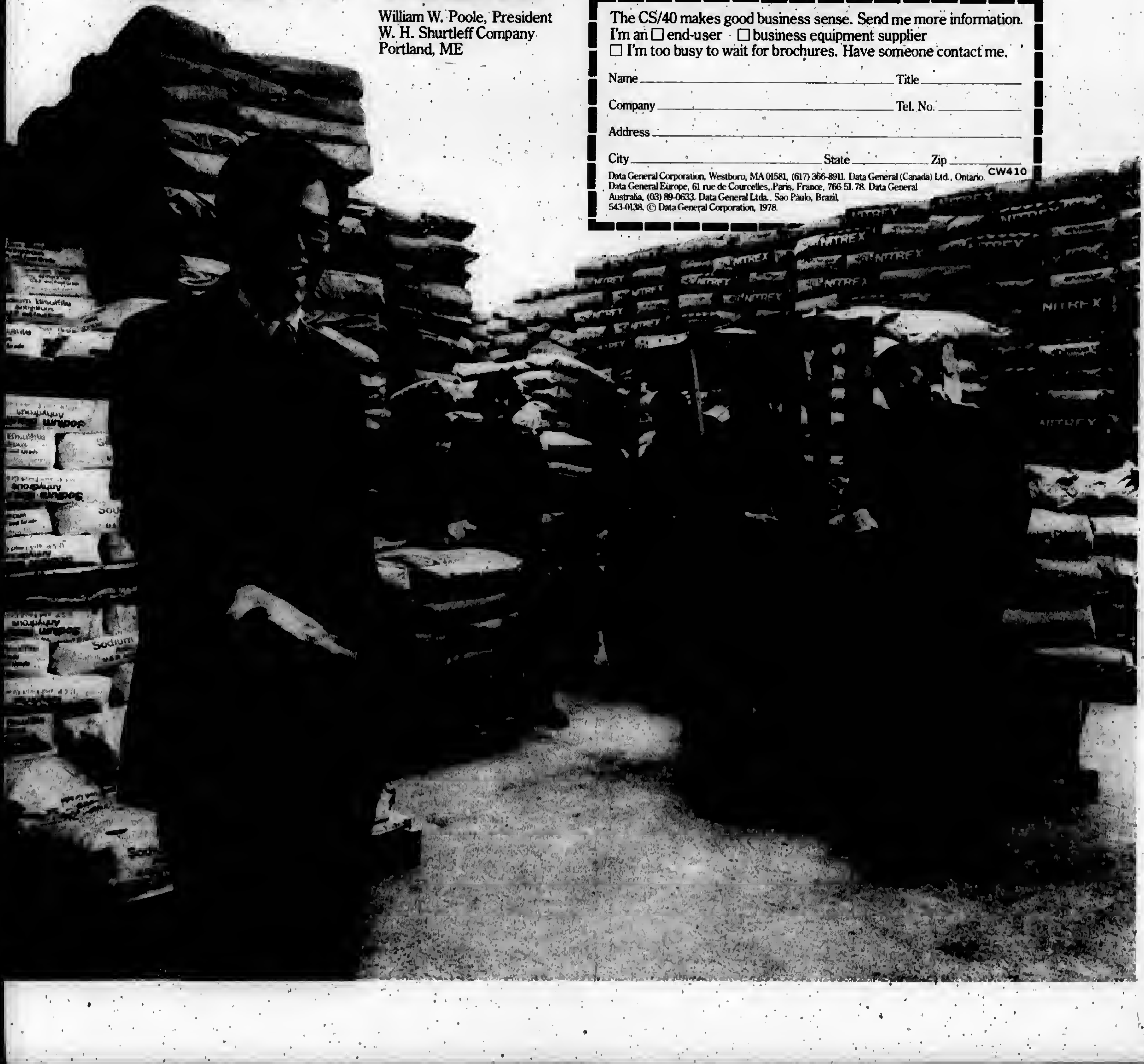

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CW410

With Card-Operated System

Petroleum Firm Strengthens DP Center Security

Special to CW

FORT WORTH, Texas — A petroleum company here has integrated its DP center's access control into an overall plan to protect data about the firm's oil and gas reserves in terms of drilling rights in proven, developed acreage.

At the close of 1975, Champlin Petroleum Co.'s land and ocean bottom leases and leaseholds amounted to more than 772,000 acres, including 334,000 in production and 438,000 offering future potential. Information about these vital holdings, along with other proprietary data, has recently been accorded an extra level of protection.

Champlin has always carefully protected this vital data base. At the company's administrative services offices at Enid, Okla., the information services department has been and is protected by a trained guard force aided by a closed-circuit TV system.

However, since early January 1976, these important offices, including the entire DP center, have had the extra round-the-clock protection of an Interrogator 880 all-electronic card-operated access control system, manufactured and installed by Cardkey Systems, a division of Greer Hydraulics Inc. of Chatsworth, Calif.

Although the corporation is headquartered at Fort Worth, the Enid, Okla., operation — about 80 miles north of Oklahoma City — serves as hub of much of the company's business operations. Within two buildings, each one story high, some 300 Champlin employees staff the information services department, the administrative services organization (including payroll) and the purchasing department.

And only those 300 authorized people can enter the two buildings — access that is completely regulated by the Interrogator 880. Since the system's installation, each employee has carried an invisibly coded plastic card that must be used to open key access doors whenever these doors are not otherwise controlled by a security guard or receptionist.

A Champlin employee gains access to a secured area by inserting his card into a slot on the face of the card reader.

For example, one of the buildings has two exterior doors. Since installation of the system, one of these doors has been permanently locked, while the other has been equipped with a card reader terminal wired to the 880 central control console in the building's security headquarters. Moreover, the entrance to the payroll department features a second Cardkey terminal.

This means a clerk in payroll must pass through two electrically controlled doors to get to his or her job station. The system has also been designed so that this individual needs to carry only one card to open both doors, while employees of other departments can enter the building using their pass cards but cannot use them to enter the payroll section.

Discrimination Process

The Interrogator 880 system accomplishes this discrimination process by means of "access-level control" feature. When an employee wants to enter one of the controlled doors, he simply inserts his card into a slot in the adjoining card reader. His card, like all the cards issued to Champlin employees, has been previously programmed to carry a facility code plus a unique four-digit employee number. The card reader scans this magnetically coded data and, if the facility code is found to be correct, transmits the employee number to the microprocessor in the control console.

The processor, in turn, checks its memory to determine if the number is valid for that particular door. The controller memory can be expanded to make access decisions for as many as 62,000 card holders and 128 separate card readers. In Champlin's case, it simply distinguishes between people authorized to enter the building and people further authorized to enter the payroll or more secure areas. When a "request" matches an authorization, the computer unlocks the door, the entire operation taking less than a second.

This capability is even more evident in the other building, which houses Champlin's central DP facility. This building also has two exterior doors. A receptionist controls entrance through one; a card reader protects the other.

Computer Center Control

But even tighter control was considered necessary for the computer center itself. A second reader-terminal controls the door into the overall center

(Continued on Page 53)

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Card-Operated System Tightens Firm's Security

(Continued from Page 52)

which, in turn, contains three physically separated operations: data control, in which specific computer programs are planned, set up and quality controlled; the tape vault; and the computer operations area containing the DP hardware. A third card reader controls access to the latter section.

The need for this increased level of control is understandable when one considers the company's financial investment in the information services department. According to Jerry Parker, Champlin's director of information services, "the company pays out about $150,000 each month in rental of computer equipment. And of the $4.5 million budgeted annually for the information services operation, about 60% goes to salaries for employees, most of whom are regularly involved in programming and software maintenance.

"You might better appreciate our concern for data security and integrity," Parker continued, "when you realize that the computer center serves a teleprocessing network of 17 timesharing terminals and seven remote batch terminals in nearly as many different company locations across the country."

"Obviously, if an intruder could get into the computer center, particularly outside of working hours, he would have access to private information of incalculable value," he said.

To further ensure that such an incident will not happen, a guard assigned by the Champlin security department continually monitors the Interrogator 880 console during the day shift and checks its output during inspection rounds throughout the two night shifts. When an unauthorized entry is attempted at either of the two buildings, the system controller activates both audible and visual alarms signifying the illegal attempt.

In addition, the 880 controller drives a companion line printer that records the attempt by printing out, in red, the number of the security card being used, along with the time of the occurrence and a code indicating why the card was rejected. For example, the card in question may have been reported as lost or stolen or the rejection may reflect attempted use of a card at a terminal for which it was not authorized.

The Interrogator 880 can be programmed to print out all entry transactions, both valid and invalid, when the company wishes to use the system for general monitoring purposes. Under this "roll call" mode of operation, which can prove especially useful in emergency situations, the printout of all valid transactions would be in black, with only the exceptions highlighted in red.

'Time-Zone' Control

The system also offers what Cardkey calls "time-zone control." This is a clock-synchronized discrimination feature that can be used to divide the day into eight separate time zones, giving a total of 56 different time zones per week. Each time zone can be programmed to have a start and stop time accurate to the minute.

A user can then store predetermined access time periods for each of his authorized employees. The cards of dayshift employees would then only work, for example, from 8:15 a.m. to 5:15 p.m., second shift from 5:15 p.m. to 1:15 a.m. and so on. And the cards of some employees, such as certain supervisory personnel, might be expressly okayed for entry on Saturdays or Sundays.

Programmed time-zone authorizations can be modified by the customer's security department without touching the card. If one individual or an entire group of people is switched from one shift to another, or from one work area to another, these changes can be entered on the system keyboard. In the case of group changes, a batch-processing function eliminates the tedious and time-consuming one-for-one entries.

Parker said his department recently went to a three-shift operation and may use the time-zone feature some time in the future. "When we do adopt it, we will be able to program it ourselves," he said.

Parker added, however, that Champlin already has taken advantage of another feature of the 880 system — the ability to automatically monitor environmental sensors. At the Enid facility, the system processor is tied into a Halon fire detection and suppression system installed in the computer center. In the event of fire, the 880 central controller rings an alarm at the guard station and records the event on the system printer.

The Interrrogator 880 was selected for the critical Enid application after a joint analysis by Champlin's security department and the system's engineering people.

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Technicians Consulted on Procedures

Firm Relies on 'Peopleware' for DP Success

By Ruth Knickman
Special to CW

ARLINGTON, Va. — Data entry at the Federal Home Loan Mortgage Corp. involves more than just hardware and software; "peopleware" plays an important part in overall operation.

At the Mortgage Corp., DP is viewed with professionalism and sophistication. Our department enables millions of dollars that are going to various lending institutions to be expedited promptly and accurately.

Underwriting, accounting and servicing are the major departments requiring individual loan data that must be processed daily. The paperwork in an organization such as ours can be insurmountable.

Thousands of documents flow through each month for processing, but we are not in a panic, working overtime or having a catastrophe. On the contrary, we are operating smoothly, efficiently and right on schedule for each of our users.

No Magic Formula

We do not have a magic formula for success. Our procedures are simple and effective. There is an important task to be accomplished involving people and computers and each of their values and needs is understood.

Our typical regional data processing department serves as a remote data entry and report distribution point, with equipment consisting of three Sycor, Inc. key-to-tape terminals, one high-speed printer, one low-speed printer and one tape unit with data compression.

At our main headquarters, the operation consists of Sycor equipment for off-line spooling of input and print files for transmission to and from the regional offices. The control processor is a medium-scale Burroughs Corp. B3700.

Although our operation is not large compared with other organizations, we concentrate on I/O control and scheduling to provide what we feel is the best possible service to user departments in the most effective manner possible. An important part of this service is the direct result of people-to-people communication within the company.

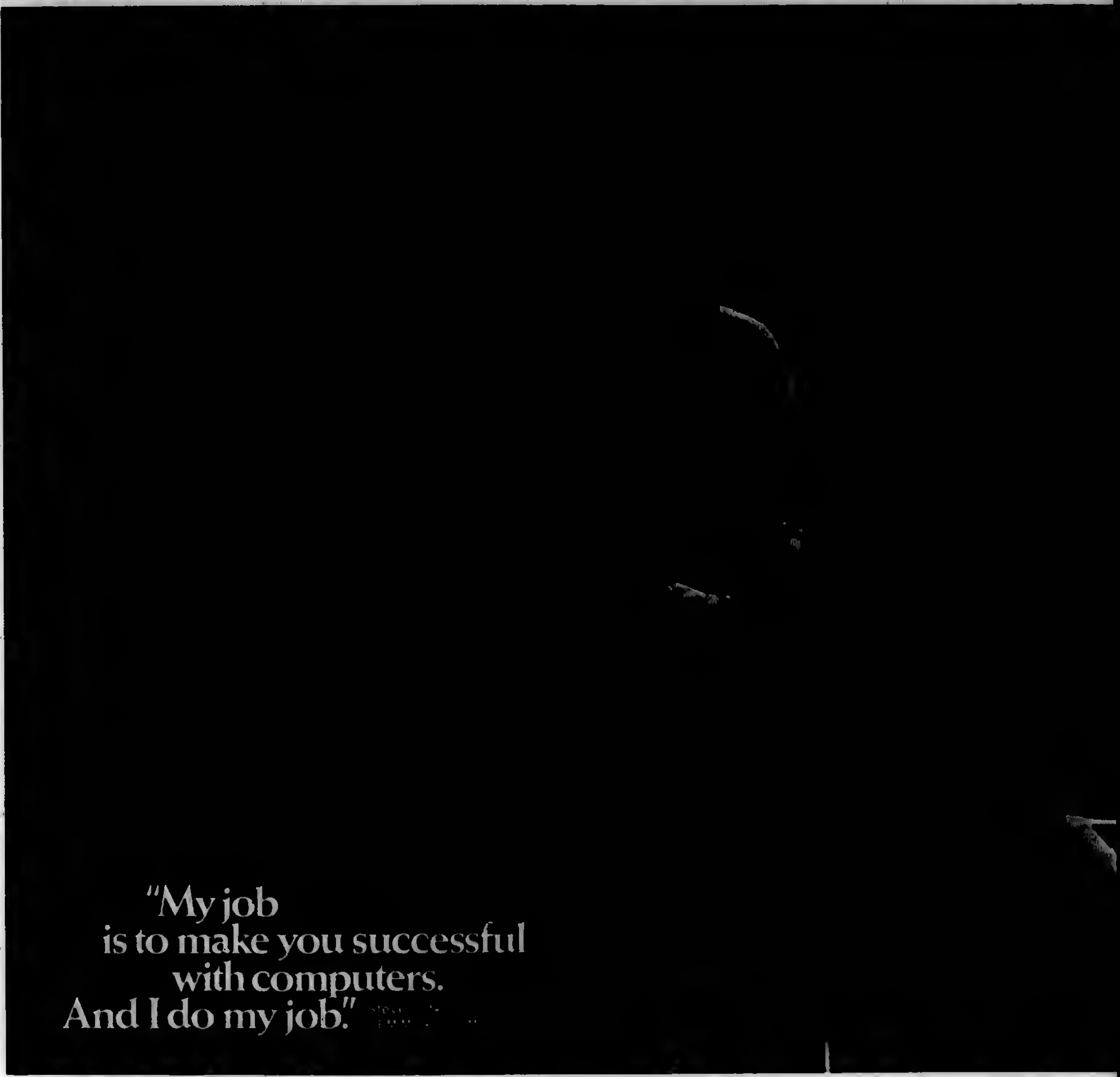
Data Entry Dimensions

Senior management, user department heads and the DP supervisor sit down together in a monthly steering committee meeting and discuss problem areas and new ideas. Through these meetings we gain valuable knowledge of how our departments relate to one another and how we can help each other. The results of these meetings are then reported to our headquarters to aid in problem resolution and development efforts. The secret here is to involve people with each other and involve people with the computer to get the very best results.

As we pull together all of the resources, we come to the core of the operation, the data input technicians. Our technicians are data entry operators, keypunchers, computer operators and clerks.

Whatever title is appropriate, the fact remains the same: these people are the main tie

(Continued on Page 55)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People Seen as Key to Successful Data Entry

(Continued from Page 54)

between success and failure in the organization.

These are the people who carry out all the procedures established by management. Through them management learns how to improve old procedures, how the new programs work and what type of equipment might best suit our needs. We listen to their opinions and take full advantage of their knowledge and experience.

The job of the technician can be tedious and boring unless management recognizes the potential of the person sitting at the terminal. Not only are technicians responsible for inputting data fast and accurately, but if the equipment fails they must know almost instantly what to do to resolve the problem.

A repairman may be required, or a static buildup may have locked up a terminal, a tape may be bad or a problem we've never experienced before may crop up. Whatever the problem, the technicians see it is resolved and we continue to service our users in the same manner.

Department control and scheduling is a responsibility that falls on the shoulders of the DP supervisor and the data input technicians. Although the supervisor has the overall responsibility, most of the actual paper handling is done by the technicians. If even one report were lost, it could be a critical problem.

Users batch their documents in batches of 50 or less and submit them to DP. The technicians are required to log in pertinent information for each batch. This enables us to always have an accurate record of what work was submitted by a user and which technician is responsible for that work.

After the computer reports are distributed to the various users, the technicians are sometimes called upon to help analyze the reports. Additionally, each technician is aware of the various deadlines that must be met by each user department. Again, the technician is very much involved in planning, control and scheduling.

The picture is becoming clearer in industry today. We're not just operators. Everyday, our knowledge is challenged with new experiences.

The technician is an accurate and fast typist, knowledgeable in maintaining equipment, experienced in document control and schedules and able to act as a reports analyst and a communications specialist.

Future plans of the Mortgage Corp. call for the study and implementation of new data entry equipment that will serve its long-term needs for remote data entry equipment and local processing (data validation, local inquiries and peripheral processing that does not require the headquarters data base).

Along with looking to more sophisticated equipment, the company opens the doors of education to its employees. This is done in numerous ways, such as in-house seminars, outside seminars and reimbursed college courses.

To further stimulate the employee, subscriptions to newspapers, magazines and publications are provided.

Probably unique to the firm is the yearly seminar for data processing supervisors and their immediate supervisors from all of the seven offices across the U.S. At this seminar, we make recommendations for policy and procedural changes. There's plenty of open discussion.

The results of these meetings are considered most valuable by the firm as many new developments have emerged and much knowledge has been gained by bringing these professionals together.

Knickman is the DP supervisor for the Mortgage Corp.'s northeast region and a member of the Data Entry Management Association.

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Zeta Adds Plotter Controller

CONCORD, Calif. — Zeta Research has unveiled a microcomputer-directed controller that provides operator preprogramming capabilities for its line of plotter systems.

The 6300 controller utilizes four microcomputers to regulate random plotting sequences and/or multiple copy commands, the firm said.

Features include operator scaling of plots, speed selection of each application, automatic plot search, programmable pause, message-to-operator commands and error correction.

The 6300 also allows for arc and circle generation of any radius in either direction, a dot/dash mode that produces lines and curves with dashes and spaces in user-defined patterns and a built-in character generator.

The controller is priced at $13,500 from Zeta Research, 2300 Stanwell Drive, Concord, Calif. 94520.

Zeta Research 6300

AMA Schedules Courses For Non-DP Executives

NEW YORK — A three-day course designed to acquaint managers with the basics of hardware, software and DP functions will be offered in Chicago on April 24-26, by the American Management Associations (AMA).

"Fundamentals of Data Processing for the Non-Data Procesing Executive" will cover CPUs, memory and storage systems, magnetic tape and disk units, punched cards and paper tape, terminals and printers, a spokesman said.

Additional Topics

Application programs, job control language, interpretive languages, compilers and assemblers will also be discussed.

The seminar will also orient the individual with various processing modes, current technologies and DP people and their duties, as well as computer system analysis and design, the spokesman noted.

More Locations

The course will be repeated on May 1 in Philadelphia, May 8 in Bloomington, Ind., June 12 in San Francisco and June 14 in New York.

Registration fees for each meeting are $475 for AMA members and $545 for nonmembers. Team discounts for three or more people from the same firm are available at $405 for AMA members and $465 for others. AMA is headquartered at 135 W. 50th St., New York, N.Y. 10020.

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Revised Reports Issued by NMA

WASHINGTON, D.C. — The National Micrographics Association (NMA) has issued two revised Resource Reports, "Periodicals and Newsletters" and "Education Courses in Micrographics."

"Periodicals and Newsletters," catalogued as RR3, offers a listing of publications in two groups: those dealing primarily or exclusively with micrographics and those which are micrographic-related.

A brief description of the publications, an address key and price information are included. RR3 is available prepaid at $2 for NMA members and $3 for nonmembers.

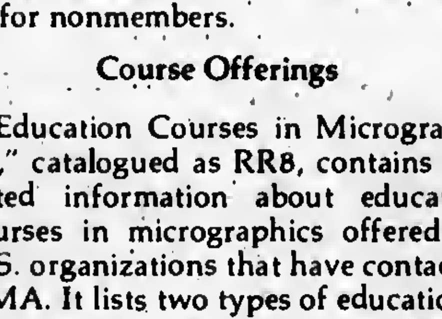
Course Offerings

"Education Courses in Micrographics," catalogued as RR8, contains updated information about education courses in micrographics offered by U.S. organizations that have contacted NMA. It lists two types of educational programs: a state listing of courses offered by universities and colleges and given over a period of time as well as short-term courses and seminars listed alphabetically by the organization sponsoring the program.

RR8 Prices

Dates or specific content information are not included since many of the programs are not offered on a regular basis. "Education Courses in Micrographics" is available prepaid at $2 for NMA members and $3 for nonmembers.

Both Resource Reports may be obtained from NMA, Publications Sales, 8728 Colesville Rd., Silver Spring, Md. 20910.



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HIS Add-Ons Bow

BEDFORD, Mass. — Cambridge Memories, Inc. has announced a series of add-on memory units compatible with Honeywell Information Systems, Inc. series 200 and 2000 computers.

The 2000/Stor series was designed to attach to 14 models of HIS processors including the 2200, 3200, 2050, 2050A and 2070, a spokesman said. Both the storage medium and interface technology used in the memory units are said to be compatible with the memory organization used by HIS in its M4, M6, M7 and M9 memory drawers, the spokesman added.

Simple Installation

Addition of the 2000/Stor unit to a processor reportedly requires as few as four cables and no change in HIS software, diagnostic routines or hardware attachments, he said.

Features of the add-on memory include a built-in maintenance panel, self-testing diagnostics and an optional stand-by spare memory, the spokesman noted.

A typical upgrade of 128K on a 2050 with 256K of memory costs $41,000 from Cambridge Memories at 12 Crosby Dr., Bedford, Mass. 01730.

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Hand-Held Unit

OCR System Debuts

Caere Model 610 OCR Reader

MOUNTAIN VIEW, Calif.— Caere Corp. has unveiled a hand-held optical character recognition (OCR) system that can reportedly read up to 130 char./sec.

The Model 610 reader incorporates an automatic line tracking (ALT) system that recognizes characters within a tilt range of 30 degrees left-to-right, the firm said, noting that power requirements for the unit are less than 25W.

The system works within the National Retail Merchants Association (NRMA) Voluntary Retail Identification Standard Specification A, the firm added.

The unit, complete with 10-foot retractable cable, is priced at $1,500 from the firm at 345 E. Middlefield Road, Mountain View, Calif. 94043.

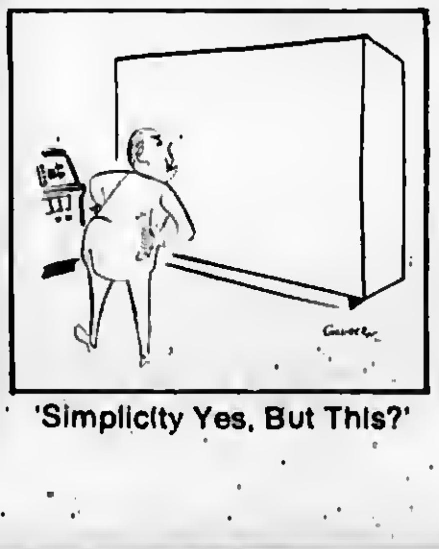
EM&M Adds Multiport Unit

CHATSWORTH, Calif. — The Severe Environment Products Division of Electronic Memories and Magnetics Corp. has a multiport semiconductor memory unit that can reportedly interface with four independent external computers.

The SEMS-17 features 1.8M words by 16 bits of random-access memory (RAM) and contains 56 memory cards, each capable of providing 32K by 16 bits of storage, a spokesman stated. The memory unit incorporates two direct memory access (DMA) interface cards, four control cards and four error detection/correction cards.

The control cards monitor system performance and relay fault isolation to the primary computer while allowing for continuous power and temperature checking, the firm said. Single-bit error correction and multiple error detection is also controlled by the system cards.

The memory unit with backup power supply is priced at $175,000 each in million-word capacities in small quantities from the firm at 20630 Plummer St., Chatsworth, Calif. 91311.


'Simplicity Yes, But This?'

Hard Copy From Fiche

SCHAUMBURG, Ill. — Addressograph-Multigraph Corp. has released a plain paper microfiche enlarger-printer that produces hard copy from fiche reductions.

The 1830 accepts 105 mm by 148 mm silver, diazo or vesicular microfiche and can give the user any three of seven standard formats using reductions of 20X, 24X, 42X or 48X, the firm said. Copy expansion ratios range from a ratio of 18:1 for the 20X reductions to 44:1 for the 48X mode.

Large Capacity

The unit can be loaded with up to 2,000 sheets of 20-lb bond paper, and the output receiver stacks up to 500 sheets of dry, fused copies in either separated or collated sets, the firm explained.

The unit operates with 120 Vac and costs $35,000. Rental and lease plans for the 1830 are also available with prices beginning at $745/mo from the firm at 1834 Walden Office Square, Schaumburg, Ill. 60196.

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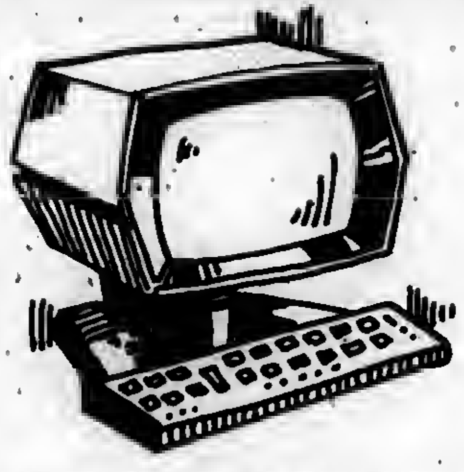
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In Setting Up Small System

Acquire Software First, Users Advised

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Executives who are considering installing a small business system at their companies should define their business needs and then acquire appropriate software before trying to select a hardware configuration, according to Patrick F. McNally, manager of the administrative services division of Arthur Andersen & Co.

During a seminar on small business systems at this year's inaugural Computer Expo '78 conference here recently, McNally said many users acquire modules in the wrong order when implementing a computer configuration. They choose their hardware first, their software next and then try to force the latter to conform to the operating requirements of the former.

Unfortunately, the hardware-first approach to installing a computer almost always results in serious user problems, and at times it results in outright systems failure, McNally warned in a tutorial on how and where to select a successful small business system.

"Vendors often advertise that their hardware will decrease your inventory or your clerical costs, but that just isn't true," he explained. "Computers themselves don't solve any problems. At best, they simply provide the information on which those solutions are based. People must still decide how that information should be used in solving business problems."

But most of those decision are incorporated into the software a company develops, not into the hardware it selects. Thus, systems failure usually occurs because users neglected to pay adequate attention to software development, McNally asserted.

"Remember, software and personnel, not hardware, are the keys to solving business problems," he told seminar attendees.

Industry-Specific Needs

One of the most important considerations users should keep in mind when searching for software for their systems is to select a package tailored to their industry's individual needs. For some users with highly specialized applications, only custom-written software will do; for others, off-the-shelf packages will suffice, McNally said.

Still other users will find they can achieve the desired systems results with off-the-shelf software that they modify to suit their needs, either by themselves or with the help of an outside agency. McNally warned users, however, that they could be courting disaster if they tamper too much with their canned software packages.

Most software originates from one of three places, the Arthur Andersen executive said: hardware vendors, many of which sell applications packages with their systems; original equipment manufacturers; and consulting firms and software houses.

After users find a reputable software supplier and obtain an applications package suited to their needs, the search for an equally suitable hardware configuration should begin, and McNally offered users some advice he said could help them choose their equipment intelligently.

Above all, users should not acquire a system with more capabilities than they need to solve their business problems, he said.

Many users find the lure of a high-powered system — with its fast cycle and instruction times, high-speed printer and massive disk storage capacity — nearly impossible to resist. In many cases, however, users discover they can perform their intended jobs by dispensing with all the functional frills and opting for a simpler — but more economical and practical — hardware alternative, McNally noted.

Consider Capacity

"In choosing a hardware configuration, your only concern should be for getting the right capacity in terms of memory capacity and printer speed to do your job," he told listeners. "It doesn't matter how advanced or simple a system is as long as it helps you solve your problem."

Hardware effectiveness, therefore — not hardware nuances or features — should determine systems selection. "Your primary consideration in buying or renting a computer system should be getting management reports that will allow you to make decisions and save money," McNally urged his audience.

In other hardware selection tips, he advised users not to allow themselves to be unduly swayed by vendor sales pitches and to solicit user involvement in the equipment evaluation. Without this involvement, users could withhold the support executives need to successfully complete an installation and make the resulting system work.

McNally also urged users for the most part to avoid minicomputers that use hybrid languages. Although some installations of these minis might prove successful, most users discover to their dismay that they cannot find programmers or software packages as easily for those machines as they can for CPUs that work with less specialized languages like Basic or Fortran, he said.

Users Rank Reliability No. 1 In System Selection Criteria

By Ann Dooley
CW Staff

WALTHAM, Mass. — Small systems users, many bewildered by the wide array of available systems and upgrades, still look for reliability first when selecting a system, an International Data Corp. (IDC) survey found.

Surveying 189 small business computer users, IDC found that second to equipment reliability, users looked for customer support, then applications availability, expansion capability and operating software.

Users were also concerned with the reputation of the vendor, followed by price, then equipment availability, training, programming languages and contract terms.

Users indicated they were least concerned with the financial arrangements of the contract.

More than 80% of those sampled had selected small business computers for the first time, according to IDC. Thirty percent of the users had used a manual system before deciding to automate; 25%, accounting machines; 20%, a service bureau, 18%, an in-house computer; and 8%, a combination of service bureau and accounting machine.

Before making a final decision on a system, users shop around, usually contacting at least three vendors on the average, survey results indicated. More than 80% of the respondents contacted at least two manufacturers and 25% contacted only three.

During the selection process, users would usually meet with the vendor about six times over a period ranging from four months for the independent manufacturers to six months for IBM, survey results showed.

Nearly 90% of those polled received system demonstrations, half viewing them in the vendor office only. The rest saw demonstrations at user sites or at both user and vendor sites, according to the survey.

IBM was required to show a system less often at a user's site than the other manufacturers; the industry giant demonstrated only one-third of the time at a user's site, while more than half of the non-IBM vendors were obliged to show a system at a user site.

Most users obtained their machines through the manufacturer directly, although that figure was split between manufacturer and dealer/distributor for the independent small business computer systems, the survey indicated.

(Continued on Page 60)

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16-Bit Interdatas Get Multitasking

OCEANPORT, N.J. — Reduced memory requirements and a user-oriented text editor are two of the features that reportedly characterize a multitasking operating system introduced by the Interdata Division of Perkin-Elmer Corp.

Describing the OS/16MT2 system, Interdata's product specialist Stephen F. Mullins noted, "Memory requirements for a Sysgen on a 16-bit processor have been reduced 50%. The user can customize the system to his exact requirements using as little as 32K bytes of memory and a disk unit."

The operating system also performs Sysgen procedures on the company's 32-bit minicomputers, Interdata officials added.

The system, an enhanced version of Interdata's multitasking operating system for the firm's 16-bit minicomputer family, provides support for processors ranging from the 8K-byte Model 5/16 to the Model 8/16E, which provides an extended memory of 256K bytes, company spokesmen said.

Real-Time Use

For real-time applications, the OS/16MT2 can be completely memory resident. For less time-critical applications, selected portions of the system can be resident on disk, the officials explained.

"A typical program development system is some 22% smaller than under the previous operating system," Mullins said. "Requiring only 13.5K bytes of memory, it provides single-user support for a disk unit, line printer, operator console, index files and Interdata's command substitution system."

The operating system also comes with the OS/16 Edit, an interactive text editor that allows users to prepare Ascii text files, write programs and modify binary data, Interdata officials said. The text editor can operate on one display text line only, on a range of lines or on a complete file, the spokesmen added.

In the U.S. only, the OS-16MT2 costs $1,500. Interdata is located at 2 Crescent Place, Oceanport, N.J. 07757.

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Dynus Disk Unit Based on Micro

COSTA MESA, Calif. — A moving-head disk controller from Dynus, Inc. is said to support any industry-standard 2.5M to 20M-byte disk drive that operates at 1,500- or 2,400 rev/-min or at 100- or 200 track/in.

Software-transparent to the Digital Equipment Corp. (DEC) LSI-11, the DI-CO3 consists of a quad-sized printed circuit that emulates the DEC RK-11 disk system and is software transparent to DEC's RT-11 operating system, Dynus said.

The bipolar, microprocessor based controller plugs into any standard LSI-11 backplane assembly and thus dispenses with chassis, univerters and interfaces, a spokesman added.

Using a double-frequency recording technique to store data on IBM 2315- or 5440-type disk cartridges, the product provides a direct memory access transfer rate of 6.4 microsec/word.

Two additional address bits reportedly provide up to 128K words of direct addressing capability for upward compatibility with future LSI-11s.

The DI-CO3 costs $2,500. Dynus is located at 3198 G Airport Loop Drive, Costa Mesa, Calif. 92626.

Reliability Tops On Users' Lists

(Continued from Page 59)

Results showed that IBM users were more likely to lease or rent their systems than users going to other manufacturers. Only 30% of the IBM users owned their own systems, 60% leased and 10% rented, while 75% of all non-IBM users owned their systems. The other non-IBM users leased from the maker or a bank, according to the survey.

Of the 189 sampled users, 38% chose IBM equipment; 20% Burroughs Corp; 10% each, Digital Equipment Corp. and NCR Corp; 5% each, Philips Business Ssytems, Inc. and Wang Laboratories, Inc.; and the remaining twelve percent, Datapoint Corp., Prime Computer, Inc., Varian Data Machines, Basic Four Corp.; Martin-Wolf, Inc., Nixdorf Computer, Inc. and Data General Corp.

Users were generally satisfied that their systems lived up to their vendors' performance claims, according to IDC.

The major user complaints were slow service and downtime, slow printer, small disk size, small CRT, lack of foresight in not using a consultant in the selection process and problems with the dealer and distributor.

Benefits discovered by users included ease of use, good service, friendly vendors and the speed and accuracy of the processed reports.

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The reason Epoch 4 has made it big in Japan is because it deserved to.

One-Board Add-On Unveiled

CRANBURY, N.J. — Dataram Corp. has introduced what it calls the industry's first single-board 128K by 18 semiconductor add-on memory for Digital Equipment Corp. PDP-11 expansion.

The DR-114S is compatible with DEC's MS11-JP 16K by 18 single-board semiconductor system and conforms to DEC's standard hex board size, company spokesmen said.

In addition to the maximum size of 128K words, the memory comes in lower capacities of 16K, 32K, 64K and 96K, Dataram said. The 16K and 32K configurations use 4K chips; the larger capacities use 16K chips, the firm added.

Equipped with on-board refresh and a provision for battery backup, the DR-114S reportedly accesses in 375 nsec and has a cycle time of 525 nsec.

Operating with +5V and +15V, the unit plugs into available slots in a host PDP-11 or operates with one of Dataram's existing connector assemblies, the firm said.

Because of the availability of the company's connector assemblies and because of the range of available jumper options, the DR-114S reportedly operates with DEC's full line of PDP-11s.

A 32K by 18 unit costs $2,210; a 64K by 18; $3,740; and a 128K version, $7,920. Dataram is at Princeton-Hightstown Road, Cranbury, N.J. 08512.

NI Interface Links DEC Micro, IEEE Bus

AUSTIN, Texas — Users can control up to 14 instruments with an interface that links the Digital Equipment Corp. LSI-11 microcomputer to the IEEE Standard 488-1975 bus, according to the interface's developer, National Instruments Corp. (NI).

Usable either in a single or multiple controller environment, the GPIB11V-1 plugs into a double-height slot and is hardware-compatible with any LSI-11 system including the LSI-11/2, PDP-11/03 and the PDP-11V03, NI said.

The interface reportedly provides hardware for decoding various general-purpose interface bus (GPIB) commands and can function as a talker, listener or controller.

With its standard 2- meter or 4-meter bus cable, the unit links to digital counters, voltmeters, frequency synthesizers, network analyzers, timing generators, terminals, printers and other devices to allow users to construct LSI-11 measurement and test systems, NI officials explained.

Support Software

Support software reportedly includes drivers, utilities, diagnostics and an interactive control program. Users can assemble the driver program including the interrupt service routines as a Fortran, Macro or Basic callable subroutine package for stand-alone use or under an RT-11 operating system, the company said.

The utility program includes a device table that contains information about each interfaced instrument, and the interactive control program allows users to perform GPIB functions interactively to facilitate debugging and instrument testing, NI spokesmen added.

A total of 24 lines implement the bus. Sixteen of these lines are signal lines; one is a ground line; one is a cable shield; and six are twisted pair common lines for an equal number of signal lines, the officials added.

In quantitities up to four, the GPIB11V-1 costs $695, including software and cable; in quantities of 25 to 99, the product costs $450. NI is located at 8330 Burnet Road, Austin, Texas 78758.

Kybe Expands Cassette Line

WALTHAM, Mass. — Kybe Corp. has expanded its product line with the introduction of a top-of-the-line cassette series that is compatible with almost all power typewriters, text editing machines, communications terminals and word processing systems, according to the company.

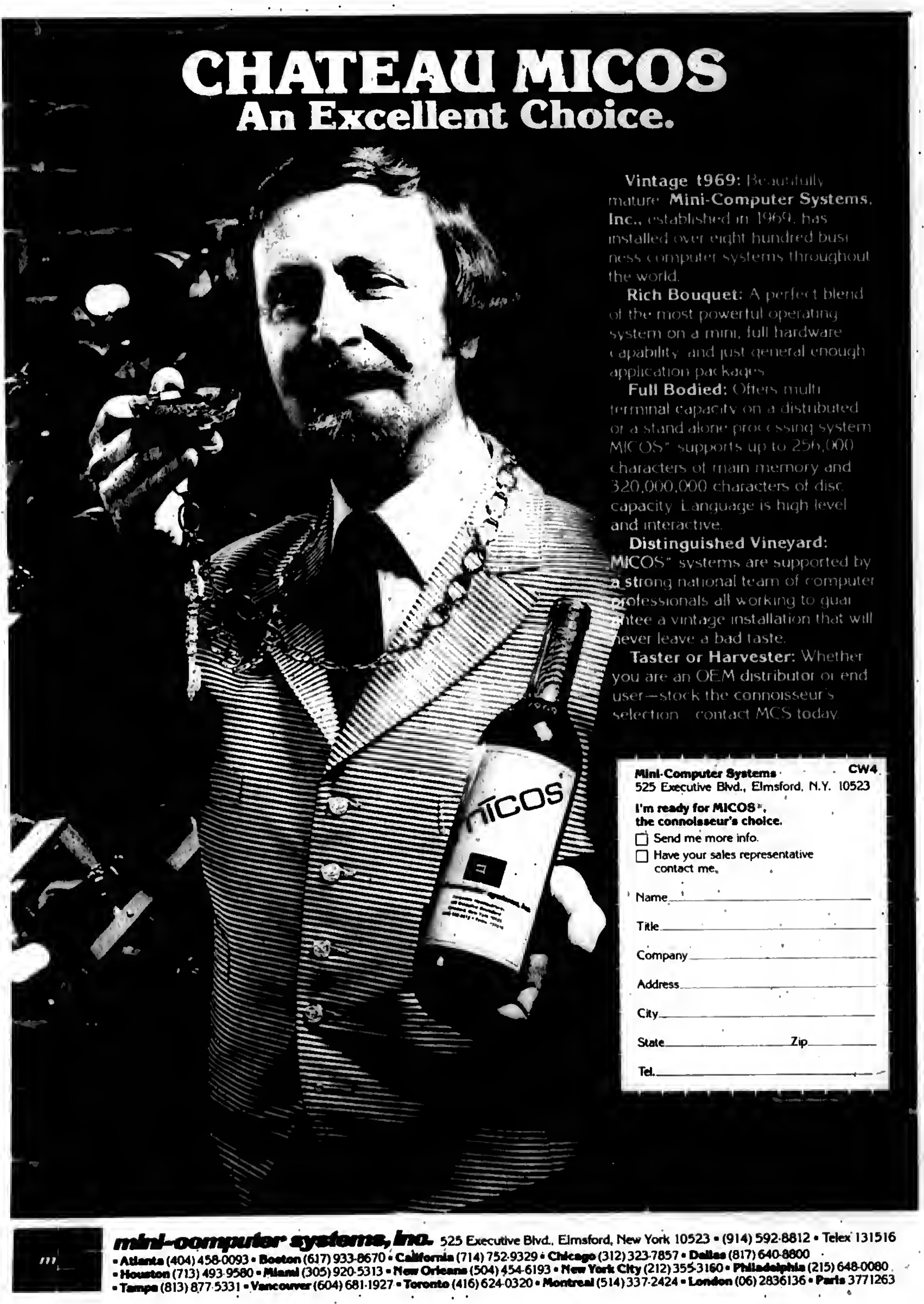
Built to comply with all Ansi, Ecma and ISO requirements, the K series cassettes provide a dual "write lockout" system consisting of removable plugs and permanently attached slides that guard against accidental erasure of data, a spokesman said.

To help preserve tape and ensure data accuracy, the cassettes come in a fiberglass-reinforced, interlocking case and provide computer-grade tape that has been certified error-free, the firm noted.

The products also reportedly provide lap joint/dovetail interlock and six screw fasteners on the cassette halves.

Low-friction slipsheets and machined Delrin tape rollers minimize tape wear and alignment problems, and custom-designed combination spring and foam pressure pads increase the accuracy of head-to-tape contact, Kybe officials claimed.

In quantities of 10, the cassettes range in cost from $4.30 to $6.95 from Kybe at 132 Calvary St., Waltham, Mass. 02154.



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DG Boosts Speed, Capacity Of Cartridge Disk System

WESTBORO, Mass. — Data General Corp. has introduced a cartridge disk subsystem that the company said provides a capacity of 20M bytes and transfers data at 625 kbyte/sec.

Compared with the firm's previously announced 6045 cartridge disk subsystem, the Model 6070 offers twice as much capacity and data transfer speed, DG officials said. But in most other respects — packaging, size and weight, ac power requirements, operator controls and subsystem environmental specifications — the latest DG subsystem offering is identical to its 10M-byte counterpart, the officials added.

Equipped with one spindle that provides a fixed 10M-byte disk platter and a removable 10M-byte disk cartridge, each 6070 drive uses a modified frequency modulation (MFM) recording technique that reportedly yields a doubled bit recording density of up to 4,040 bit/in. on the innermost track. These recording characteristics allow the product to store data as 512-byte sectors in 408 cylinders, the company explained.

Users can attach one to four drives to each 6070 controller to form 20M- to 80M-byte subsystems, DG spokesman said. Drives come with intergral power supplies, cartridges and cable sets, they added.

Using a DG Model 1145 disk cartridge, the subsystem reportedly rotates at 2,400 rev/min with a 12.5 msec rotational latency and seeks in 10 msec track-to-track, 38 msec average and 70 msec maximum. Start-up time (load to operating speed) totals 35 sec, compared with a stop time (load to operating speed) totals 35 sec, compared with a stop time of 25 sec, the firm said.

Software Support

Software support for the Model 6070 subsystem comes from DG's Advanced Operating System (AOS) for Eclipse computers and RDOS for Eclipse and Nova computers, company officials noted.

Both AOS and RDOS support concurrent batch and real-time operation plus IBM RJE80 and Hasp II communications software, the spokesmen said. The operating systems also support Fortran IV to optimize Fortran 5 and Extended Basic high-level languages, they added.

On commercial Eclipse computers, RDOS also supports the Infos file management system, Ansi-74 Cobol, RPG-II, the Interactive data entry/-access system, Algol and time-sharing Basic, DG said.

AOS supports DG's PL/I, which the company claimed is the first implementation of this high-level structured programming language by a minicomputer manufacturer.

DG's own structured systems development language, DG/L, runs on AOS or RDOS Eclipse systems to produce programs independent of the operating systems, the company said.

The standard Model 6070 subsystem with 20M-bytes, a controller and six cartridges costs $13,500 from the firm at Rt. 9, Westboro, Mass. 01581.

MDB Links Series/1 With Many Line Printers

ORANGE, Calif. — MDB Systems, Inc. has introduced a controller that is said to allow most familiar line printers to operate with the IBM Series/1 without software changes.

Designed as a plug-in module, the MB1-49-LPC is transparent to the host computer's diagnostics, drivers and operating systems, an MDB spokesman said.

Line printers compatible with the controller reportedly include the Digital Equipment Corp. LA 180, the General Electric Co. Terminet series and units from Centronics Data Computer Corp., Data Printer Corp., Data 100 Corp., Data Products Corp. and Houston Instruments Co. The product also accommodates the Diablo Systems, Inc. 2300 as well as units from Printronix, Inc., Tally Corp., Control Data Corp., Okidata Corp. and any other vendor whose printers emulate a Centronics or Data Products interface, MDB spokesmen said.

Consisting of one printed circuit board, the MB1-49-LPC fits into one slot of a Series/1 chassis and provides a ribbon cable that links the unit to a line printer, they added.

The line printer controller costs $1,995 and will be available in June from MDB Systems at 1995 N. Batavia St., Orange, Calif. 92665.

Monthly Newsletter Focuses on Minis

PENNSAUKEN, N.J. — Auerbach Publishers, Inc. is issuing a monthly newsletter along with its "Minicomputer," "Business Minicomputer Systems" and "General-Purpose Minicomputer" reports.

Called the "Mini Observer," the newsletter will cover products, systems and enhancements introductions; discuss changes in pricing data; detail developments in software and peripherals; and provide analyses of trends, the firm said.

Nonsubscribers can purchase a yearly subscription for $48. Auerbach is at 6560 N. Park Drive, Pennsauken, N.J. 08109.

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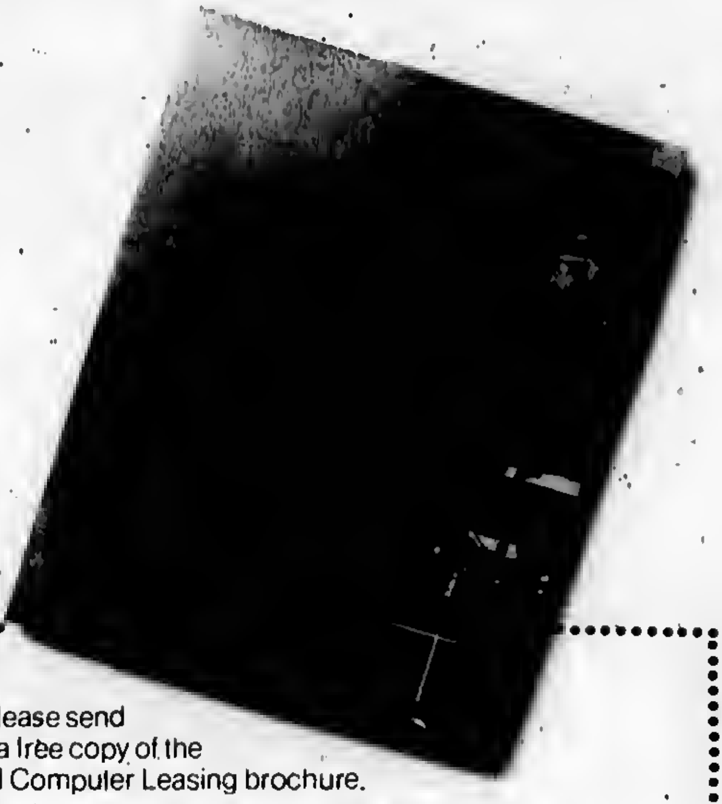

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For Its Purchasing Decisions

Mini Proves Indispensable to Parts Distributor

MONTREAL — Purchasing activity came to a temporary halt here at Century Automotive Corp. recently when its minicomputer went down — proving to the firm that the system had become indispensible in just a few months.

While the temporary shutdown was soon corrected, it proved how valuable the system was in making purchasing decisions, according to Barry Filger, director of operations.

The system was installed at the end of 1976 in order to enable the firm to move away from the traditional "seat of the pants" purchasing posture into a more scientific approach that has already provided savings for the firm, Filger said.

The company is a large independent automotive parts distributor. For some time it had employed an outside service bureau to handle accounts receivable; except for this, however, internal paper processing was quite primitive, Filger admitted.

In deciding to purchase the Micos system developed by Minicomputer Systems, Inc., it elected to move rapidly in putting all sectors into the on-line system operating in real-time.

Century contracted with Oka Computer Systems here to develop the applications programs and a system that would cover inventory control, order processing, shipping and billing, accounts receivable, accounts payable, sales analysis and general ledger.

Filger acknowledged that this "cold turkey" move was risky. "When you go from somewhere around zero to, say, seven or eight on a scale of 10, you don't go without problems," he said. "But we had a trial-and-error mechanism with too much opportunity for error and thought we should automate quickly."

Exists to Serve

The privately held company has flourished in recent years, with an estimated 1977 sales volume of $6.2 million. It has always recognized that its sole reason for existing, especially in a highly competitive field, is to give service. It manufactures nothing, but simply serves as a link between a 50,000 sq-ft warehouse and a 1,300 active accounts, primarily jobbers and mass merchandisers.

With some 27,000 items carried in stock as a normal way of doing business, the company faces a large problem in servicing its market. No customer can afford to stock more than a minimal amount of any single item and must count on the distributor for prompt delivery.

To satisfy demand and to make itself an indispensable link in the distribution chain, the firm promises same-day delivery within a 20-mile radius of Montreal for orders in by 10 a.m. and next-morning delivery for those in by 4 p.m.

Obviously the best way to place an order for prompt delivery is by telephone, and Century encourages this by providing a toll-free inbound Wats line.

Filger said that about 60% of orders are by phone and the company would like to get the ratio even higher as a way of emphasizing the quality of its service. Delivery is by the company's own fleet of eight vehicles, backed up by a public trucker when needed.

However, before installation of the system — and when it was down recently — it was difficult to handle the paperwork properly and even more difficult to control stock. It was impossible to develop a realistic purchasing mechanism, Filger said. The right information wasn't available in any way that could be readily analyzed and acted upon, even though purchasing wisely is as critical to making a profit as quick delivery is in building a customer base.

"Buyers can be highly experienced and have a good feeling for what the market wants," Filger said. "But that is all it is — a feeling. Being human, their feelings could too easily be wrong and a mistake can be expensive, with hard cash sitting on the shelves for five or 10 years. With the computer, we took a step toward error-free purchasing and it has made an enormous difference."

Buying Triggers

The system contains buying triggers, with clearly established minimum and maximum quantities for each item, based on the item's sales history. By purchasing only to replenish stock, rather than attempting to predict what demand will be, Century is projecting inventory savings of $600,000. With such savings, combined with others produced by better use of warehouse space, lower insurance and reduction of staff, the inventory factor alone has justified the purchase — not counting the elimination of the service bureau charge, according to the firm.

The system has substantial built-in expansion qualities, the firm said. For example, it could handle 13,000 more stock items in its current configuration, and, with additional equipment, be increased to cover 60,000.

The CPU has 192K expanded memory with real-time clock and automatic program load. There are eight terminals, three printers, two disk drives of 40M bytes each and two acoustic couplers.

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MEMOREXCELLENCE

Does Escalation Calculations

Distributed MIS Gets First Real Estate Use

NEW YORK — Clerical and accounting tasks that used to take a real estate firm here 10 hours a day plus Saturdays to perform now require only seven hours of labor a day, thanks in part to a newly installed distributed management information system (MIS).

Williams Real Estate Co. may have become the first firm in its industry to operate such a system when it configured a minicomputer-based network to perform escalation calculations for real estate lease contracts, according to company Vice-President Alan W. Hoffberg.

Until less than 10 years ago, Williams, which controls more than 22 million sq-ft of local business and industrial floor space, managed most of its clerical and accounting functions without DP aid. Then, in 1969, company executives considered possible ways of justifying the cost of a computer system and explored its potential benefits to their operations.

Concluding that Williams would gain an immediate payback if it automated its escalation calculations, Hoffberg, a certified public accountant as well as a systems and procedures expert, picked that application as the first target of the firm's automation efforts.

Complex, repetitive and subject to human error and misinterpretation, the calculations can delay rent collection and cause unnecessary tenant-landlord friction if mishandled, Hoffberg explained.

Rather than start with a full-fledged, in-house computer operation, Williams first delegated the task of performing escalation calculations to a time-sharing service.

Heartened by the success of that move, Hoffberg then developed a comprehensive system that the company could expand to accommodate additional applications. As a first step, Williams officials created the concept of an Annualized Projection of Rental Income (Apri) report, from which it could easily generate a tenant billing and collection system, Hoffberg said.

Under the plan, Apri would not only satisfy a broker's need for accurate, updated information on rental rates but provide data on cancellation privileges and options to extend, Williams officials speculated. It would also aid negotiations for new and renewal leases, financing, building sales, budgeting, analysis and market evaluations, they added.

Disappointing Search

Hoffberg began developing the system while directing a search for hardware and software suppliers. The hunt proved long and disappointing.

Typical hardware offerings featured high equipment charges, and most of the software he evaluated proved far too simple to meet Williams' needs. Most of the software, for example, would do only limited escalations, Hoffberg recalled.

Then Hoffberg learned of a Boston firm, The Analytical Sciences Corp. (Tasc) that had created a real estate management system on a Datapoint Corp. Cassette 1100 dispersed processor. Williams, however, concluded the system could not meet its needs without modification, a spokesman said.

Consequently, Tasc drew upon Williams' experience to revise and expand the system to satisfy the more sophisticated requirements for the management of New York commercial properties. In all, Williams and Tasc spent nine months negotiating a contract — of more than 100 pages — for a system adapted to Williams' commercial property management needs.

The results of the real estate management system at Williams have proved so effective that Tasc has sold the package (except for features proprietary to Williams) to other Manhattan real estate firms, Tasc officials reported.

Effective Operation

In operation, the real estate management system provides Williams' administrators with multiple data entry and validation capabilities within their own offices. The resulting transaction files are periodically collected by telephone each night.

Using a Datapoint communications software product, Datapoll, unattended computers transfer data to a remote central computer for processing. Data transferred from the Datapoint 4530 Datashare multiuser system in Manhattan to the Tasc IBM 370 in Boston relies on a type of IBM 2780 emulation software.

The update of the master data base arrives by air courier from Boston as required. Apri reports, on the other hand, are produced at a few moments' notice on Williams' equipment.

Meanwhile, profit and loss statements, balance sheets, unpaid bill reports and detailed general ledgers are available on microfiche at 17 workstations whose users do not require up-to-the-minute information or on-line, interactive processing, Williams officials said. Open-item billing and collection reports are also available at the microfiche workstations and on-line with interactive processing.

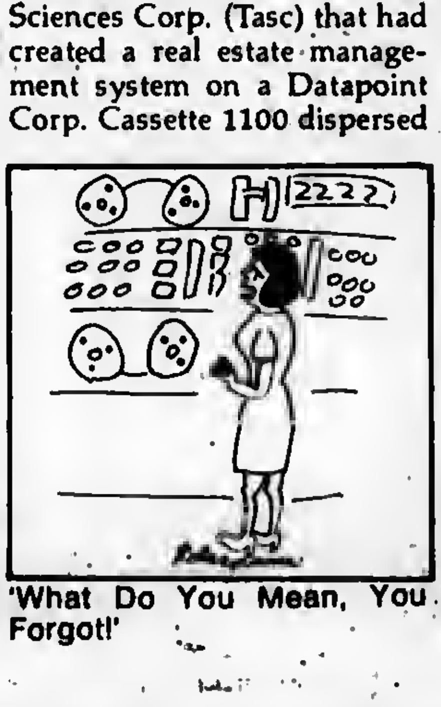
The microfiche, which cost a fraction of the former multilith dissemination method, also contain data from the master data base that is not resident on the in-house computer system.

Williams can update tenant accounts by entering amounts of payments, credits or adjustments; it can request the printing of journals on the Datashare system printer; or it can recap, transmit or hold the journals for auditing.

Communications between background programs and the interactive entry programs relies upon Datapoint's telecommunications enhancement to its Datashare language. The enhancement enables exchange of data between user programs executing in a single processor.

Williams added new applications to the Tasc system one step at a time. Eighteen months after automating real estate accounting and management operations, the company added payroll.

As a by-product of the accounts receivable program, the system also keeps summary statistics and batch details of outstanding balances on all properties. It readily produces daily cash position bank balances — cash flow information — for owners of all the 200 different Manhattan properties managed by Williams, a spokesman said.



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Byte Industries Denies Pact With Defunct Firm

By Tim Scannell
CW Staff

SUNNYVALE, Calif. — Byte Industries, Inc. has not entered into any contractual agreements or arrangements to satisfy the customers of the now-defunct Associated Electronics, a lawyer for Byte said recently.

Bryce Ward, president of Associated Electronics, had said Byte Industries would supply memory boards to the 20 or more customers left unsatisfied as a result of Associated's closing down [CW, Feb. 27]. Byte's lawyer, however, denied this claim, stating the firm "has made no such arrangements with Mr. Ward or anyone else."

Informed of the Byte lawyer's statement, Ward admitted there is a great deal of misunderstanding surrounding the affair, but continued to contend those people who sent in orders for memory board kits "will get their money back or they will get their memory cards.

"I don't want to leave anybody out there that was a customer of Associated Electronics dissatisfied — it's just that simple," he said.

Ward apparently did discuss with Byte the possibilities of working "something out" to satisfy his customers, "but was never able to reconcile what the new arrangement would be," according to the Byte lawyer. A misunderstanding evolved after Byte, Inc. was purchased by Logical Machine Corp. last September and became Byte Industries, Inc.

Although Ward was assured by officials of Byte, Inc. that it would take care of his customers, those same officials were no longer in charge after September. Since no contracts were signed, Byte Industries has no obligation whatsoever to the customers of Associated Electronics, the Byte lawyer stated.

Ward agreed "there were no specific written arrangements made and there was no specific deal" with Byte Industries to satisfy his customers, aside from a few vague agreements.

"I think I know who's right and who's wrong, but that would depend on the court at this point and I just don't want to pursue it any further," Ward said. "The principle of the thing is that I wanted to be sure that we took care of our obligations."

Micro Bytes

Adapter Drives Printer From Commodore's Pet

BROOKFIELD, Conn. — A peripheral adapter from Connecticut Microcomputer drives an RS-232 printer from the Commodore Pet's IEEE-488 bus.

The Pet ADA 1200 allows users to obtain hard-copy program listings and to type letters and create manuscripts, mailing labels, or other printed materials using an RS-232 printer, according to a spokesman.

With power supply, case and RS-232 connector, the unit costs $169 from the firm at 150 Pocono Road, Brookfield, Conn. 06804.

LSI-11s Get Serial Line Interface

ORANGE, Calif. — MDB Systems, Inc. has introduced an asynchronous serial line interface with modem control for Digital Equipment Corp. LSI-11 microprocessors.

The interface has switch-selectable transmission rates from 75 bit/sec to 19.2 kbit/-sec with no crystal change.

The DLV11E module has RS-232 receivers and drivers for terminal operation but does not include current loop interfaces. The board is an LSI-11 dual module that mounts in one-half of a quad slot.

The interface costs $275 and delivery is in two weeks from the firm at 1995 N. Batavia St., Orange, Calif. 92665.

Artec Cuts Prices on 32K Board

SAN CARLOS, Calif. — Artec Electronics, Inc. has reduced the price on its 32K-byte static memory board kit from $1,055 to $935.

The board, compatible with S-100 bus structures and designed for users of Z80-based systems, is also available fully assembled for $985, a spokesman said.

Prices for similar boards, reduced because of the anticipated decrease in integrated circuit chip costs, are $745 for the 24K model in kit form and $790 assembled, $510 and $545 for the 16K in kit and assembled forms, respectively, and $285 for the 8K kit and $310 for the assembled version.

Further information can be obtained from Artec Electronics, 605 Old County Road, San Carlos, Calif. 94070.

Game Catalog Published

MORRISTOWN, N.J. — Creative Computing has announced the availability of its book and game catalog from its offices at P.O. Box 789 M, Morristown, N.J. 07960.

SIA Disk Storage System Fits S-100, DMA Micros

GLENMORE, Pa. — An 8080A microprocessor-based disk subsystem said to be compatible with S-100 or direct memory access (DMA) interfaces is available from System Integration Associates (SIA).

The SIA-2000 contains a resident disk operating system and has a data storage capacity ranging from 12M- to 48M bytes, a spokesman said. The system performs tasks associated with storage management such as record blocking, directory maintenance, sorting, searching and indexing of files.

Disk commands in the form of symbolic English and strings include initialization and copying procedures; file creation, opening and closing; record erasure, reading, appending, replacement, deletion and searching; and sequential, random or index sequential access of those files, the firm said.

The SIA-2000 features diagnostic capabilities such as automatic retries on disk errors and also performs a self-test of the subsystem before becoming ready.

The unit contains 16K bytes of random-access memory with the DMA interface, an 8080A microprocessor and disk interface logic that includes real-time key search hardware, SIA stated. Firmware for the system is contained in 15K bytes of programmable read-only memory.

The SIA-2000 is priced at $5,783. SIA is at Little Conestoga Road and Adams Drive, Glenmore, Pa. 19343.

Ampex Has 16K Bytes of Core For Intel Single-Board Units

EL SEGUNDO, Calif. — A 16K-byte random-access core memory compatible with Intel Corp. single-board computers is available from the Ampex Corp.

The MCM-8080 memory board can be used with the Intel SBC-80/05, 80/10, 80/20 and equivalent units and provides up to 64K addressable locations for either 8-bit or 16-bit applications, Ampex noted. Data access time is within 325 nsec and read and write cycle times are 780 nsec and 1,240 nsec, respectively, a spokesman claimed.

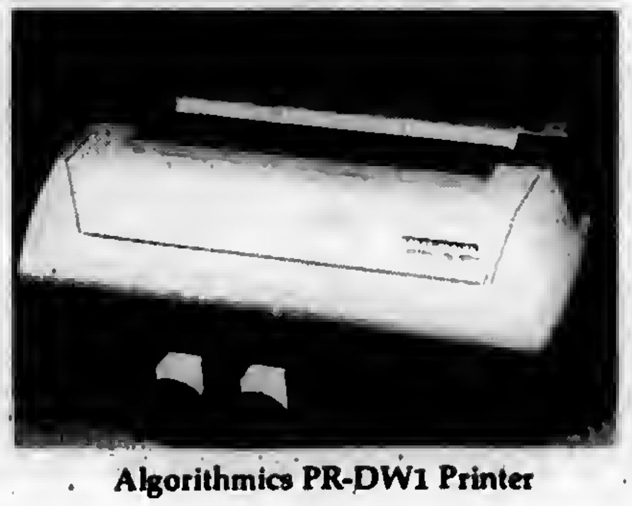
Switches on the unit select 16K contiguous addresses beginning at locations 0000, 4000, 8000 or C000, eliminating the need to install or relocate jumpers used in other boards, he added.

The MCM-8080 also includes circuitry to detect input dc power conditions and inhibit operations when out of tolerance, Ampex said.

The board was designed to occupy one card slot in the rack and utilizes the +5V and +12V power available. It is priced at $885 from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

Daisy-Wheel Printer Available

NEWTON UPPER FALLS, Mass. — Algorithmics, Inc. has a daisy-wheel, bidirectional, microprocessor-controlled printer that can operate at speeds up to 45 char./sec.



Algorithmics PR-DW1 Printer

The PR-DW1 functions under the control of an internal microprocessor and communicates with the host microprocessor over a high-speed asynchronous parallel interface, the firm stated. The carriage on the unit can be positioned left and right in increments of 1/120 in. and the platen can be rolled forward and backward in steps of 1/48 in., a spokesman added.

The interface to the host micro consists of both hardware and software, he said. Software is available in both text printing and printer/plotter graphics packages.

Options consist of 28 different type styles, including programming and foreign languages as well as scientific characters.

The PR-DW1 is priced at $2,678 from Algorithmics, Box 56, Newton Upper Falls, Mass. 02164.

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Disk Fits SWTPC 6800

SAN ANTONIO, Texas — The Southwest Technical Products Corp. (SWTDC) has a dual-drive, single-density, double-sided 8-in. floppy disk system for users of its 6800 microprocessor.

The DMAF1 consists of an SS-50 bus-compatible direct memory access (DMA) controller capable of handling up to four drives, two California Computer Products, Inc. 143M double-density rated disk drives, a regulated power supply, drive motor control board and interfacing cables, SWTPC said.

8K Basic Interpreter

The software includes an 8K Basic interpreter with disk file capabilities and string functions, according to a spokesman. Each diskette holds approximately 600K bytes of data with a total of more than 1M byte of data online for the system.

The unit sells for $2,095 assembled and $2,000 as a kit from the SWTPC at 219 W. Rhapsody, San Antonio, Texas 78216.

Techtran Offers Diskette System

ROCHESTER, N.Y. — Techtran Industries, Inc. has introduced an RS-232 or 20mA plug-compatible minidiskette system with a storage capacity of more than 200K characters.

The Model 950 microdisk system incorporates a Shugart Associates, Inc. disk drive with switch-selectable data transmission rates of up to 9,600 bit/-sec, a spokesman stated. Data can be recorded in either file or batch modes, with the unit entering file names into a directory for random-access retrievals, he added.

Binary Mode

A binary mode is also provided for limited remote control and code-transparent applications, the firm noted.

The unit is priced at $1,395 from Techtran Industries, 200 Commerce Drive, Rochester, N.Y. 14623.

Computerco Has Serial Converter

CHARLESTON HEIGHTS, S.C. — Computerco., Inc. has a serial-to-parallel converter designed to operate with microcomputers using transistor-transistor logic (TTL), RS-232C and 20mA current-loop interfaces.

The converter accepts data in serial form and sends it out in parallel along with a strobe signal to operate output devices, the firm stated.

Busy Signal Provided

A provision for a busy signal is provided and an on-board clock permits the remote installation of these output devices, a spokesman noted.

The unit is priced at $69 for TTL and $75 for either RS-232C or 20mA current-loop. An optional power supply for the converter is available for $50 from the firm at 5833 Dorchester Road, Charleston Heights, S.C. 29405.

AQ Analyzer Handles 6802

YORKTOWN HEIGHTS, N.Y. — A buffered probe that extends the capabilities of the AQ6800 microprocessor analyzer to 6802 microprocessor units is available from AQ Systems, Inc.

With the PRB68/02 probe, the AQ6800 displays all address, data and status information of any 6802 microprocessor chip in the system being tested. The clip is connected through a 9-in. flat cable to a buffer that presents a negligible load while permitting bidirectional access to the address and data buses.

The PRB68/02 probe costs $295 and the AQ6800/02 system, complete with probe, is $1,950 from AQ Systems, 1736 Front St., Yorktown Heights, N.Y. 10598.

16K Board Built For Zilog Units

WOODLAND HILLS, Calif. — A 16K memory board that is pin-compatible with Zilog, Inc. microcomputer systems has been announced by American Microcomputer Corp.

The MEM-1 features 4K or 16K dynamic random-access memory (RAM) with switch-selectable addressing throughout any segment of the 65K address space, the firm stated. The unit has an increased degree of noise immunity because of address latching and its printed circuit design, a spokesman claimed.

The MEM-1 costs $595 from American Mirocomputer, 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

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Graphics Board Offers Two Operating Modes

WESTLAKE VILLAGE, Calif. — A graphics board from Vector Graphic, Inc. that is compatible with the S-100 bus operates in either a digital output or 16-level gray-scale mode.

The board requires +8Vdc and a minimum of 8K random-access memory (RAM). It will product digital graphic displays of 256H by 240V screen elements or gray-scale 128H by 120V elements, according to a spokesman.

The video output was designed to interface to standard raster scan monitors, he added.

RAM Multiplexed

The RAM used with the board is multiplexed between the bus and the graphics unit, freeing the memory for other uses when not used for graphics purposes, the spokesman explained.

The graphics board costs $195 as a kit and $235 assembled from Vector Graphic, 790 Hampshire Road, Westlake Village, Calif. 91361.

Kit Lets User Hook Micro To Hitachi Television Set

GOLETA, Calif. — Microcomputers with standard EIA video format signals can reportedly interface with certain Hitachi Ltd. television sets through the use of a modification kit developed by Pickles & Trout.

The TVM-41 kit adapts the microcomputer's signal to that of Hitachi's receivers, a spokesman said. The unit can operate with Hitachi 12-in. P-04, P-05, P-08, PA-4, PA-5, PA-8, P-40 and P-41 models and its 9-in. I-28 unit.

The adapter draws about 12mA of supply current from the television set and incorporates an on-board regulator to reduce the effect of power supply ripple on the display, the firm said.

The television monitor is capable of displaying more than 90 char./line after introduction of the TVM-41, a spokesman added.

The price of the adapter kit is $20. Pickles & Trout is at P.O. Box 1206, Goleta, Calif. 93017.

GSI Has 64K RAM Board

WALTHAM, Mass. — GSI Systems has introduced a 64K random-access memory (RAM) board it said is compatible with Intel Corp. or National Semiconductor Corp. single-board computer (SBC) 8010 backplanes.

The 10046 board replaces four 16K Model 8010 boards and provides a 475 nsec access time and a 650 nsec refresh, GSI said. The board incorporates the logic and circuitry necessary to perform accessing, reading, writing, transparent refresh, time-out refresh and direct memory access (DMA) functions, according to a spokesman.

The 10046 can be driven by an Intel or National Semiconductor 8010 MPU board and requires a +5Vdc and +12Vdc power supply. Two serial I/O ports can also be added, permitting the board to communicate with various peripherals, terminals and modems.

The 64K board sells for $1,795 from GSI Systems at 223 Crecent St., Waltham, Mass. 02154.

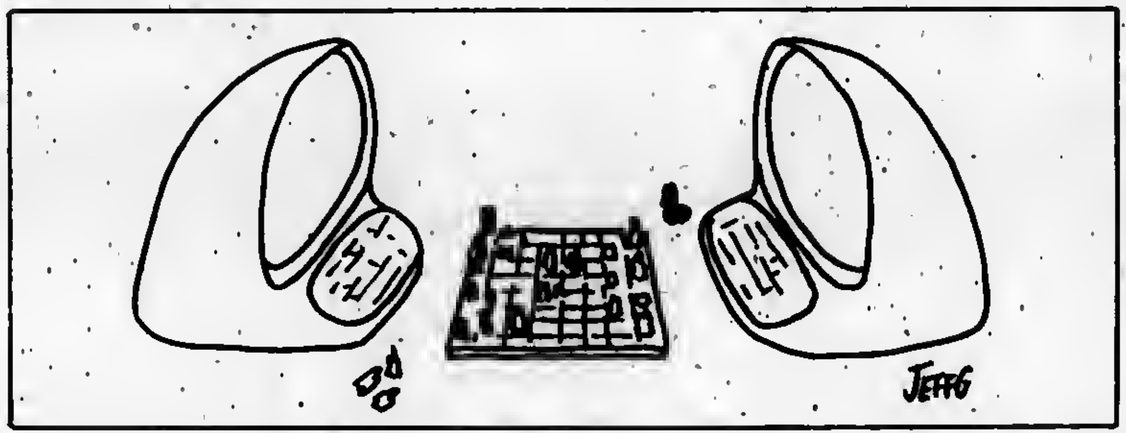
Disassembler Fits Z80, Has Byte-Oriented Routines

BERKELEY, Calif. — Alphabit Microsystems has released a disassembler that is output compatible with Z80-based assembly languages.

Under UN-Z80 software, a module to be disassembled can be anywhere in the memory space in one or multiple extents and the program, byte or word format can be specified for each extent. Labels for forward and backward references are automatically resolved, the display or printer output will generate addresses, object and source and the source code may be generated and stored on disk or tape for subsequent input to an assembler, the firm stated.

All I/O routines for UN-Z80 are byte-oriented and are facilitated by Jump vectors, the firm noted.

The software costs $35 on North Star floppy diskette or tape cassette format from the firm at Box 1107, 2000 Center St., Berkeley, Calif. 95704.



P

PORT — A place of access to a system or circuit. Through it, energy can be selectively supplied or withdrawn or measurements can be made. Examples are the port in a wave or in a bass-reflex speaker enclosure. 2. An opening or connecting opportunity. Device terminals that provide electrical access to a system or circuit are examples. The point at which input or output is in contact wth the CPU can be considered a port. 3. An entrance to or an exit from a network. 4. In data communications, that part of a data processor which is dedicated to a single data channel for the purpose of receiving data from or transmitting data to one or more external, remote devices.

PREFIX MULTIPLIERS — Prefixes which designate a greater or smaller unit than the original by the factor indicated. These prefixes are:

Prefix	Symbol	Factor
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
hecto	h	10^{2}
deka	da	10
deci	d	10^{1}
centi	c	10^{-2}
milli	m	10^{-3}
mico	u	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}
atto	a	10^{-18}

PRINTED CIRCUIT BOARD — 1. Also called a card, chassis or plate. An insulating board onto which a circuit has been printed. 2. The printed circuit or PC board should more accurately be termed a printed wiring or PW board to reflect its true function. Basically it is an insulating board complete with metallic wiring paths for point-to-point connections, but may also include metalized connecting surfaces and heat sinks or heat radiators. They may be single-sided, double-sided or multilayer — actually sandwiches of boards where high-density interconnections are required.

PROOF LISITING — Refers to a designed report prepared by a processor which shows the coding as originally written, any comments that may have been written and the machine language instructions produced.

Q

QTAM — Queued Teleprocessing Access Method.

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820

COMPUTERWORLD

CI Notes

Justice Probing Micro Licensing

WASHINGTON, D.C. — The Justice Department is looking into "possible restrictive licensing practices" within the microcomputer industry.

The civil investigation is the first step in a possible court action and is being undertaken to determine if there is any basis for a possible suit against the industry.

The probe began last July and the department has contacted about half a dozen firms that manufacture or license microprocessors for information on how they handle the licensing of those products.

Generally the manufacturer or developer of a microprocessor will license other firms to manufacture products meeting that design so that people purchasing the microprocessors will have at least two sources of supply.

CCIA Gains Six Members; Now Includes 50 Firms

WASHINGTON, D.C. — Six firms have joined the Computer and Communications Industry Association (CCIA) over the past few weeks, boosting membership to more than 50 firms.

The new members include Tandem Computers, Inc., Software AG of North America, Pansophic Systems, Inc., The Computer Software Co., Turnkey Systems, Inc. and International Computer Programs, Inc.

It is particularly significant that four out of the six new members are software companies, the CCIA noted, boosting the representation of this market segment in the association.

Presently, the CCIA member companies have combined annual revenues in excess of $2.75 billion and employ over 100,000 people, CCIA said.

Contract for 480 Minis

Vendors Protest Postal Award

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Four DP firms are vigorously protesting a $6.3 million U.S. Postal Service award to a small software company for a change-of-address application that is expected to save the post office at least $23 million annually.

C3, Inc., Datapoint Corp., Digital Equipment Corp. and Inforex, Inc. contend their prices and that of NCR Corp. were all lower than the bid made by Sigma Data Computing Corp., the winner of the contract for 480 minicomputers to be placed in 52 U.S. cities.

The Postal Service took the vendors through benchmark tests of their ability to handle the application and made the award to Sigma Data before informing at least five of the nine firms tested that they had failed the examination, spokesmen for the firms said.

The protesting companies believe the Postal Service only wanted Data General Corp. hardware and that no firm offering any other brand of equipment "had a prayer of winning the award."

Sigma Data will provide the post office with DG Nova 3/12 minis with 8K memory. The $6.3 million does not include maintenance costs for the equipment's five-year life.

Real Negotiating in Order

The Postal Service is bound neither by General Services Administration (GSA) computer procurement rules nor by the fear of an audit by the General Accounting Office (GAO) even though it is heavily subsidized with taxpayer dollars. However, the Postal Service is required, according to its own contracts manual, to conduct "meaningful negotiations" with all vendors who offer to provide equipment and services.

"The Postal Service did not conduct 'meaningful negotiations' with anyone but Sigma Data," Bill Dryfoos, director of federal marketing for Inforex, said. "The post office let everyone assume they passed the benchmark tests and their proposals were acceptable when that just wasn't true."

The only way Inforex and the other firms could have held up the contract would have been to file a protest before the award was made to Sigma Data, he added.

After the fact of the award, the firms — "all big companies with national service organizations" — were told they couldn't perform the application adequately, the Inforex official said.

The application would aid the Postal Service in its handling of letters returned to the post office when the people to whom they are addressed have moved. Now, a clerk must leaf through a shoebox full of change-of-address cards, find the new location and type out a new address label for the letter, according to Thomas Griggs, contracting officer for the Postal Service's search for an automated means of performing this task.

Postal Service research in Long Beach and Santa Ana, Calif., with Data General hardware over the past two years has indicated the post office can save at least $23 million a year, and probably much more, by using stand-alone minis with printing capability, he said.

Under the contract with Sigma

(Continued on Page 72)

IBM Return Rate Seen Support for U.S. Case

By Catherine Arnst
CW Staff

NEW YORK — IBM's rate of return on equity between 1962 and 1975 was high enough and consistent enough to support government charges that the firm dominates the computer industry, Dr. Leonard Weiss, economics professor at the University of Wisconsin, testified recently at the U.S. vs. IBM antitrust trial.

IBM's average rate of return, similar to profits, for the period studied was higher than that for all but four of 48 dominant or leading U.S. firms, according to Weiss. He made his calculations as an expert witness for the government's case.

Dominant firms are those that have the ability to substantially influence or control their particular market. Weiss calculated the rate of return (a shorthand term for net earnings after taxes and after extraordinary items and discontinued operations, all divided by stockholder's equity) from statistics garnered from Compustat, a service of Standard and Poor's.

Other Industry Rates

However, IBM attorney Ronald Rolfe calculated that 83 firms had rates of return on earnings that were higher than IBM's for at least seven of the 13 years measured, and 13 of these firms had higher profits than IBM for every year. Several of these firms operated in industries that Weiss characterized as highly competitive, such as McDonald's Corp. in the fast food industry, Winn-Dixie Supermarkets, Prentice-Hall Publishing Co. and Yellow Freight, in the trucking industry.

A firm could have high profits for several reasons, such as superior management, location and

(Continued on Page 72)

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IBM Rate of Return Seen Fuel for U.S. Case

(Continued from Page 71)

innovations, Weiss said. He had not been aware that the firms Rolfe named had higher rates of return than IBM.

"Generally accepted theory suggests that dominant firms in markets with high barriers to entry would make exceptional profits," Weiss said, and he prepared the chart with the goal of comparing IBM's profits with those of other large corporations.

IBM's average for the 13-year period examined was a "very high" 17.62 and "IBM consistently earned a good deal more than the average of all these corporations (12.18)," Weiss said.

That 12.18 figure represents an average that includes "a number of firms which themselves have a good deal of market power . . . Twelve is probably too high for the average of competitive industries. It might more realistically be 10 or 11," Weiss said.

Higher Than IBM

Four firms on the chart showed averages higher than IBM's — Eastman Kodak Co. (20.5), Xerox Corp. (22.01), Caterpillar Tractor (17.77) and Lockheed Aircraft (18.02). General Motors Corp. and R.J. Reynolds Tobacco Co. were the only other firms that came close to IBM. The first three of these firms are dominant firms "in the sense of firms that have more than half the market and no close rivals," Weiss said.

General Motors is not a dominant firm because it has a close rival in Ford Motor Co., "but it is the leading firm in an industry with very high barriers to entry," he said. R.J. Reynolds is in a similar position in the tobacco industry.

Lockheed is an "aberration" because it was carrying a deficit of $64 million in its equity account in 1974, so its profits for 1974 and 1975 were divided by a very small equity creating "enormously high rates of return" for a firm that was actually in serious danger, Weiss said.

Weiss also calculated the range of the rate of return over the years in order to measure instability of profits, in turn an indicator of riskiness. A firm with very unstable profits would probably be characterized as more risky than a firm with very stable profits, and some people believe that high risk is a reason for high profits, he said.

IBM's range is a very narrow 3.3, the difference between the low of 15.83 in 1966 and a high of 19.13 in 1964. Only R.J. Reynolds, at 2.34, had a narrower range in the group of 48 firms, while the average was 7.7. IBM's high profits can thus not be attributed to risk taking, Weiss said.

The economist compared IBM's figures with those of five other general-purpose computer systems manufacturers, including Control Data Corp. (CDC), NCR Corp., Burroughs Corp., Honeywell Information Systems, Inc. and Univac. The average for these firms ranged from 5.89 for CDC to 11.27 for Burroughs. The range varied between 6.19 for Honeywell to 22.17 for NCR.

In advance of preparing the table, Weiss hypothesized that "IBM had a great deal of market power since it was a dominant firm and was protected by very high barriers to entry, and my normal expectation, given those circumstances, is that IBM would earn exceptional profits, and that expectation has been supported."

Vendors Protest Contract Award

(Continued from Page 71)

Data — who in turn will buy hardware and maintenance directly from DG, the Novas will interface with Centronix model 702 printers. Postal Service clerks will input a five-character access code form the old address and the system will locate the new address stored on floppy disks, Within 2.6 seconds, the clerk will have a new address label printed and ready to be attached to the letter or package.

Griggs said the contract schedule calls for the first system to be installed in Louisville, Ky., on June 2 and the last in Franklin Park, Ill., around mid-August 1979.

The protesting firms do not know if or when the Postal Service's chief counsel's office will decide whether the award should be delayed or recompeted. Some of the companies are appealing to Capitol Hill, and one is entertaining the idea of a suit.

Three firms — Compuserv, SCI Systems, Inc. and Logicon, Inc. — all bid DG hardware and all had higher prices than did Sigma Data. Inforex's Dryfoos believes that by spending $12,530 per Nova, the Postal Service is spending about $2.5 million more than is necessary. He "guaranteed" that the post office received bids at least $2 million lower than Sigma Data's bid.

C3, which offered the post office a Coronex CPU with DG-compatible software, "was never informed that our proposal was technically deficient in any way," John Vazzano, the company's vice-president, stated.

"The pre-award benchmark test cost money," Vazzano added. "To take companies through a benchmark when they don't have a prayer of winning is really unfair." Another firm indicated it spent between $50,000 and $100,000 to respond fully to the Postal Service's request for proposal.

Vazzano promised "it will be a long time before C3 gets involved in any procurement at the Postal Service again."

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Proposed by Computer Lessors

Separate Leasing Company Urged for IBM

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — The government should try to force IBM to establish a separate leasing company to finance computer equipment from any manufacturer, according to the Computer Lessors Association (CLA) here.

Furthermore, IBM should only be allowed to offer its equipment on an outright sales basis, the CLA said, and on equal terms to all leasing companies; including the one to be set up under its proposals.

The organization, which represents 19 third-party leasing companies, supports the Justice Department's position that IBM has monopoly power and believes "IBM's dominance stems principally from its rental and leasing policy," according to a CLA position paper.

As a result of such dominance, "the only successful competitors of IBM to date have been, almost without exception, those companies with limited product offerings targeted at relatively narrow segments of the entire computer market. In a rental and leasing environment, a full-line challenge to IBM is simply not possible," the CLA said.

IBM's leasing policy has inhibited the natural growth of a used computer market, restricted the natural evolution of the third-party maintenance business and — "perhaps the most insidious effect" — has allowed the firm to manipulate and control its customers, CLA charged.

Separate Company

The Justice Department should focus more of its efforts on structuring remedial measures that would end these policies, the CLA urged, suggesting the centerpiece of such efforts should be a separate leasing company.

According to the position paper, the proposed majority of the company's stock would be owned by existing IBM stockholders and/or the public at large, with the remainder staying in the control of IBM.

IBM would then be required to sell its equipment and related services to all third-party leasing companies, including the proposed company, on the same terms, CLA said. IBM would be motivated to establish commercially reasonable terms because of its financial interest in the proposed company, it said.

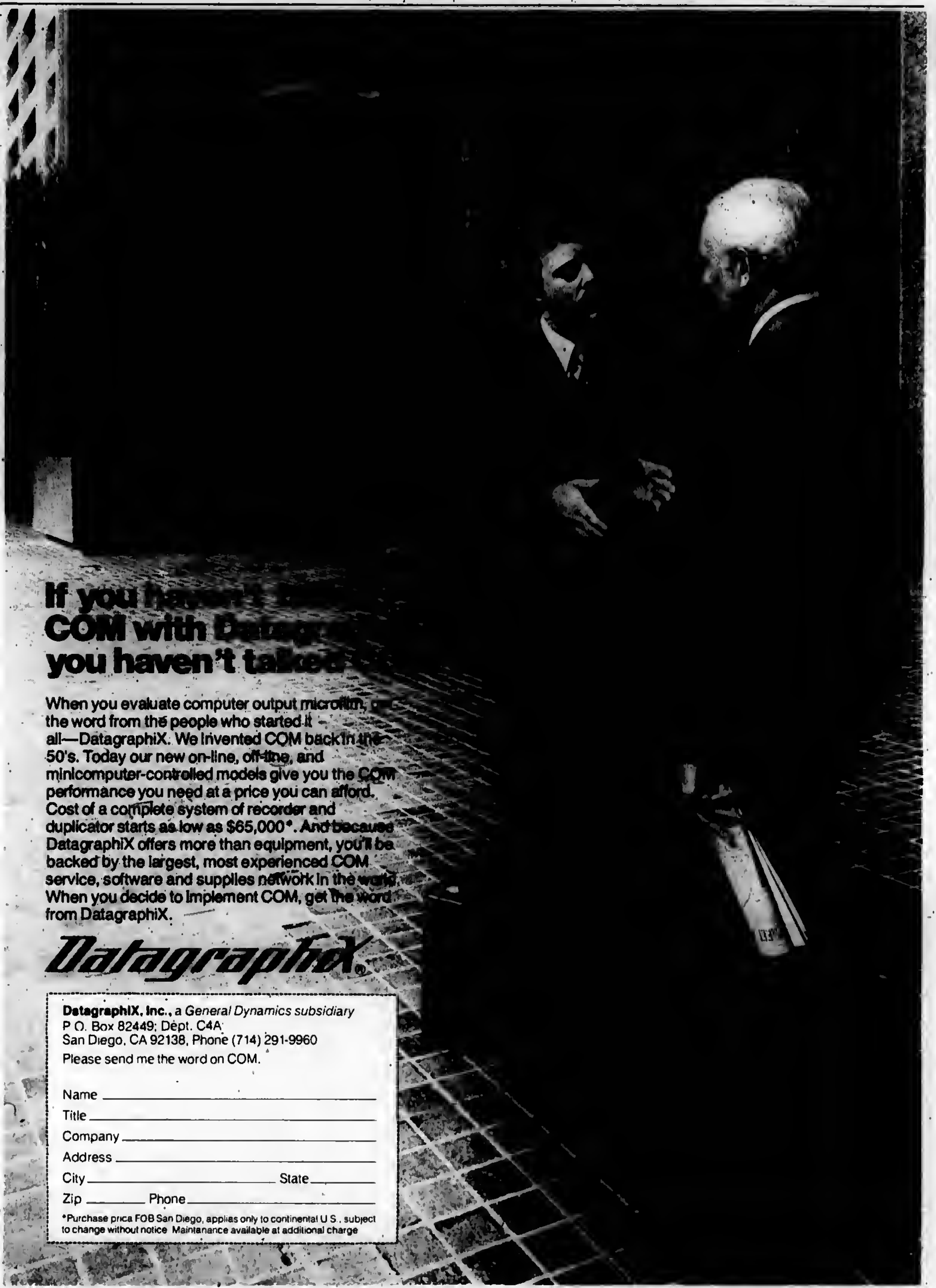
The proposed leasing company would also have to offer lease financing for the products of all manufacturers on substantially the same terms and conditions that it offers comparable IBM products, according to the plan. IBM would be required to provide maintenance for specific machine models on a "commercially reasonable basis" so long as 5% of such machines are still in service.

The CLA also suggested that IBM be prohibited from preannouncing new equipment until it is ready to release all the specifications to the industry, and any rumors of new developments should be confirmed or denied by IBM within 10 days in a "reputable publication."

Neutral Meeting

Representatives of CLA met with Assistant Attorney General John Shenefield about the proposal and received neither negative or positive response, according to James F. Benton, CLA executive director.

The strength of the plan is that it is self-monitoring and so requires no outside regulation, which should appeal to both users and other leasing firms, he said.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Upgrade Questions Loom

Large South Korean Users Getting Even Larger

By Bill Orr
Special to CW

In South Korea, as elsewhere, the big users set the pace in application development. Looking at a few of the leaders can give insight into both the present status and future direction of computerization in the country.

Korean Air Lines (KAL), for example, has the largest computer installation in that country. It is a duplexed IBM 370/-145 with an on-line reservation system, developed by KAL in two years.

By the end of 1976, the capabilities of even this configuration had been surpassed by the volume of tourist traffic. KAL's next major expansion, scheduled to be phased in by the end of 1979, will be a fully automated departure control system that will weigh baggage, plan meals, make hotel reservations and handle other administrative tasks.

In late 1976, the airline replaced its IBM 3742 data entry workstations with Pertec CMC5s, a second-generation switch that illustrates the technical self-confidence of the operation run by W.M. Choi, general manager of the Management Information System Department.

The Samsung Group is one of 10 general trading companies (GTC) in the "zaibatsu" tradition of Japan. GTCs get preferential treatment from the government, especially in matters of foreign trade.

This is the second in a two part series on computing in South Korea. The first part dealt with governmental policies [CW, April 3]; this half covers what computer users are doing in the country.

In return, they must meet certain national goals, including export targets, and must help smaller businesses with both manufacturing orders and management assistance.

Annual Revenues

The huge Samsung conglomerate has annual revenues of more than $1 billion and employs more than 26,000. It accounts for over five percent of South Korea's total exports. Its products include foodstuffs, textiles, petrochemicals, heavy machinery, electronics and appliances.

Among Samsung's enterprises are a posh department store, an insurance company, a general hospital and a 1,000-year-old liberal arts university.

Serious DP Recent Step

Yet Samsung is really just getting under way with serious computerization of its production operations and management information system (HIS). Samsung's corporate computer center under Nah Joon, chief manager, has an IBM 370/135 and a Model 125, with on-line links to data entry and remote batch terminals throughout South Korea.

The corporate DP department has a staff of 200, about half of them system engineers and programmers. A DP control team, reporting directly to the Samsung chairman, guides DP policy for the many and diverse activities of the huge conglomerate.

The DP scene is changing rapidly at Samsung as the corporation hones its management disciplines in order to compete even more aggressively in the big league of international trade.

Sometime in 1978, Joon plans to upgrade his installation to handle more production and management applications, mostly via remote job entry from the various divisions and subsidiaries. Distributed data processing does not appear to loom large in these plans, although intelligent terminals are in the picture.

As the incumbent, IBM has a natural advantage at upgrading time. Samsung has used some of IBM's programs, including a sophisticated dye-matching application, which tends to strengthen loyalties. But, Joon insists, Univac, Control Data Corp. and Facom are all under consideration.

IBM vs. Facom

Korea Electric Co. is a huge government-owned utility which controls most electric power generation and all distribution. Korea Electric's DP operation has been a battleground in the IBM-Facom struggle.

The company's first computer was a 360/40, installed in 1971. This was replaced in 1977 by a Facom F230-45, primarily because of a lower price tag.

Productivity in Korea Electric's billing operation rose an impressive 2,000% in the 10 years that the utility has moved from manual methods to its present installation — which is already bursting at the seams.

So it's upgrading time again, and M.S. Lee, executive chief of the computer center, is giving both firms mixed reviews. IBM's prices are higher, he said, but its power utility applications packages are better.

Facom's prices are attractive, and its management reporting formats are rated more suitable for South Korea's business protocol than IBM's. Facom's Fortran compiler is admittedly slow, but the hard-hitting Japanese manufacturer knows it and has put a software team on the job of souping it up. And so it goes.

Centralized System

The new system, planned for procurement in 1979, will of course be a big one, with 1G byte of main memory. True to the prevailing motif in South Korean DP, the system will be centralized and will put a heavy emphasis on management information. The software system will have seven large interconnected MIS data bases.

The Korea Science and Technological Information Center (Korstic) is a nonprofit clearinghouse for technical information used by businesses, universities and research institutions — with an emphasis on servicing small and medium-size firms. Korstic is active in acquiring data bases (example: the prestigious Chemical Abstract Condensates) and is developing data bases on South Korean science and business.

In 1976, the staff developed an impressive although somewhat complex word processing system that handles both Hangul and Chinese characters.

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Raytheon Maintaining Products With DDP Net

By Robert Josephson
Special to CW

NORWOOD, Mass. — In order to keep management up-to-date on problems with its equipment in the field, Raytheon Data Systems Co. here has been practicing what it preaches through the use of a distributed system based on the firm's own products.

The network of distributed processing systems employs the company's PTS/1200 products; display terminals in the offices of J. Thomas Markley, president, and John Tincler, vice-president, provide access to details on Raytheon system outages in North America.

The Outage Reporting System, first developed as the company's base of installed equipment outgrew the walls in the field command center, includes a total of seven PTS/1200 systems: one in the field command center, one in each of Raytheon's five regional service offices and one in the company's nearby parts depot.

Each of those configurations includes a terminal control unit with 128K words of memory, four disk drives, a line printer and CRT terminals.

Terminals in the field command center are manned between 7 a.m. and midnight every day of the year by coordinators who are also on call between midnight and 7 a.m. When the initial PTS/1200 system was installed in the field command center, those coordinators received calls directly from customer engineers throughout the country.

Since installation of PTS/1200 systems in regional service offices in New York, Atlanta, Chicago, Houston and Carson, Calif.; outage reports are phoned to those locations. Twice each day, details on the status of outages within each region are transmitted to the PTS/1200 at the field command center. Bisynchronous communications lines operating at 2,400 bit/sec were established between each remote PTS/1200 system and the "host" 1200 at the field command center for that purpose.

Supporting the coordinators at the field command center in Norwood are technical specialists whose job it is to provide over-the-phone assistance to customer engineers on the site. Although customers sometimes phone regional service offices or the field command center directly when their systems go down, Raytheon customer engineers are required to report any outage of more than two hours.

Major Menu Items

Raytheon's Outage Reporting System contains three major menu items. The first calls up a screen format used to enter reports, whether called in by customers or by Raytheon engineers. That format contains information on each outage and will be updated hourly until the problem is solved.

The second menu item permits the director of customer service, field service manager or top executives to review service problems in detail within any of the five regions. The sytem permits each regional service manager to review only those outages reported within his region.

The third menu item permits review of summaries of outages or of details of outages within all regions by appropriate personnel at headquarters and provides that same information on a regional basis to each regional service manager. The system permits personnel at headquarters not only to review outages by region, but also to review outages within the area of each customer engineering office and to review outages on a per-customer basis.

Outage Details Stored

Stored in memory in the PTS/1200 at the field command center, or available on readily-accessible disk packs, are details on every extended outage. That information is also maintained on PTS/1200 systems in the field, on a regional basis.

Data gathering for those comprehensive files begins with the initial outage report. After signing on to the Outage Reporting System by keying a password, a field command center coordinator or operator at a regional service office can select the screen format for an initial report by depressing a programmable function key.

Record fields on the format are filled, or can be updated, while the command center coordinator or regional office operator is on the phone with a customer or customer engineer. Fields left blank if information is unavailable can be updated later, during one of the hourly status updates.

The outage report screen format contains data that will serve as index keys when the record becomes part of the system's historic file. That data includes the two-letter code indicating the field service region; three-letter codes indicating the customer's name and location, keyed to a Raytheon customer engineering office; and an outage report number assigned sequentially each day by the field command center or regional service office.

Other information recorded includes the number of the incident report each customer engineer completes when responding to a system outage, available as a cross-reference; the name of the person reporting the outage; the name of the customer engineer assigned; the type of system down, whether PTS-100 or PTS/1200; the symptom or nature of the problem; and the system component that caused the failure.

Josephson is manager of the field command center at Raytheon Data Systems Co. in Norwood, Mass.

How to avoid having the source of your data become the source of your problems.

A Special Report on Source Data Entry in our April 24th issue.

The trend in data collection is to get closer and closer to the data's source — with devices like OCR and Point-of-Sale systems. Which can be the source of lots of new problems for the user. What may be good for counting hamburger sales in a fast-food franchise, may be quite unsuited to a grocery store or egg wholesale business. And a system that's perfect for a big bank with many branches, may be useless at a medium-sized savings and loan.

In our April 24th supplement, edited by Frank Vaughan, we'll take a look at what it takes to get the data collection job done, accurately and efficiently, in a variety of different situations. Through a series of applications stories, we'll look at how others have solved their unique data collection problems, and give you an idea of some of the things you should do — as well as some of the things you shouldn't. The report will include:

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- AND A SPECIAL LOOK AT DISTRIBUTED DATA ENTRY SYSTEMS

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Applications and Systems Programming on a DEC PDP11/70, with significant responsibilities in a mid-size (40 terminal) local timesharing environment. Assist with all college administrative and systems programming, and interface with all types of users. Good opportunity for broad experience in timesharing environment, plus use and development of expertise on PDP11/70.

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Racal-Milgo, Inc., a worldwide manufacturer of data communication equipment, has immediate openings for programmers with a minimum of 2 years real time assembly language experience with mini or micro processors. Communications, teleprocessing, remote batch IBM 3270/2260, Uniscope 100/200/400, VIP 7700 exposure helpful.

We're looking for qualified development and enhancement people to compliment our small staff of dedicated programmers. We are heavily involved in the development of new software for data entry, message processing and other real time applications of CRT terminals.

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Successful applicant should have 3-5 years managing product development of SMART terminals. Software background desirable.

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Computer Scientists & Software Engineers

Would you like to be a contributor at one of the San Francisco Bay Area's fastest growing software systems developers? Are you one of those especially talented individuals who relishes the challenge of solving complex problems, who wants to stay in the forefront of technology, who uses structured design and implementation methods, and who would like to work in an environment where your experience in one or more of the following areas would be recognized and put to immediate use?

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  -Secure systems technology
* Microprocessor systems architecture
* Image & signal processing
* Interactive computer graphics
* Advanced scientific programming
* Systems programming: UNIX, RSX-11D/M, IAS, VMS
* Communications systems
  -Packet/message switching
  -Environmental applications
  -Circuit switching

If you have a BS, MS, PhD or equivalent experience in one or more of the areas listed above, please send us a copy of your resume in confidence. If you qualify for one of our select positions, you will receive the professional recognition you deserve, excellent compensation, and one of the best fringe benefits packages in the country.

Refer to Professional Employment, Dept. PF-41.

Ford Ford Aerospace & Communications Corporation

Western Development Laboratories Division
3939 Fabian Way, Palo Alto, California 94303

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CSC

ENGINEERS / PROGRAMMER/ANALYSTS

Announcing better-than-equal opportunities.

Think about it.

Computer Sciences Corporation isn't the only company in America aggressively seeking out talented and technically qualified women and minority group members.

You see more affirmative action recruitment programs every day.

But.

Don't let them blind you to the fact that all "equal opportunities" aren't necessarily equal in terms of the long term growth potential open to you as an individual...after you're on board.

In the middle of one of the most competitive job markets for technical talent in recent years, CSC's success in attracting women and minority group engineers and computer software specialists has been largely the result of one important fact—**the growth and technical accomplishments achieved by so many of the women and minority group professionals already on the staff.**

So, if what you're looking for is substantially more than lip service, we warmly invite you to look into the "better-than-equal" opportunities waiting for every qualified candidate at CSC.

EXPERIENCE IN ANY OF THESE AREAS CAN QUALIFY YOU:

CSC opportunities are as numerous and diverse as the whole world of communications and computers, from undersea to outer space, including challenging programs for every branch and mission of industry and government, from military to municipal. CSC is the largest information sciences company in the nation, yet each operation and technical team maintains its own identity and individuality.

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- Spacecraft Control Systems
- Naval Communication Systems
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- Computer Communication Systems
- Computer Architecture
- Computer Security
- Network Protocol Design
- Distributed Mini-Based Processing
- Communications Simulation
- Process Control

PROGRAMMER/ANALYSTS

H6000
H716, 516
WWDMS (MDQS)
IDS, ISP
GCOS
GMAP
FORTRAN
COBOL
WWMCCS

COMPUTER NETWORKS
ARPANET
Protocol Design
Terminal Interface

MINICOMPUTERS
PDP 11
UNIX
ELF II
RSX 11D
Assembly Language
FORTRAN IV

360/370
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LOCAL INTERVIEWS ARE PLANNED FOR YOUR CITY IN THE NEAR FUTURE, SO BE SURE TO MAIL US YOUR RESUME TODAY OR TELEPHONE CHRIS PAPPAS TOLL FREE AT (800) 336-0173 ANY DAY THIS WEEK.

For promptest attention, address your resume directly to Chris Pappas, Employment Manager, Box 314, Computer Sciences Corporation, Systems Division, 6565 Arlington Blvd., Falls Church, Virginia 22046. (Just outside of Washington, D.C.)

CSC COMPUTER SCIENCES CORPORATION
SYSTEMS DIVISION

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Alan K. Murrey,
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1801 East Cotati Ave.
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Confers with operations management, and manager of systems/program?ming relative to improvement in software systems. Analyzes in-house computer software for improvement of systems, generation procedures for batch and on-line systems. Maintains program libraries, allocate disc space for resource efficiency. Work as a key member on projects in development of on-line systems.

Bachelors required. Masters preferred. Major in computer science; courses in systems programming. 3-5 years experience preferred. Salary commensurate with experience and qualifications. 12 month appointment.

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☞ IMS

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You should consider that MCAUTO is completely dedicated to keeping current with the state-of-the-art, is exclusively in the data services business, and provides you the opportunity to work with clients in all types of industries.

Our employe benefits, competitive salary, education support, and efforts to provide you job satisfaction are the best that anyone in the industry can offer.

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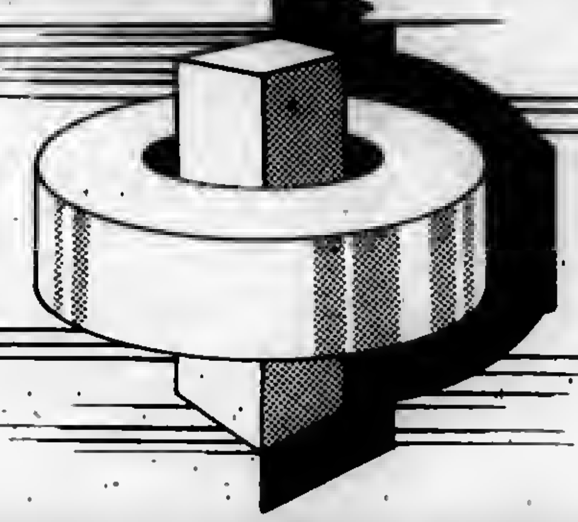
CSC

SOFTWARE SYSTEMS ENGINEERS



are you a square peg in a round hole?

You Won't Be When You Join CSC

Computer Sciences Corporation (CSC) has united state-of-the-art software systems technology with a people-oriented philosophy to produce a capability in the information systems field that is unsurpassed. In fact we are the world's largest software organization, with an impressive roster of clients and an ever-increasing number of long-term projects.

To meet our commitments and keep pace with our continuing growth, we are seeking Software Systems Engineers to be involved in the design and implementation of sophisticated systems in:

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- **CMS-2**
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COMPUTER SCIENCES CORPORATION

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Chairperson
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Kean College of N.J.
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Union, N.J. 07083
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Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS or JES3 skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

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We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beekhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call Charlie Wareing, 408/735-4326 (collect), in our Software Education Department. He'll be happy to talk with you. We are an equal opportunity employer.

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All positions are located at our attractive 500-acre facility in Windsor, Connecticut, near Hartford, in the beautiful Connecticut Valley.

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Positions require experience writing, designing and implementing business systems. Intercom or Total experience is a plus. COBOL and OS/JCL a must. Degree preferred.

SENIOR SYSTEMS ANALYSTS

Requires 3-5 years experience in the development and installation of manufacturing, inventory, financial systems. A degree plus background in data base systems required. On/line systems experience a plus.

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MS in Engineering of Sciences. Highly challenging senior level position developing sophisticated software systems to support I/O and computer resource management for scientific applications. Project leadership is a plus. Three years experience in scientific or systems programming for CDC systems (CDC 7600, CIBER 172).

Please send your resume, including complete salary history, in confidence to: C.M. Himelberger, Supervisor, Professional Employment, 1000 Prospect Hill Road, Windsor, Ct. 06095. An Equal Opportunity Employer M/F.

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Write or call collect to Owane L. Legg at:

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MRI Systems Corporation, the data base management company, is accepting applications for experienced sales personnel. Selected applicant will be assigned the New York City and New Jersey territories for exclusive marketing of SYSTEM 2000, TP 2000, CONTROL 2000 and related services.

Applicants should be self-motivated, have high energy levels and a desire to succeed in an expanding company. Applicants must have a proven sales record in the computer industry.

MRI offers a comprehensive benefit package, including profit sharing. Salary in mid 20's plus the best sales commission plan in the industry. For consideration send your resume with sales accomplishments in strict confidence to:

Personnel Manager
MRI SYSTEMS CORPORATION
P.O. Box 9968
Austin, Texas 78766

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San Francisco Peninsula

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We require individuals with interests and concepts in online interactive systems who have a desire to implement them for real use, working on design and implementation of online econometric modeling and numerical database retrieval and analysis involving analysis and programming in Fortran and Assembler languages. Requires degree in Engineering Economics, Math, Economics, Business Computer Science or Statistics.

Scientific Programming Analyst

Requires 6 years' experience in systems-level programming and Computer Science with strong emphasis in IBM 360, OS/MVT and IBM 3704/3705 or equivalent data communication equipment and programming, telecommunications and online systems operations background, and a degree in Math, Physical Science or equivalent experience. IBM 360 Assembly language and PL/I; plus familiarity with wide variety of remote terminal equipment is desirable.

Systems Programmer

Excellent opportunity for individual with 10+ years' experience in systems-level programming and Computer Science with strong emphasis in IBM 360, OS/MVT and other IBM 360/370 systems, knowledge of Assembly language; PL/I and systems experience related to online operations, plus ability to coordinate and direct the activities of programmers, systems and operational personnel. Requires full knowledge of telecommunications and data communications, with a PhD in Math/Computer Science, related field or equivalent experience.

Chemical Information Specialist

Successful individual will participate in online database customer service and user education activities, updating, proposing and evaluating new databases and search techniques, and developing and implementing software required for database maintenance. Requires bachelor's degree in Chemistry with an emphsis is Organic Chemistry, plus a minor or comparable experience in Computer Science or Computer Programming. A major in Computer Science and a minor in Chemistry also acceptable.

If you're ready for a truly professional environment in an exciting research facility, then join us on the San Francisco Peninsula now. You can expect a good salary and comprehensive benefits package, plus all the responsibility you can handle. For immediate consideration, please forward your resume with salary history to Professional Employment, Dept. CW-410, P.O. Box 504, Sunnyvale, CA 94086. We are an equal opportunity affirmative action employer.

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This is your opportunity to join one of Florida's leading retailers.

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We offer excellent opportunity for personal and professional growth potential. Top salary and full benefit package (relocation expense included).

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JByrons

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Miami, Florida 33169
Equal Opportunity Employer

DARTMOUTH COLLEGE
ASSISTANT DIRECTOR

Administrative Support
Computing Services

QUALIFICATIONS: 2-3 years of programming (knowledge of COBOL, PL/1 and BASIC preferred); minimum of 5 years' experience in the design and analysis of large computer applications; experience in academic environment desirable; experience with both batch processing and time-sharing computing required; B.A. degree or equivalent.

RESPONSIBILITIES: Establish standards and procedures for applications development; supervise staff of 10-12 analysts and programmers; develop departmental budget and short- and long-range plans; consult with all administrative departments on campus regarding new or revised applications; responsible for training of programming staff and users' personnel; participate in short- and long-term planning for computing at the College.

SALARY: $16,000-$20,000 commensurate with experience.

Send resumes before May 1, 1978 to: Manager of Employment, P.O. Box 283, Hanover, N.H. 03755.

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Must have at least six years background utilizing Honeywell software and H6000 equipment. COBOL programming experience to include materials/maintenance management.

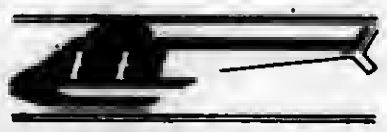
SOFTWARE ANALYST

Prior background in Honeywell software support. Requires thorough knowledge of GCOS, GMAP and GRTS.

DATA BASE ANALYSTS

Should possess one to three years experience in Data Base maintenance programming utilizing IDS. Applicants with strong experience in IMS or DMS may be considered.

For immediate attention, please send resume in confidence to:



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Bell Helicopter TEXTRON

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This individual will manage business-opportunity search, screening, and business analysis of a wide-range of ideas and inventions. Interface with the technology and business planning groups throughout the company provides a high level of exposure to all aspects of our business. This position offers the potential for long range involvement with approved projects.

The manager of our New Ventures Operations group is looking for people with experience in business or strategic planning at corporate level. Do you have two years or more experience with a data communications or telecommunications company? How about product planning or electronics experience? Do you have an MBA or equivalent? If you do . . . we should talk.

Market Analyst

Our New Ventures group does much of its own market research and analysis. We are looking for someone with a flair for innovative research into new business opportunities. You would be responsible for defining and implementing specific market research programs, and analyzing results, in support of one or more of our Business Project Managers.

You would also be involved in the screening and analysis of a wide range of New Venture business opportunities, providing you with contact and exposure across the whole range of the company's business.

Have you demonstrated your abilities to carry out in-depth market research programs? Have you done this for three or more years in industrial electronics? Have you a background in business, financial and product planning? Or an MBA or equivalent? If you do . . . we should talk.

Send detailed resume and salary history to: Art Andersen, Tektronix, Inc., P.O. Box 500, D30, Beaverton, Oregon 97077 or Call Art Andersen at 800-547-1164 (Toll Free).

An Equal Opportunity Employer M/F/HC.

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NCR NEAT/3

We are a major on-line real time processing center servicing over 50 thrift institutions throughout the New England area. Because of our growing customer base and expanding services, we are seeking people with NEAT/3 level 2 experience for systems and programming positions. These positions offer excellent opportunity to work in a professional environment and take part in EFTS, CIF and other on-line banking services. The company is located in a park-like setting in a small New England town just outside of Hartford, Conn. Ideal location for skiing, fishing, swimming and other outdoor activities. Send resume and salary requirements to:

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Datapoint Corporation, the leader in dispersed data processing and one of the fastest growing companies in the computer and data processing field, has excellent career opportunities for qualified systems analysts, programmer analysts and programmers in its Marketing Systems Department in San Antonio, Texas.

We are seeking aggressive individuals who have demonstrated their ability to succeed and have strong technical and business applications systems experience. Major new development in the marketing division has created positions for individuals experienced in general business applications including order entry, asset management, billing, accounts receivable and marketing reporting. If you are interested in pursuing a career in a work environment where your personal and professional talents will be fully recognized, utilized and rewarded, please send your resume and salary history in **confidence to: John Ross, Mail Station M-84, Datapoint Corporation, 9725 Datapoint Drive, San antonio, Texas 78284.**

An Affirmative Action Employer Committed to Equal Opportunity

DATAPOINT CORPORATION

The leader in dispersed data processing and communications management™

EDP SPECIALISTS

Nationwide

We take pride in our professional, discrete service to the EDP community. Please call or write to utilize our expertise for career advancement or to staff your dept.

Fees assumed by
Client Companies

Fees assumed by client co's.

LESLIE. KAVANAGH
505 5th Av, NY, NY 10017
(212) 661-0670 (agency)

PROGRAMMERS

Immediate openings available for several experienced IBM System/3 programmers. Successful candidates will have 2+ years experience in RPG II or COBOL. Experience or working knowledge of CCP is a definite plus. We have a large System/3 Model 15O with a great many CCP and BI Synch as well as batch applications. South Suburban Chicago location across from I.C. Station. Good starting pay, with excellent company benefits. Interested candidates should send resume and salary history to:

Scott Ivey

Cheker Oil Company

P.O. Box 162
Hazel Crest, Illinois 60429
(312) 335-0600

FIELD ENGINEERS...

COMMA offers new challenges to the seasoned 360/370 field engineer. COMMA is a computer maintenance service of Control Data Corporation and a Leader in 3rd party 370 maintenance. Due to planned growth and expansion into new areas, COMMA can offer opportunities in almost every major city throughout the U.S.

370 SUPPORT

COMMA is seeking dedicated Support Engineers with strong 135/138, 145/148, 155/158, 165/168 expertise to be part of our national support group. Because of the unique structure of the 370 support program, relocation may not be required.

360/370 FIELD ENGINEERS

COMMA is seeking system-trained 360 and 370 Field Engineers who have earned a solid reputation for their competence, responsiveness and interest in solving problems that effect customer satisfaction.

These positions offer excellent income, comprehensive benefits and a unique opportunity for professional personal growth.

To hear more, call toll free (or send your resume in confidance to:)

Mr. Don Richardson
370 National Program Manager
8941 Empress Row
Dallas, Texas 75247
1-800-527-3280

COMMA

a computer maintenance service of
CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

PROGRAMMER ANALYST

Position offers chief programmer status in a project environment. Resp. include designing gen. business systems, detailing flow charts & developing data bases. COBOL & data base concepts a must. Burroughs 4700 installation. $18,000. (Fee Paid).

ROBERT HALF
PERSONNEL AGENCIES
1310 Liberty Bank Building
Buffalo, N.Y. 14202
716-842-0801

TEACHING POSITIONS

One or more faculty positions at the rank of Instructor, assistant professor, or associate professor may become available in a growing Department of Information Science beginning September 1, 1978. Salary and rank will be commensurate with background and experience.

A Master's degree in Computer Science or related area is the minimum education requirement. Candidates should be able and willing to teach elementary courses in Data Processing, such as the common data processing languages (eg, COBOL, PL/I, IBM 360/370 Assembler, RPG, FORTRAN, or BASIC) and more advanced courses in several other areas such as compiler theory, systems programming, data base structure and design, information systems design, operating systems theory, microprocessing, teleprocessing, or data communications and be able to make substantial contributions toward the development of the graduate program. Letters of application, accompanied by detailed resumes, should be received by April 30, 1978 by

Dr. Donald LaBudde
Department of
Information Science
Northeastern Illinois University
5500 North St., Louis Ave.
Chicago, Illinois 60625
An Equal Opportunity - Affirmative Action Employer

SYSTEMS/ANALYSTS

Dillard Department Stores, Inc. is the Southwest's leading retailer in the field of data processing. We have the most progressive on-line software tools: TSO, SPF, CICS, DL/I on an IBM 370/158AP MVS.

We are seeking systems/analysts or prog/analysts with design experience for several large on-line projects just beginning. Knowledge of data base CICS, OS, and structured techniques will be helpful. The opportunity to learn and grow will be provided to the right applicants.

The projects are challenging, the environment is dynamic, and the career opportunities are excellent.

Send resume with current salary and requirements in confidence to;

Personnel Office
Dillard Department Stores, Inc.
P.O. Box 486
Little Rock, Arkansas 72203

Equal Opportunity Employer M/F

SR. PROGRAMMER

Progressive research & development firm seeks individual with min. 2 yrs. COBOL exp. in business applications. Heavy programming in both design & maintenance. IBM or DEC hardware. Degree preferred. Salary to $25,000.

PROGRAMMER/ ANALYST

Suburban Boston consulting firm needs programmer with min. 2 yrs. RPG II exp. in manufacturing & retail apps. Requirements include solid programming skills & ability to communicate with first time users. IBM SYS 3 environment.
Salary to $22,000. (Fee Paid).
Contact Gerry Battista.

ROBERT HALF
PERSONNEL AGENCIES
140 Federal St.
Boston, Mass. 02210
(617) 423-6440

Programmers

Software Support Specialist

You will assist in maintaining Gould software running on IBM, UNIVAC, CDC, and DEC equipment. Close liaison with customers required to define and solve applications problems. You will also be called on to help thymarketing department with pre-sale software installations.

Applicants should have experience in generation and maintenance of IBM operating systems, and be capable of resolving system and application problems. Assembly language and Fortran experience on large IBM system highly desirable. Position requires a degree in computer science, or equivalent experiance.

Salary commensurate with experience. Complete benefits package; including company car. The openings exist in our offices in both El Monte, California and Cleveland, Ohio.

Please mail resume or call Ed Herchenrader collect at (216) 361-3315 to schedule interview. Gould Inc., Instruments Division, 3631 Perkins Avenue, Cleveland, Ohio 44114. An equal opportunity employer M/F.

GOULD

ORIGINATOR!
PROBLEM SOLVER!
CONSULTANT!

You're ALL 3 in 1 in Your Leadership Role with Hammermill

Start up involvement in our sophisticated OS environment positions you for outstanding, autonomous involvement in all major facets of your professional potential.

As **ORIGINATOR** — you'll design, test, debug programs, software, develop JCL procedures for new systems development.
As **PROBLEM-SOLVER** — you'll diagnose irregularities in existing programs and recommend corrective modifications.
As **CONSULTANT** — you'll provide technical support to EDP colleagues; implement CICS problem resolution, and consult with both software vendors and project development people.

Minimum 3 years DP experience required in application and/or systems programming. CICS with either DOS or OS/VS operating systems a must.

Position with a progressive manufacturer/distributor of world-famous fine commercial papers, offers an excellent salary and benefits including expense paid re-location to an uncrowded, pleasant lake and countryside community. Big enough for all the amenities of comfortable good living. Small enough to be neighborly, friendly. For complete information, send your resume, in confidance, to:

Manager Corporate Recruiting
HAMMERMILL PAPER COMPANY
Box 1440, Erie, PA 16533
An equal opportunity employer M/F.

COMPUTER PROGRAMMER

To work in the development of on-line applications in a Burroughs 4700 Medium Systems environment. COBOL programming experience is required. Experience in any of the following areas is desirable.

- Burroughs FORTE/2 Data Base System Software
- Burroughs Medium System NDL
- Financial and/or Student Accounting Systems for an educational institution.

Send resume, salary history, and salary requirements, by April 21, 1978 to:

Kenneth P. Van Kammen
Data Processing Manager
Gateway Technical Institute
3520 - 30th Avenue
Kenosha, Wisconsin 53141

Gateway Technical Institute is an Equal Opportunity Employer/Program.

MIDWEST PRO'S

DBMS DEVELOPMENT	30K
D.P. MGR. S/111	24K
PROJECT MGR.	24K
IBM SOFTWARE	30K
MINI SOFTWARE	25K
CDC SOFTWARE	30K
GRAPHICS SOFTWARE	30K
ANALYSTS & PRO.	22K
CAD/CAM SOFT	30K

All fee's and expenses paid by client companies. Contact John Ridenhower or forward resume to Jenké & Associates, 42 N. Pennsylvania, Suite 201, Indianapolis, Indiana 46204, (317) 638-3593.

DIRECTOR OF MATERIALS

The Data Communications Division of Harris Corporation is one of the country's largest independent suppliers of remote batch terminals and distributed processing systems used in data processing networks. To keep pace with our growth, we are currently seeking a Director of Materials for our DALLAS Headquarters.

You will be responsible for Production and Inventory Control, and Traffic functions including responsibilities for generating and maintaining Production Schedules, controlling manufacturing and off lease equipment inventory, and operating the shipping and receiving functions. A degree and 7-10 years experience is essential. Experience preferred in a computer related industry. Familiarity with MIS Systems including MRP desired.

For prompt consideration, please send your resume including salary history and requirements to: Employment Manager, Harris Corporation, Data Communications Division, P.O. Box 44076, Dallas, TX 75234.

HARRIS
COMMUNICATIONS AND
INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

EDP SEARCH SPECIALIZING IN RECRUITMENT AND PLACEMENT OF:

OS SYSTEMS PROGRAMMERS
Network Analysts
Performance Evaluation
EDP AUDITORS

SYSTEMS MGR $33M
Rocky Mtn Co. seek exper. in: Good Supervisory Skills, NCP/VTAM SDLC, MVS Internals, Networking.

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Must work with PE tool have internals exper. Seek 2 yrs experience.

EDP AUDIT $15-$30M
We have over 80 positions open coast to coast.

Train for EDP AUDIT $18 to 25M
If you have strong financial systems design exper and good programming skills plus eng degree major CPA FIRM will train.

Scientific
We urgently seek all types mini exper for our clients coast to coast.

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EDP SEARCH
(405) 525-8833
Okla City, OK 73112
P.O. Box 12566

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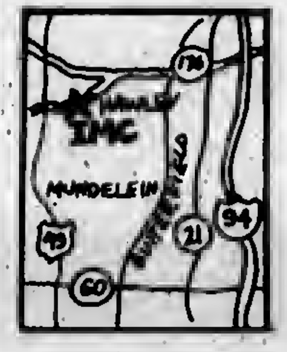
data processing

OPEN HOUSE

we'll be talking attractive salaries & benefits...



Next Saturday, April 15, from 9AM—4PM we're opening our doors to DATA PROFESSIONALS who know what they're worth.

We'll show you our technology. . . IBM 370/158 AP and tell you about our on-line applications and processing for approximately 25 IMC divisional locations throughout the country.

If you're qualified in any of the following areas, why not join us.

PROGRAMMER ANALYSTS
COBOL and/or Assembler language experience in business applications is required.

SOFTWARE SPECIALISTS
Teleprocessing
Experience in Assembler language; IBM 3705 communications controller; EP teleprocessing networks and BTAM coding necessary.

CICS
Experience in installation of CICS; service application; Assembler language, CICS application coding and CICS internals necessary.

CICS
CICS on-line system designing and programming--utilizing Assembler language.

COMPUTER OPERATOR
Experience with IBM 370/148 or larger or knowledge of MVS/JES 2 required. Second or third shift, some weekends.

Openings exist in our Mundelein and Des Plaines facilities. To arrange an appointment convenient to your schedule, call now: Ms. Pat Christ, (312) 566-2600, Ext. 3456 or JUST DROP IN!

On Saturday, April 15th ONLY, please call: (312) 566-2605

...to Data Professionals who know what they're worth!

INTERNATIONAL MINERALS & CHEMICALS CORPORATION
421 East Hawley Street, Mundelein, Illinois 60060
an equal opportunity employer m/f

Assistant Director for Academic Services

Will report to Director of Computer Center. Will be responsible for interface with faculty, students, and off-campus time-sharing users to assist in the development of academic, research, and instructional computer applications. Will also work with college management and Deans in conducting institutional research. Will be responsible for design of an information system for college management to include data base design, forecasting techniques, trend analyses, and complex search mechanisms. Educational background should include a Master's Degree in mathematics or physical science and at least 10 years in a leadership role in the development of computer applications and information systems. Position includes teaching Computer Science or Mathematics courses and carries the rank of Assistant or Associate Professor. Responses must be received at the address below by April 14, 1978.

Mr. Samuel Hoffman, Dir.
Computer Center
West Chester
State College
West Chester, Pa. 19380
An Equal Opportunity and Affirmative Action Employer

TELEPROCESSING HARDWARE SPECIALIST

Clemson University is seeking a Teleprocessing Hardware Specialist to plan equipment needs, help design, and develop hardware systems, and be responsible for installation, modification, and enhancement of minicomputers and microprocessors supporting a distributed processor terminal network. Desired qualifications include a BS in electrical engineering, computer science, or a related discipline, vendor training in equipment repair, several years' participation in design, development, and maintenance of large-scale communications oriented hardware systems, and some supervisory experience. Starting salary $20-25,000. Please send resume to:

Dr. C.J. Duckenfield, Director
Clemson University Computer Center
Clemson, S.C. 29631
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WELCOME TO ATLANTA

Whitlow and Associates represents many client companies in Atlanta and the rest of the Sunny South, (also others nationwide). As a brief example:

Sr. S.A. to $22K **Manufacturing**	**P/A to $28K** **Minis**
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CALL NOW - (404) 262-2566

Plan to stop by and drop off your resume while you are in town, or send to Jim Steel/Frank Parks at:

Whitlow & Associates
3390 Peachtree Road, N.E. - Suite 236
Atlanta, Georgia 30326

MANAGER RESOURCE PLANNING

Hartford area Corp. creating Sr. level position for indiv. to establish Corp. wide mgmt. dev. career path planning, salary levels and D.P. Educ. functions. Indiv. must be promotable to Sr. executive level. Starting salary in mid $30,000 range. (Fee Paid). Contact Stan Durbas for details.

ROBERT HALF PERSONNEL AGENCIES
111 Pearl St.
Hartford, Conn. 06103
(203) 278-7170

SENIOR SYSTEM SOFTWARE SPECIALIST

We're the Acushnet Company, well-known manufacturer of golf equipment, rubber, synthetic rubber, and other elastromeric products, with sales in excess of $94-million. Currently, we have an excellent growth position available.

We are seeking an individual with a degree or its equivalent with the following required experience:

- 5 or more years of general D.P. experience in an advanced medium or large scale data center with telecommunications.
- 3 or more years of IBM Assembler language programming.
- 2 or more years of experience in a significant DB/DC environment at the system software level.

Experience in some of the following areas would be helpful; prior experience in a technical support group, COBOL, FORTRAN, project leadership, IBM system control programs, internal knowledge, especially VM/370 and DOS/VS.

You will be responsible for primarily maintaining and enhancing a DB/DC environment at the system software level, and secondarily for IBM SCP's (VM/370 and DOS/VS) and program products.

Please send your resume with current salary and work history to Ed Mulkern, Professional Staffing, Acushnet Company, P.O. Box B965, New Bedford, MA 02741.

ACUSHNET COMPANY
An EOE M/F

COMPUTERS

CUSTOMER ENGINEERS

Immediate Openings

Must have a minimum of 2 years' maintenance experience on one of the following computer systems:

IBM 360-65
DEC MINIS
(PDP 8 and PDP-11)

Positions are available in Austin, Tex, Washington, D.C., Martinsburg, W. Va. and Dearborne, Mich. All positions offer an excellent salary plus an outstanding benefits package.

For immediate consideration please call collect Tom Suvara, (215) 659-7700, Ext. 381. If unable to call please forward resume with salary history to Department C.W.

Ford Aerospace & Communications Corporation
3900 Welsh Road
Willow Grove, Pa. 19090
An Equal Opportunity Employer, M/F

SOFTWARE SPECIALISTS

Aquidneck Data Corporation, an innovative consulting firm located in Middletown, Rhode Island, is hiring computer specialists to fulfill commitments in Navy online systems for shipboard applications.

THE COMPANY

Since its founding in 1976, the company has operated on a philosophy of bonuses for excellent achievement; profit sharing; Management by Objectives; and an open, professional atmosphere.

THE AREA

Middletown, Rhode Island, located near historic Newport and the Atlantic Ocean, offers a variety of year-round cultural and recreational activities. Middletown is convenient to both the Providence and Boston metropolitan areas.

THE WORK

Aquidneck Data Corporation maintains a close customer relationship by identifying with and solving specific customer needs. For this reason, ability to communicate effectively and to work within a team are valuable assets. Openings exist in the following areas.

•PROGRAMMING

Openings exist for programmers to develop, implement, test and document online data base management, scientific and financial applications. Experience in data base design, programming interactive systems, COBOL, or BASIC is required.

•SYSTEMS ANALYSIS

Systems analysts are needed for software development projects. Experience in assembly language programming for online systems applications is required. Experience with CMS-2 and the AN/UYK-7 is helpful. Senior Systems analyst openings require in-depth knowledge of software design and development, and extensive experience in assembly language programming. Experience with command and control systems is a plus.

•CONFIGURATION MANAGEMENT

Available positions are for software configuration management and documentation of online combat systems. Experience in developing and implementing software CM plans, procedures, and standards is desired.

•SHIP'S SYSTEMS

Ship's Systems Specialist positions require extensive knowledge and experience in attack and ballistic-missile submarine operations at both the command and operator levels. Ship's systems of particular interest are sensors, navigation, weapons and weapons control.

To apply, send your resume to:
Ms. Janet Cooper

Aquidneck Data Corporation

Box 99 • Middletown, R.I. 02840
An Equal Opportunity Employer M/F

SENIOR ANALYST/ PROGRAMMER

SENIOR SYSTEMS PROGRAMMER

BURROUGHS B4700 SYSTEMS

ON-LINE THRIFT APPLICATION
MCPV & NDL MAINTENANCE

Thrift Customer Services, Inc., a medium/large Bank Service Corporation located in Florham Park, N.J., is seeking 2 individuals with experience in Thrift Applications or Burroughs MCP Software. COBOL knowledge is essential. Excellent benefits. Salary commensurate with experience. Send resume with salary requirements to:

THRIFT CUSTOMER SERVICES, INC.
P.O. BOX 142
FLORHAM PARK, N.J. 07932
Attn: Personnel Director

AN EQUAL OPPORTUNITY EMPLOYER.

PROGRAMMER

Ore-Ida Foods, Inc., a national leader in frozen foods, has an immediate opening for a business programmer to work with a 370 DOS/VS installation. You will have the opportunity to assist in systems design. Applicants should have 2 - 5 years programming experience with ADPAC, COBOL or Assembler language desired. Some college and on-line programming and data base experience preferred.

This position offers competitive starting salary, liberal benefits and relocation. Send complete resume including salary history and requirements to **Personnel Manager, Ore-Ida Foods, Inc., P.O. Box 10, Boise, ID 83707.**

An equal opportunity employer M/F

Ore Ida®

DATA PROCESSING PROFESSIONALS

MP&L is a rapidly expanding utility located in Duluth, Minnesota. Our exceptional growth has created immediate opportunities for the following positions.

SENIOR SYSTEMS PROGRAMMER

Responsibilities include evaluating system and applications software packages, generating, testing and debugging DOS and/or OS operating systems, data base and other system software. Qualifications include a BA Degree in Computer Science or Vocational Certificate in Computer Programming. 4-7 years experience on a medium to large DOS or OS computer installation and at least 4 years systems programming with computer operations experience.

APPLICATIONS ANALYST

Responsibilities include analyzing information requirements, preparing conceptual, general and detailed designs, plus, supervising project teams in application development. A BA Degree in Computer Science plus 2 years as an Application Analyst and 4 years as Programmer Analyst in business or utility industry is required.

If you are qualified for these positions and are looking for competitive salary, excellent benefits and growth potential in the future, plus, a location that offers you and your family an uncrowded, four-season environment — SEND YOUR RESUME INCLUDING SALARY REQUIREMENTS TO:

mpl

Oliver C. Houx
Employee Selection Adm.
MINNESOTA POWER & LIGHT CO.
30 W. Superior St.
Duluth, Minnesota 55802

An Equal Opportunity Employer

SOFTWARE MANAGEMENT

To $45K

Our client, a $50MM Manufacturer of minicomputer based systems, seeks two Senior Software Managers.

DIRECTOR OF SOFTWARE DEVELOPMENT

Responsible for all software development in the company. Must lead technically as well as manage all efforts in the areas of Real Time OS, High level languages, Applications software, etc. Full management responsibility includes budgets, staffing, planning and implementation.

MANAGER OF DIAGNOSTIC SOFTWARE DEVELOPMENT

Must be capable of developing diagnostic test philosophy and have extensive experience at the systems level as well as knowledge of diagnostic development for CPU, memory and peripheral components.

In addition to hands-on technical leadership will manage a group responsible for determining future needs, capital equipment and information systems requirements, as well as future software tools.

Additional software openings exist in Systems, Diagnostic and Applications programming at this outstanding company.

For further discussion, please call or write in strict confidence, Bob Pelkey.

George D. Sandel & Associates
Executive Search Consultants
(617) 890-0713 479 Winter St.
Waltham, Massachusetts 02154

Our client is an equal opportunity employer M/F

Software Entrepreneur

We are a profitable, mature San Francisco based computer peripheral firm, willing to invest venture capital in a start-up software company. We are particularly interested in backing the development and growth of a firm whose initial or major direction is programming in the microprocessor realm with applications in data communications.

If our investment offer and software interests are compatible with your career goals and programming experience, please forward an outline of your business plans and credentials. Write in confidence to: President,

c/o CW Box 1534
797 Washington St.
Newton, MA. 02160

COMPUTER PROGRAMMER/ ANALYST

Exciting opportunity now exists for an experienced programmer analyst. New Burroughs B-1700 system will be used as a stand alone system and an RJE to a B-6800. Successful candidate will assist in the design, implementation and maintenance of on-line administrative student and financial systems. A minimum of two years of experience including COBOL programming and system analysis and design. Experience with Burroughs hardware/software desirable. Salary range $15,732 - $19,176 with excellent fringe benefit package. Contact Charlie Perry, 182 East Walnut Ave., Rialto, CA. 92376.

Data Processing Opportunities

San Francisco Peninsula

Siliconix, a growing company in the semiconductor industry for over 15 years, continues to excel in profit and reliability, and that means exciting and STABLE career opportunities for qualified professionals in our Information Services Group. Join us now if you qualify:

Systems Analysts

(One opening in Financial/Administration, another opening in Sales/Marketing) Qualified Information Systems Analysts will work with management defining systems objectives, establishing detailed requirements, preparing user documentation and training users in systems operations. BS in Business or Math with 4-6 years' work related experience.

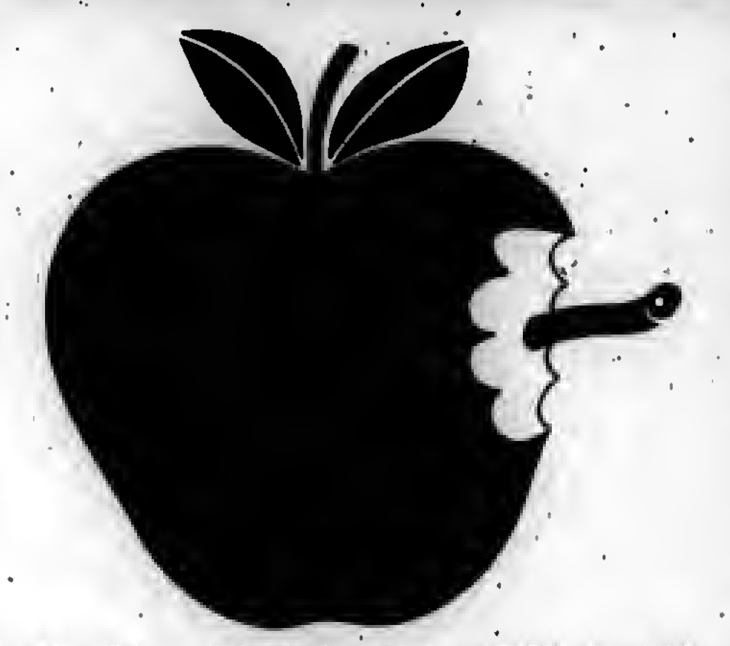
Operations Manager

Responsibilities will include multi-shift supervision of a 370/135 DOS/VS system, including online systems and data entry. The successful candidate should have a minimum of 2 years' supervisory experience, be highly motivated and service oriented. A BS degree in Business is preferred.

If you're ready for pleasant year 'round weather, easy access to fine schools, theatre and water activities, then join us now. You can expect a good salary and liberal benefits including dental insurance, profit sharing, tuition assistance, relocation assistance, and a stock purchase plan.

For immediate consideration, please send your resume to Professional Employment, 2201 Laurelwood Road, Santa Clara, CA 95054, or call COLLECT (408) 988-8000, ext. 233. An affirmative action employer.

Siliconix incorporated



Programmers. . . there is a way to avoid unpleasant surprises. Unless you have total information about a given career opportunity you cannot be sure it's for you. By using the services of N.C.A. you can be sure. You'll not only be shown more career opportunities than you could find elsewhere, you'll also be given complete, detailed data on each, plus the inside information that is vital in avoiding mistakes. Call the firm nearest to you. No charge to you. No obligation. Confidentiality assured.

National Computer Associates

CHICAGO
Thomas Hirtz and Associates, Inc
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606
Telephone (312) 236-5075

DALLAS
DataPro Personnel Consultants
4256 L B J Freeway
Suite 102
Dallas, Texas 75234
Telephone (214) 661-8800

DETROIT
Electronic Systems Personnel
Prudential Town Center
3000 Town Center, Suite 2586
Southfield, Michigan 48075
Telephone (313) 353-5580

FLORIDA
Data Sciences Personnel, Inc
Suite 265, 16490 N.W. 7th Ave
Miami, Florida 33169
Telephone (305) 685-7891

HARTFORD
Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105
Telephone (203) 549-4240

LOS ANGELES
Constellation Enterprises
Suite 900, 3255 Wilshire Blvd
Los Angeles, California 90010
Telephone (213) 487-0610

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
801 Nicollet Mall, Suite 1718
Minneapolis, Minnesota 55402
Telephone (612) 338-8714

NEW JERSEY
Systems Search II
75 South Orange Avenue
South Orange, N J 07079
Telephone (201) 761-4400

NEW YORK
Bofal Associates, Inc
405 Lexington Avenue
New York, New York 10017
Telephone (212) 687-0906

NORTH CAROLINA
TaskForce, Inc
1040 E. Wendover Ave
P O Box 8858
Greensboro, N. Carolina 27405
Telephone (919) 373-1461

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa 19086
Telephone (215) 565-2926

PITTSBURGH
Electronic Systems Personnel
106 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219
Telephone (412) 391-6450

SAN FRANCISCO
The Computer Resources Group Agency, Inc
303 Sacramento Street
San Francisco, California 94111
Telephone (415) 398-3636

SYRACUSE
CFA Associates Personnel, Inc (Agency)
2530 James Street
Syracuse, New York 13206
Telephone (315) 463-5226

WASHINGTON, D.C.
ISP Systems Corporation
Suite 210
1211 Connecticut Avenue N W
Washington, D C 20036
Telephone (202) 833-8040

OVERSEAS ADVENTURE $40K+

IRAN

Applications programmer, Systems Engineer, H-6000 or L/66, GCOS/COBOL/GMAP IDS TPE/MULTICS, US firm has 18-24 mo tours w/fam. Ex financial pkg in Tehran. Ski 1 hr fm office. Rush resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101. (703) 356-1997. Other positions avail.

Teaching position in business Information Systems: Doctorate or ABD required in information systems, business data processing, or related discipline; CDP and/or business dp experience helpful. Position involves teaching business-oriented information systems courses, 12 hours/semester, in growing 2- and 4-year business information systems area. Rank and salary based on qualifications and experience. Send resume and three letters of recommendation to:

Robert E. Nelson, Dean
College of Business & Public Affairs
Grisa Hall, Office #445
Western Kentucky University
Bowling Green, KY 42101

Western Kentucky University is an Affirmative Action/Equal Opportunity Employer.

SENIOR PROGRAMMERS

HERE IS:
an excellent opportunity to EXPAND your professional career and join Northern New England's largest food wholesaler/retailer.

YOU MUST:
have three to five years Cobol programming experience and excellent written communications skills; IMB 370 experience preferred.

YOU WILL:
work with some of the foremost experts in the EDP field on a variety of programming applications.

WE OFFER:
a challenging and progressive work environment, coupled with an excellent compensation program and the opportunity to live in a most desirable part of the country.

PLEASE:
send your resume, including salary history, in confidence to:

M.A. Shube
Employment Manager
HANNAFORD BROS. CO.
P.O. Box 1000
Portland, Maine 04104

HANNAFORD

An Equal Opportunity Employer

MANAGER DATA PROCESSING

Computer Products Inc., a leading manufacturer of computer based measurements and control systems has an immediate opportunity for a manager of Data Processing.

Creative . . . Responsible . . . and immediate is this position! We are seeking an individual with a minimum of 5 years' experience in business systems management in the manufacturing environment. This "pro" will be able to interpret management needs and desires into an interactive management information system, and run the system on the hardware. The successful candidate has specified, ordered and brought up utilizing software acquired or developed by the manager and his data processing staff.

Computer Products is a dynamic organization where aggressive and effective performance is acknowledged and rewarded. We offer a highly competitive salary, excellent benefits and relocation assistance . . . as well as outstanding career potential. If you have the qualifications to fill this position, please send your resume with salary history to:

Tony Welkar
COMPUTER PRODUCTS
1400 NW 70 Street
Ft. Lauderdale, FL 33309
305/974-5500

We Are An Equal Opportunity Employer M/F

DATABASE ADMINISTRATOR SOFTWARE PROGRAMMER

Are you a Data Processing Professional tired of hearing talk about the need for "Management Commitment" to systems development?

Our corporate management IS committed to the long term development of computer supported systems. With their support we are developing effective people-oriented systems in a Data Base - Data Communication environment.

We are in the early phases of installation of an integrated manufacturing control system for the first of our eight manufacturing divisions. We recognize that our system will only be as good as the people who design and implement it. In addition, we are undergoing a major expansion in the Data Processing Group. We are seeking talented individuals with experience in Data Design and Support and individuals with Software experience in OS and Telecommunications.

We are a major Milwaukee based corporation offering an excellent total COMPENSATION package. Our employees are aware of these openings.

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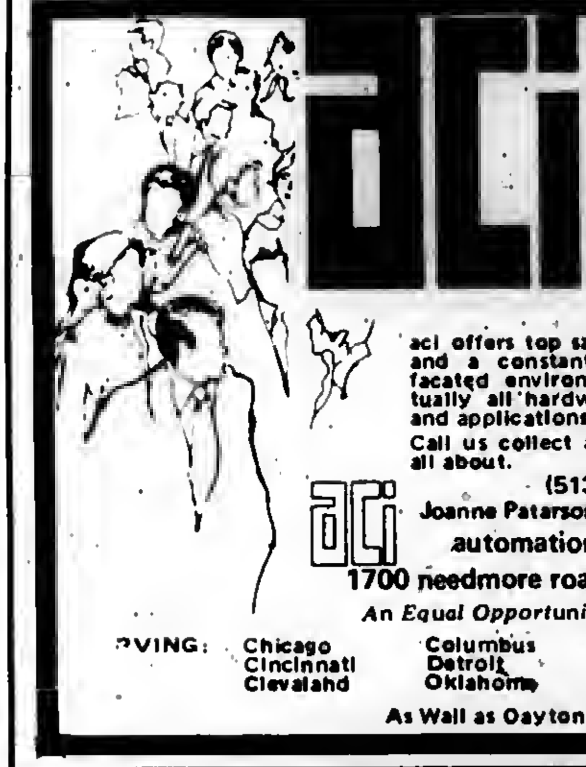

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THE POSITIONS: Openings are in our Systems & Procedures Department for qualified Systems Analysts.

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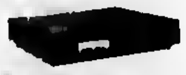
2400 bps 	**MODEM 2200/24** Half or full duplex operation over dial or dedicated facilities.	$1780 $60/mo.*	**$725** **$29/mo.***
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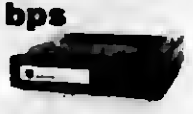
4800 bps	**MODEM 4500/48** Automatic equalization unconditioned dedicated dial lines. Optional dual 2400 bps operation on dedicated lines.	$4980 $100/mo.*	**$1795** **$72/mo.***
7200 bps 	**MODEM 4800/72** Dedicated line with optional multiport operation for up to three 2400 bps channels.	$6900 $165/mo.*	**$1995** **$80/mo.***
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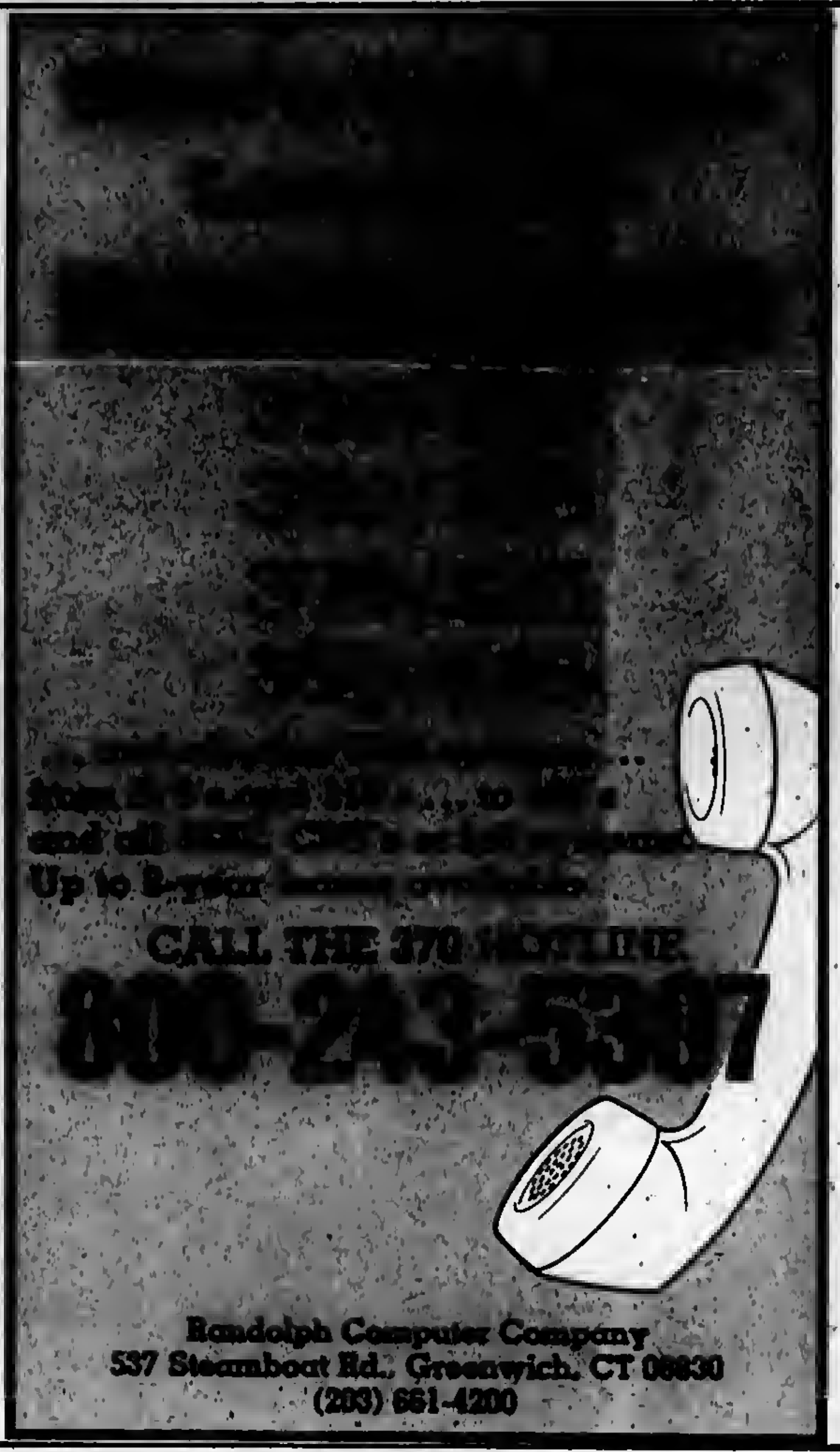

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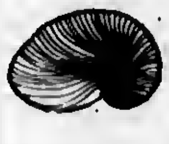

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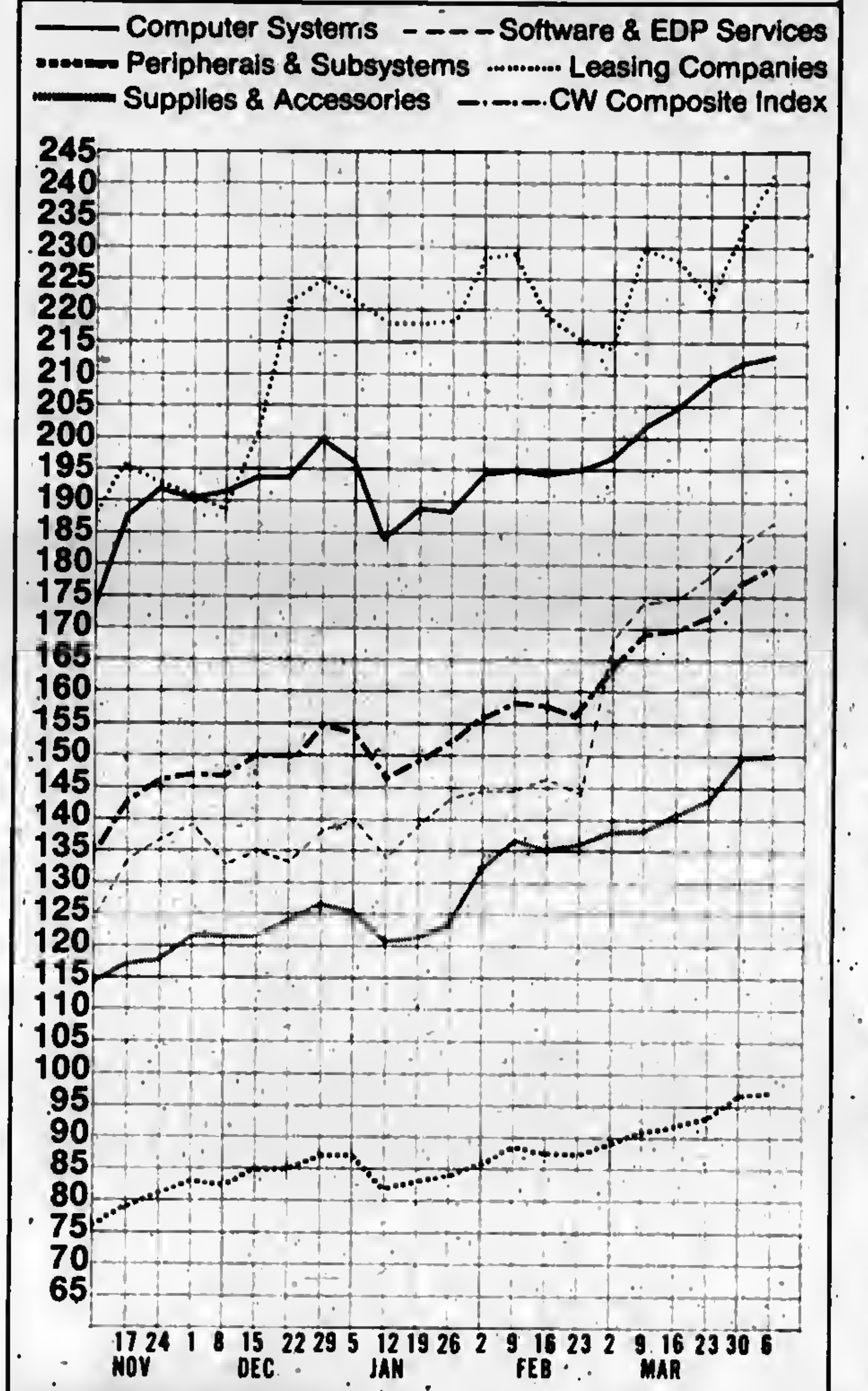

Earnings Reports

APPLIED DEVICES
Three Months Ended Jan. 1

	1978	1977
Shr Ernd	$.14	$.06
Revenue	7,384,000	4,880,000
Tax Cred	166,000	128,000
Earnings	572,000	320,000

DECISION DATA COMPUTER
Three Months Ended Feb. 25

	1978	1977
Shr Ernd	$.03	$.06
Revenue	8,228,000	7,881,000
Tax Cred	88,000	158,000
Earnings	132,000	235,000

ECRM
Year Ended Dec. 31

	1977	1976
Shr Ernd	.....	$.38
Revenue	$8,728,000	7,800,000
Tax Cred	.....	187,000
Earnings	(591,000)	449,000

DOCUTEL
Year Ended Dec. 31

	1977	1976
Shr Ernd	.....	$.64
Revenue	$25,315,000	31,293,000
Tax Cred	.....	758,000
Earnings	(8,256,000)	1,849,000
3 Mo Rev	3,843,000	6,356,000
Loss	7,894,000	182,000

GENERAL AUTOMATION
Three Months Ended Jan. 28

	1978	1977
Shr Ernd	$.27	$.18
Revenue	22,185,000	20,136,000
Tax Cred	15,000	48,000
Earnings	887,000	463,000
6 Mo Shr	.34	.51
Revenue	41,178,000	41,062,000
Tax Cred	55,000	187,000
Earnings	849,000	1,268,000

APL
Three Months Ended Dec. 31

	1977	1976
Shr Ernd	$.23	$.65
Revenue	20,438,000	20,303,000
Earnings	770,000	2,051,000
6 Mo Shr	.84	1.21
Revenue	39,832,000	40,250,000
Earnings	2,108,000	3,811,000

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 5, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 5 1978	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	22- 55	46 3/4	+ 1/8	+0.2
N	BURROUGHS CORP	55- 51	60	- 1/4	-0.4
O	COMPUTER AUTOMATION	18- 30	25 1/2	+1 1/2	+6.2
N	CONTROL DATA CORP	20- 29	25 5/8	+ 5/8	+2.5
O	CRAY RESEARCH INC	15- 32	32 1/4	+3 1/4	+11.2
N	DATA GENERAL CORP	35- 54	46 3/4	+2 7/8	+6.5
N	DATAPOINT CORP	18- 42	41 7/8	- 1/8	-0.2
N	DIGITAL EQUIPMENT	37- 53	40	+1	+2.5
N	ELECTRONIC ASSOC.	2- 5	4 3/8	+ 1/8	+2.9
A	ELECTRONIC ENGINEER.	8- 16	14 5/8	+1 3/8	+10.3
O	FOUR-PHASE SYSTEMS	13- 23	21 7/8	- 3/8	-1.6
N	FOXBORO	28- 34	33 3/4	+ 3/4	+2.2
O	GENERAL AUTOMATION	6- 9	8	0	0.0
O	GRI COMPUTER CORP	1- 1	1 1/8	- 1/4	-18.1
N	HEWLETT-PACKARD CO	62- 87	64 3/8	+1 1/8	+1.7
N	HONEYWELL INC	43- 55	44 3/4	- 1/4	-0.5
N	IBM	236-286	241 3/8	+2 7/8	+1.2
O	MANAGEMENT ASSIST	5- 12	12 3/8	+ 1/8	+1.0
O	MICRODATA CORP	7- 18	11 1/2	- 7/8	-7.0
O	MINI-COMPUTER SYST	5- 12	6	- 1/4	-4.0
O	MODULAR COMPUTER SYS	5- 12	11 1/2	0	0.0
N	NCR	32- 47	44 7/8	+1 3/8	+3.1
O	PRIME COMPUTER INC	12- 32	29 5/8	-1 1/2	-4.8
N	PERKIN-ELMER	17- 22	18 1/8	0	0.0
N	RAYTHEON CO	16- 37	36 1/4	+ 5/8	+1.7
N	SPERRY RAND	30- 42	34 7/8	0	0.0
O	SYCOR INC	8- 21	20 5/8	0	0.0
A	SYSTEMS ENG. LABS	5- 14	12 1/2	- 1/4	-1.9
A	WANG LABS.	10- 16	15 7/8	- 1/4	-1.5
	LEASING COMPANIES				
O	ALANTHUS CORP	3- 6	5 3/4	0	0.0
O	BOOTHE COURIER CORP	8- 16	16 1/2	+ 3/8	+2.3
O	COMDISCO INC	9- 16	9 1/2	+ 1/2	+5.5
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	5/8	0	0.0
M	DATRONIC RENTAL	0- 2	1 3/4	+ 1/8	+7.6
A	DCL INC	1- 4	2 5/8	+ 1/8	+5.0
N	DPF INC	6- 10	8 7/8	- 1/8	-1.3
N	ITEL	13- 22	18 1/8	+ 1/2	+2.8
N	LEASCO CORP	19- 31	30 1/8	- 1/8	-0.4
O	LEASPAC CORP	1- 2	1 3/4	+ 3/8	+27.2
A	PIONEER TEX CORP	5- 11	6 1/8	- 1/8	-2.0
N	U.S. LEASING	10- 16	13	- 3/8	-2.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 5 1978	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP. TECH	0- 2	1 1/4	0	0.0
O	ANACOMP INC	7- 12	10 1/8	- 3/8	-3.5
A	APPLIED DATA RES.	5- 10	9 5/8	+ 1/8	+1.3
N	AUTOMATIC DATA PROC	23- 30	28	- 1/8	-0.4
O	COLEMAN AMERICAN COS	1- 2	1 1/4	+ 1/4	+25.0
O	COMPU-SERV NETWORK	9- 15	9 1/4	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	8 1/2	+ 1/8	+1.4
N	COMPUTER SCIENCES	7- 11	10 3/8	- 1/8	-1.1
O	COMPUTER TASK GROUP	1- 2	2	0	0.0
O	COMPUTER USAGE	1- 3	2 3/4	0	0.0
O	COMSHARE	5- 10	9 3/4	+ 3/4	+8.3
O	DATA DIMENSIONS, INC	3- 5	4 1/2	+ 1/8	+2.8
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	17 1/2	- 3/8	-2.0
O	INSYTE CORP	2- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/2	+ 1/8	+3.7
O	KEYDATA CORP.	1- 3	1 3/4	+ 1/8	+7.6
A	LOGICON	7- 17	13	+ 5/8	+5.0
A	MANAGEMENT DATA	1- 2	1	- 1/8	-11.1
A	NATIONAL CSS INC	10- 19	18 5/8	- 5/8	-3.2
O	NATIONAL DATA CORP	4- 9	8 1/2	+ 3/8	+4.6
A	ON-LINE SYSTEMS INC	16- 24	23 5/8	- 1/8	-0.5
N	PLANNING RESEARCH	3- 6	5 1/8	+ 1/8	+2.5
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 4	3 3/4	- 1/4	-6.2
O	REYNOLDS & REYNOLDS	17- 21	21	+1 1/4	+6.3
O	SCIENTIFIC COMPUTERS	1- 4	4 1/8	+ 1/8	+3.1
O	TYMSHARE INC	14- 23	20	+ 5/8	+3.2
A	URS SYSTEMS	4- 6	5 7/8	- 1/8	-2.0
N	WYLY CORP	1- 4	3 3/8	+ 5/8	+22.7
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	10- 18	17 3/8	- 1/4	-1.4
O	ADVANCED MEMORY SYS	7- 10	10 3/8	+ 5/8	+6.4
N	AMPEX CORP	8- 13	12 3/8	- 5/8	-4.8
O	ANDERSON JACOBSON	3- 6	5 3/4	- 1/4	-4.1
N	APPLIED DIG DATA SYS	10- 20	14	+ 1/8	+0.9
O	BEEHIVE INTL	5- 12	5 5/8	+ 1/8	+2.2
A	BOLT,BERANEK & NEW	6- 9	6 3/8	+ 5/8	+10.8
N	BUNKER-RAMO	8- 14	13 7/8	+ 3/8	+2.7
A	CALCOMP	3- 5	4 5/8	+ 1/4	+5.7
O	CAMBRIDGE MEMORIES	1- 4	2 5/8	0	0.0
N	CENTRONICS DATA COMP	16- 30	19 3/4	+ 1/4	+1.2
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	9 1/8	- 1/8	-1.3
O	COMPUTER CONSOLES	4- 7	6 1/4	+1	+19.0
A	COMPUTER EQUIPMENT	2- 4	3 7/8	- 1/8	-3.1
O	COMPUTER TRANSCEIVER	1- 1	1 1/2	0	0.0
O	COMTEN	9- 15	14 3/8	- 1/4	-1.7
N	CONRAC CORP	15- 28	19 1/2	-1	-4.8

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 5 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	4 1/2	- 1/2	-10.0
O	DATA 100	6- 12	12	+ 1/8	+1.0
A	DATA PRODUCTS CORP	9- 19	15 7/8	+ 1/8	+0.7
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 4	3 1/2	+ 7/8	+33.3
O	DECISION DATA COMPUT	2- 3	1 7/8	+ 1/8	+7.1
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
A	DOCUMATION INC	6- 12	11 5/8	+ 1/4	+2.1
O	DATARAM CORP	7- 24	16 1/2	+ 1/2	+3.1
N	ELECTRONIC M & M	4- 5	5 1/4	+ 1/4	+5.0
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	8- 15	12 3/4	-1 1/8	-8.1
N	HARRIS CORP	28- 48	47 3/8	- 1/8	-0.2
O	INFOREX INC	4- 8	7 1/2	- 1/8	-1.6
O	INFORMATION INTL INC	8- 14	10	0	0.0
O	INTEL CORP.	38- 57	43 1/2	+1 1/2	+3.5
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	6- 15	13	0	0.0
N	MEMOREX	23- 34	32 1/2	+1 1/2	+4.8
N	MOHAWK DATA SCI	5- 9	9	+ 1/8	+1.4
O	PENRIL CORP	2- 6	7 3/4	+ 3/8	+5.0
N	PERTEC CORP	7- 11	10 1/8	- 1/8	-1.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	2 7/8	- 1/8	-4.1
O	RECOGNITION EQUIP	6- 10	8	0	0.0
O	SCAN DATA	1- 2	2 1/8	+ 1/4	+17.2
O	STORAGE TECHNOLOGY	10- 31	30 5/8	+ 5/8	+2.0
O	T BAR INC	7- 16	15 1/2	+1 1/4	+8.7
O	TALLY CORP.	4- 8	7 3/8	0	0.0
A	TEC INC	6- 10	6 7/8	- 1/8	-1.7
N	TEKTRONIX INC	29- 40	34 1/4	- 1/2	-1.4
N	TELEX	2- 5	4 1/8	- 1/4	-5.7
O	TESDATA SYSTEMS CP	13- 20	15 1/2	+ 1/2	+3.3
O	WILTEK INC	1- 1	1/2	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 8	8	+ 1/8	+1.5
O	BALTIMORE BUS FORMS	1- 4	2 7/8	+ 1/8	+4.5
A	BARRY WRIGHT	10- 19	17 7/8	0	0.0
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 20	19 1/2	- 1/8	-0.6
N	ENNIS BUS. FORMS	6- 11	11 1/4	+ 3/8	+3.4
N	3M COMPANY	43- 56	43 1/4	-1 1/2	-3.3
O	MOORE CORP LTD	24- 37	29 1/2	0	0.0
N	NASHUA CORP	16- 28	24 7/8	+ 1/4	+1.0
O	STANDARD REGISTER	18- 25	23	- 3/4	-3.1
O	TAB PRODUCTS CO	8- 19	9 1/2	- 3/8	-4.2
N	UARCO	18- 24	23 7/8	0	0.0
A	WABASH MAGNETICS	10- 15	12 5/8	+ 1/8	+1.0
N	WALLACE BUS FORMS	17- 21	20 5/8	- 1/4	-1.1

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Wide World Photos

No Port in This Storm

The 9,000 racing fans who showed up at Ak-Sar-Ben Raceway in Omaha, Neb., one day last year didn't bet on encountering a tornado. Experimenters at the Severe Storms Laboratory in Norman, Okla., are using a minicomputer-based warning system to provide predictions that may someday keep people on their home turf instead of exposing them to nature's wrath. Story on Page 5.

NCSS 32-Bit Minis Can Emulate IBM 370s

By Jeffry Beeler
CW Staff

NORWALK, Conn. — Users can reportedly take advantage of National CSS, Inc.'s (NCSS) full repertoire of IBM 370 series software with a 32-bit minicomputer system that the time-sharing services firm introduced here last week as a potential replacement for the 370/138.

The NCSS 3200 series, which marks the firm's debut as a supplier of stand-alone computer hardware, accommodates any 370 series software package without reprogramming or, in most instances, recompiling because the product line provides code compatibility with the 370's instruction set, company officials said.

Described as the first minis to emulate the 370 family, the five members of the 3200 series are comparable in performance to the 370/138, although the firm insists they provide twice the operating speed in a 5-ft by 3-ft by 3-ft hardware package that is priced in the same range as a typical $150,000 to $500,000 supermini system.

A VPS operating system, which evolved from NCSS' VP/CSS time-sharing operating system, allows the 3200 series to support every major computer language including Fortran, Cobol, PL/I, Basic, APL, Assembler and BAL, company spokesmen said. No rival supermini system can match the breadth of that language selection, the officials claimed.

The operating system also permits the minicomputer family to perform time-sharing, remote job entry and batch processing applications concurrently, they added.

Indeed, software reportedly represents the key to the 3200 series' operations. When NCSS decided to supply its own hardware, the company specified a configuration that could take advantage of its existing software line, which had been developed and debugged in more than five million hours of testing at more than 10,000 user sites, a spokesman explained.

Among its other features, the minicomputer series provides full compatibility with NCSS' nationwide, on-line time-sharing network, which incorporates an Amdahl Corp. 470/V6 and four IBM CPUs — a 360/67, 370/158

(Continued on Page 4)

Also Clears Security Agency

Senate: DES 'More Than Adequate'

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Data Encryption Standard (DES) is "more than adequate" to enhance the computer security of sensitive and personal information in the commercial applications for which it was intended, the Senate Select Committee on Intelligence said here last week.

This conclusion was expressed in an unclassified summary of the committee's "classified" staff study on the matter that resulted from about six months of investigation.

The committee also found the National Security Agency (NSA) has not pressured the scientific community to defer cryptological research nor has the agency tampered "in any way" with the design of the algorithm adopted by the National Bureau of Standards (NBS).

The committee also endorsed NSA involvement in the development of the standard.

Since late last year, the committee staff has interviewed public and private-sector scientists and engineers to determine the truth of allegations that NSA harassed scientists working

(Continued on Page 6)

Texas Library Testing Fiber Optics

By Ronald A. Frank
CW Staff

HOUSTON — When a CRT operator at the city library here transmits data to a nearby processor, a light beam rather than a series of digital pulses is generated.

The CRT at the library is one of nine terminals connected to the CPU over a fiber optical link that uses coherent light instead of electrical signals for data transmission. The library is one of the first user sites to apply fiber optics for transmitting data.

Fiber optics is not now commercially available for data trahsmission, but the Houston test is considered by experts to be a step in that direction.The fiber optics cable used to link the library's CRTs with a Univac 1900 Computer Assisted Data Entry (Cade) processor was supplied by Univac, according to Alan Albright, manager of remote operations and hardware support in the management information systems (MIS) department of the City of Houston.

The optical cable has been operating for about two weeks without problems, Albright said. The thickness of a lead pencil, it was installed in existing underground conduits by the city. The actual conductor is about as thick as a pin; it transmits data at 2,400 bit/sec.

The fiber optics link is approximately 3,000 feet long, running between a city fire alarm building and the municipal library. The link connects to a standard coaxial cable that runs for 4,000 feet from the alarm building to the MIS center.

(Continued on Page 7)

Analyst, Programmer Jobs Increasing — And Changing

By Ann Dooley
CW Staff

WASHINGTON, D.C. — The job market for programmers and systems analysts, almost negligible in 1960, is expected to grow to half a million workers by 1985 — but not without changes in job functions caused by technical advances and the small computer boom, the U.S. Department of Labor reported in its "1978-79 Occupational Outlook Handbook."

Systems analysts can look forward to brighter employment prospects through the mid-1980s than workers employed in almost any other occupation, the Labor Department reported. The anticipated high rate of employment was attributed to expanded computer use in areas such as accounting and research and development.

But the technology that has reduced the size and cost of computer hardware, making it accessible to the small user, will create occupational changes for the systems analyst, the Department of Labor noted.

Job opportunities in DP service firms may not grow as rapidly as in the past because small users will be installing their own computers, the handbook noted. This trend will be offset, however, by the small users' rising need for

(Continued on Page 6)

Testing Needs Broader Scope, Users Advised

By Don Leavitt
CW Staff

SAN DIEGO — The traditional view of testing — exercising a program to prove that it is error-free — is erroneous, according to Lois Rose, a senior staff consultant for Yourdon, Inc.

Speaking at a technical session of the Americas Univac Users Association here last week, Rose said it is impossible to demonstrate there are no errors. Beyond that, test cases put together by the developer tend, quite understandably, to be biased in favor of proving the program correct.

(Continued on Page 7)

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Cat Out of the Bag:

Univac 9000 Users Getting Upgrade

By Don Leavitt
CW Staff

SAN DIEGO — Users of the older Univac 9000 series CPUs will soon have a new upgrade path, according to a Univac official who told a users meeting here the 90/40 CPU will be announced formally this week.

H. Glenn Haney, Univac's vice-president of Worldwide Marketing, told more than 400 members of the Americas Univac Users Association meeting here last week the 90/40 is compatible with the programs and operating system of the 90/30. In addition, it can support twice as much main memory and all the peripherals now available on the 90/30, Haney said.

The CPU in the 90/40 has about 30% more compute power than the 30, he said, explaining later that the increase in power comes from faster access time and "some minor hardware changes." One of these changes provides an "early fetch" of the next instruction to be executed so the system can "look ahead" to what it will have to do.

The processor's faster time does not involve use of a cache memory, he added, although he begged off discussing more details because he is "not really technically competent to do so."

Likewise, although he mentioned that the 90/40 will support a disk upgrade compared with what is available on the 90/30, Haney did not go into specifics.

Nor did the official mention the 90/40's minimum memory size, but he did note its 1M-byte maximum configuration matches the minimum configuration of a 90/60, leaving some users with the impression the 90/40 may be the only system Univac plans to offer between the high and low ends of the 90 series.

Software Compatibility

The 90/40 CPU is completely software-compatible with the highly successful 90/25 and 90/30, utilizing OS/3 and any application programs developed under that environment without any change, Haney asserted. Apparently not even recompilation will be required.

The 90/40 will not support the VS/9 operating environment of the larger Series 90 CPUs — the 90/60, 70 and 80 — but will accommodate OS/4-based work originally developed on the older 9000 series processors.

This should make the system a good upgrade for the OS/4 users who have been limited, until now, to moving either to the 90/30, with no gain in power but an easy switchover, or to the 90/60 and the much more difficult conversion to VS/9, Haney told the 400 to 500 users assembled in the Hotel Del Coronado dining hall.

Release Predictions

OS/4 is apparently on a maintenance-only status with no new functional enhancements. By contrast, a Univac spokesman at an earlier conference session spelled out the company's substantial extensions planned for the next two releases of OS/3 and admitted there would be still another release before next spring's meeting.

Since the Univac official's comments on the 90/40 preceded the formal introduction of the product, he did not announce either the system's costs or its delivery dates. He acknowledged, however, that the system will be demonstrated in Germany this week.

Earlier in his talk, Haney provided another perspective on the 90/40 processor. He noted Univac has abandoned its plan to develop one line of systems into which the company might merge both the Series 90 and the 1100 system users.

The so-called "Roanoke Project" had "very sound" technological roots developed over three years, he said, but Univac now feels users might be uneasy about switching from equipment with which they are familiar.

Instead of the "Roanoke" approach, Univac has now decided on a system of compatible upgrades to extend both of the current lines separately. "Roanoke" technology will be utilized, he said, and compilers compatible with both operating systems will be developed.

OS/1100 for the big systems will be rewritten in an evolutionary way so both types of current users will feel comfortable with it, Haney said, adding he expects "some features" of VS/9 to be carried over to the rewritten operating system. He did not, however, specify which VS/9 features might be included in the transfer.

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Newcomer Two Pi Launches OEM Business

By **Jeffry Beeler**
CW Staff

SUNNYVALE, Calif. — The 32-bit minicomputer introduced last week by National CSS, Inc. (NCSS) was produced by Two Pi Co., a newcomer to the CPU manufacturing field.

Two Pi is a subsidiary of the U.S. division of Philips, the worldwide electronics conglomerate based in The Netherlands.

The firm is now offering a basic version of the system dubbed the V32 to other OEMs, service bureaus and other buyers capable of adding value to the product.

Like its NCSS counterparts, the Two Pi/V32 system runs on the same software that controls 370 series CPUs and operates in the same performance class as the 370/138, according to the firm. It also requires a minimum main memory of 256K bytes, provides built-in air conditioning and executes the complete 370 series instruction set, company officials said.

But unlike the 3200 series, the V32 expands to accommodate up to 4M bytes of main memory, twice the maximum capacity of the NCSS systems and four times the capacity of the 370/138, they explained.

At present, the Two Pi system accepts only stand-alone IBM peripherals. Next year, however, the firm plans to introduce a series of controllers that will permit a V32 CPU to accommodate small disk units, tape drives and other peripherals from competitive minicomputer manufacturers.

When those offerings appear, the V32 will provide about a 2:1 price/performance edge over its IBM equivalent, Two Pi claimed.

Other features offered with the OEM system reportedly include basic and extended control modes, control registers, extended precision floating point registers, error correction codes and an RS-232 Ascii interface for the configuration's operator console.

Capable of supporting up to eight data channels, the V32 uses standard 115 Vac and draws 30A, Two Pi officials said. A byte multiplexer is said to provide eight control unit positions and supports up to 256 low-speed devices concurrently, while accompanying micro-diagnostics allow users to isolate internal equipment malfunctions to the card level.

Deliveries of the V32 system will begin by mid-year. Because it is supplying the system only to OEMs like NCSS, Two Pi declined to issue prices for the V32.

Two Pi is located at 1050 East Duane Ave., Sunnyvale, Calif. 94086.

The Two Pi V32 has internal minicomputer architecture but uses 370 software and operating systems.

NCSS 32-Bit Machines Run IBM 370 Software

(Continued from Page 1)

and two 370/168s — all of which accept 110-1,200 bit/sec asynchronous and 2,000-9,600 bit/sec bisynchronous transmissions, the firm said.

The 3200 series hardware was developed by Two Pi Co. of Sunnyvale, Calif. (see story above).

NCSS officials claim the systems operate 50%-60% faster than the Digital Equipment Corp. VAX 11/780 and Decsystem-2020, Data General Corp. M/600 and its upgrade, Interdata, Inc. 9/32VS, Prime Computer, Inc. 500 and other megamini systems in its performance class.

Typical customers for the NCSS systems range from those who require extensive education and "hand-holding" such as Basic/Four Corp. and IBM System 3 users to customers of Itel Corp. or Control Data Corp., whose CPUs operate in a much higher price and performance range than the 3200 series, the firm said.

A second class of prospective customers will be those in the 370 replacement market, NCSS said, claiming that "a small 3200 selling for $235,000 can match the power of a similarly configured 138 that costs more than twice as much." Company officials, however, downplayed the significance of 370/138 users being potential customers for their equipment.

Two-Level Operating System

The 3200 series' VPS software reportedly operates on two levels. One level, dubbed VP, schedules and allocates resources based on the mix of the users' jobs and the associate priorities, a spokesman explained.

The other level, termed CSS, controls user functions like supervisory services, disk space management, file I/O, terminal I/O and program execution, he added.

The VPS operating system is also said to come with four user software systems — for CRT screen formatting, multiterminal operation, interprocess communication and voice response operation. These systems allow the 3200 series to perform commercial applications like on-line order processing, inventory control, data base inquiry and update, personnel management and payroll, company officials said.

Other software packages offered with the 3200 series include Nomad, a data base management system. EMS, a financial planning and forecasting system; and business accounting systems (BAS), a library of programs that allow users to perform applications such as general ledger, accounts payable, accounts receivable, budget analysis and customer statement preparation. The BAS option adds an extra $5,000 to the 3200's purchase price, an NCSS spokesman said.

Communications Capabilities

Among its data communications capabilities, the 3200 series supports various interactive terminal models and uses bisynchronous and Hasp protocols to accept remote job entry workstations either in a stand-alone or multiprocessing mode, according to a spokesman. CRT terminals that can link to the systems include the IBM 3270, Hazeltine Corp. 1500 and Lear-Siegler, Inc. ADM-2.

The 3200 series systems can also operate as part of a packet-switching network, company officials said.

A basic 3200 series CPU incorporates a 256K-byte MOS main memory expandable in 256K increments to 2M bytes, NCSS noted. The VPS operating system, however, gives the family virtual memory addressing capability of up to 16M bytes, with 8M bytes available to the users' programs and an equal amount reserved for CSS facilities like the VPS/editor, VPS/exec and file system processors.

A basic configuration with a 512M-byte main memory, 200M-byte disk unit, 75 in./sec tape drive, 300 line/min console CRT terminal and eight communications lines costs $235,000. The largest of the basic configurations — the 3248N networking system — costs $400,000.

National CSS is located at 542 Westport Ave., Norwalk, Conn. 06851.

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Using 'Doppler Radar'

DP-Based System Keeps Eye Out for Tornadoes

By Tim Scannell
CW Staff

NORMAN, Okla. — Tornadoes — violent, funnel-shaped windstorms — take an average of 117 lives each year in the U.S. alone, according to the National Weather Service.

In an effort to reduce that death toll, scientists here at the National Oceanic and Atmospheric Administration's Severe Storms Laboratory have developed an experimental minicomputer-based weather monitoring system which, in most instances, has succeeded in determining the formation of a tornado 20 minutes before the funnel touches the ground.

Under the present system, the National Weather Service usually issues tornado warnings based upon reports from spotters, who literally can't tell when a tornado strikes until it does, according to Dr. Richard Doviak, chief of advanced techniques at the Laboratory. Occasionally, he said, the service will issue warnings based on conventional radar reports but these are unreliable because the features they have to identify using their radar are subject to ambiguous interpretation.

The proposed system incorporates a specialized type of radar that observes the wind and rain movements five to six miles up within a thundercloud to detect the formation of mesocylones, the precursors of tornadoes, Doviak said.

The basic radar, fabricated from Army-Navy surplus parts, operates somewhat like conventional radio devices in that it emits an ultrahigh frequency signal and detects that signal as it is reflected off an object. However, the system carries the principle a step further and also measures the Doppler variation, or change in the sound frequency of the returning signal, Doviak said.

By measuring the intensity of the frequency change, the Doppler radar can not only determine what, if anything, is in the area but also which way it is moving and exactly how fast, Doviak continued.

Processing Steps

The signals collected by the Doppler radar are input to a large-scale mainframe that analyzes the data and provides three "moments" or viewpoints of a resolution cell [area]: the mean velocity, the presence of turbulence and the degree of that turbulence, Doviak explained.

The preprocessed information is then fed into a Ling Electronics minicomputer that acts upon the data and presents it in two different ways on a Vector Graphics, Inc. color CRT. First, the minicomputer displays all three principal moments within a resolution cell, and then it details the degree of velocity through varying patterns of color, Doviak said.

The color or measure of velocity within a resolution cell is actually a third dimension of presentation, he explained. The Doppler portrays wind flowing away from the radar and toward the radar, and the color is inserted as a quantitative representation or map of the windfield throughout a thunderstorm, he said.

The radar in Norman works in conjunction with a similar device located in Oklahoma City. Together, both Doppler systems monitor 762 resolution cells spaced 150 meters apart, Doviak noted.

> *'By measuring the intensity of frequency changes, the Doppler radar can not only determine what, if anything, is in the area but also which way it is moving and exactly how fast.'*

Although the system has pinpointed, in advance, every tornado that has occurred in the area, there is a certain degree of inaccuracy associated with velocity measurements over a wide field, Doviak indicated. The accuracy ranges from "less than a few meters per second to maybe a completely inaccurate estimate."

Even though a resolution cell is very large, a single tornado could take up the entire space, Doviak explained. Since the radar only has a .8 degree beam width, "you don't get a [true] measure of the velocity" because that one point may or may not be representative of the actual velocity of the cell."

Even though the system has proved satisfactory in predicting tornadoes and, in some cases, heavy thunderstorms that could lead to flash floods, Doviak doesn't think the National Weather Service will adopt the Doppler radar for quite some time. "I suspect operational prototypes won't be available for three to five years," he said. "Before we go ahead and request money for additional radar . . . from Congress and the appropriate agencies . . . we have to have a basis for requesting those funds.

"We have a pretty good system as it exists now," he continued. "The question is, how much better can we make that system with the Doppler radar?"

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Senate Unit Calls DES 'More Than Adequate'

(Continued from Page 1)

in the field of public cryptology and to assess the role played by the agency in the creation of the federal encryption standard.

Among those interviewed were representatives from NSA, NBS, the National Science Foundation (NSF), the Department of Defense, IBM and the Institute of Electrical and Electronics Engineers (IEEE). In addition, over 200 pages of private and public papers and documents were also analyzed, the summary report said.

In its search for an encryption algorithm that would satisfy the standards responsibilities imposed on the agency by the Brooks Act of 1965 and the computer security requirements of the Privacy Act of 1974, NBS solicited algorithms from the private sector. In consultation with NSA, the bureau determined the algorithm submitted by IBM was the best and should be adopted as the federal government's DES.

Private computer scientists and engineers developing their own encryption systems expressed doubts about the security of that algorithm and the process through which the IBM encryption method was chosen; they also expressed reservations about NSA's involvement, the summary said.

The intelligence committee investigated allegations that NSA exerted pressure on NSF officials to withhold grant funds for scholarly research in public cryptology and computer security, concluding that the security agency exercised no leverage over NSF.

"However, the very uncertainty and ambiguity surrounding cryptology has prompted some NSA officials to express concern to NSF about certain grants with cryptological ramifications and to suggest that NSA be involved in reviewing these proposals," the summary noted. NSF has agreed to permit NSA participation in the decision process leading to the award of these grants "since it views NSA as the only location of competent cryptological expertise in the government," the intelligence committee added.

The Senate committee also denied charges that the NSA directed an employee who was also an IEEE member to write to the institute warning its members that some of their correspondence was in violation of government regulations affecting the publication and export of cryptographic information.

"The committee has determined that Mr. [J.A.] Meyer's letter to Mr. [E.K.] Gannet of the IEEE was initiated solely by Mr. Meyer in his capacity as a member of the IEEE and was not prompted by any NSA official," the summary stated. The committee's report also pointed out that, as a matter of policy, the security agency never confirms the identity of its employees.

"There has been no direct or indirect government harassment of scientists working in the field of computer security," the Senate committee found. In addition, no university has withdrawn library material from its shelves as a result of NSA pressure, as had also been alleged.

No Tampering

Among the charges of NSA impropriety was that under the guise of testing the mathematical formulas IBM submitted to NBS, the security agency "tampered" with the final algorithm in order to weaken it and create a "trapdoor" which only NSA could open.

The intelligence committee determined that only IBM invented and designed the algorithm and that NSA did not tamper with that design. NSA did "convince" IBM, however, that a reduced key size — the string of binary numbers that directs the encryption process — would be sufficient.

The security agency also "indirectly assisted" in the develpment of S Box structures, that part of the algorithm which governs the iterative process. In addition, NSA certified that the final algorithm was, "to the best of [its] knowledge," free of any statistical or mathematical weaknesses.

Finally, the intelligence committee reported that "the overwhelming majority of scientists consulted" about the time necessary to break a message encrypted using the DES algorithm felt the security it afforded was more than adequate for at least five to 10 years for the unclassified data for which it will be used.

The intelligence committee plans no further work in this area, a spokesman said.

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Outlook for Jobs Bright

(Continued from Page 1)

analysts to design systems for the small computer and overcome its problems.

The handbook indicated that graduates of computer-related curriculums have excellent job opportunities, as do college graduates with computer-related courses. People without a college degree or those college graduates without a computer background can expect competition from the more qualified applicants.

High Pay for Analysts

Systems analysts historically enjoy high pay as well as good job opportunities, according to the handbook. In 1976, weekly earnings for beginning systems analysts averaged $250 in the private sector, according to data from the Bureau of Labor Statistics and several private firms.

Experienced workers earned $340 to $380 a week and lead systems analysts earned $385 to $400 weekly. Systems analysts earned well over twice as much as the average for all nonsupervisory workers in private industry.

The entry-level salary for college graduates working in federal government was about $180 a week in 1977 and all federal levels were generally comparable to those in the private sector, according to the handbook.

Systems analysts working in the North and West earned slightly more than in the South; they were generally employed in DP service firms and heavy manufacturing rather than in insurance companies or educational institutions.

Programming Jobs on Rise

Programmers can also expect an employment growth rate faster than the average for all occupations.

In addition to jobs that will result from industry growth, several thousand openings will come from the need to replace workers who leave the occupation.

Demand for applications programmers will increase as the rate of automation increases, but employment won't grow as rapidly as in the past because improved software that can be used by a nontechnical person will simplify or eliminate some programming tasks, the handbook said.

In addition, openings for programmers in DP service firms are also not expected to grow as fast because of the small business computer boom. As more firms install their own computers, the demand for DP service firms may slow somewhat, the handbook indicated.

Demand throughout the economy should remain strong through the next decade, however, Labor said.

In programming, too, job prospects will be best for college graduates with computer-related courses and graduates of two-year programs in DP technologies, the handbook noted.

In 1976, the statistics show, 230,000 people were employed as computer programmers working in industries similar to those where systems analysts were found.

The average weekly earnings of programmer trainees in the private sector ranged from $190 to $200 in 1976, according to Labor statistics. Systems programmers earned more than applications programmers, the former earning an average $360 weekly and the latter $310 weekly.

The average salary for lead systems programmers was $385 and for lead applications programmers, $355.

Again, as with systems analysts, programmers earned about twice the average of all nonsupervisory workers in private industry.

In the U.S. Civil Service, the entrance salary for programmers with college degrees was about $180 a week in 1977.

Users Advised to Take Broader View of Testing

(Continued from Page 1)

A far better definition of testing would be to call it the process of executing a program with the intent of finding errors or, more dramatically, a diabolical process of destroying a system before it can hurt anyone, Rose continued. With that emphasis, there will be fewer surprises for the user and fewer headaches for the technician, she said.

Testing has to be considered as a far more comprehensive set of activities, continuing in various ways throughout the life of a programming project and into the time when the resulting programs have been put into production, Rose said.

There is a difference between testing and debugging, she pointed out. Testing finds the errors, while debugging involves diagnosing the precise nature of the error and correcting it.

External Factors Neglected

Conventional testing tends to work against the internal logic of whatever software is being exercised, neglecting any serious consideration of the external behavior of the program. This means that such things as module logic, program structure and program control are evaluated, but module function and module interfaces, for example, are neglected, according to Rose.

With that focus, the tester may not realize that logic paths are missing, that the wrong function has been implemented, that specifications have been misinterpreted or that the code includes some unpredictable data sensitivities, she warned.

Since the cost of correcting errors — in both time and money — increases with the age of the project, it is important to "build out" the bugs as early as possible, principally by conducting testing throughout the project using a controlled methodology. Virtually any real methodology will help, she noted, although Yourdon "obviously" advocates a structured approach.

Structured analysis, for example, in effect tests the analyst and the user by eliminating the "mind reading" that typifies most current analyses and by providing a precise and concise means of specifying the system.

By using data flow diagrams and other visual aids instead of narrative English, the developers can test for completeness of their work, can maintain the specifications easily and can avoid any need to "freeze the specs" except at the moment of actual cutover to the new system, Rose claimed.

Comparable tools used during the design phase ensure that interfaces are defined precisely. They also protect the system against bug "ripples," enable the planning of testing and implementation in detail and lead to the construction of a void set of test cases, she continued.

Structured programming provides "highly readable" code that is more than traditional "bottom-up" logic. It concentrates on the user function and therefore is more reliable as well, according to Rose.

She noted that a walkthrough or code inspection session by the programmer's peers is one of the best forms of testing "if everyone recognizes the need to evaluate the work critically, without becoming critical of the programmer personally."

The test team, especially for the final acceptance test, may and probably should include people such as auditors, users, analysts and the data center staff, she said. "Assorted diabolical and inimitable" people from elsewhere in the enterprise might be useful but programmers must be excluded, she emphasized.

Texans Testing Fiber Optic Link

(Continued from Page 1)

Four CRTs at the fire alarm building and five at the library are used for remote data entry applications with the Univac 1900 CPU at the MIS center. At each end of the fiber optic link are special converters that translate the digital signals from electrical form to a light form for transmission.

Each end of the half-duplex optical link has a receiver/transmitter unit so data can be sent in either direction with light waves.

Although described by Albright as a test, the city has plans to install a second fiber optical cable under city streets to connect the airport to the MIS center. The link presently in operation does not use modems and the CRTs appear to the CPU to be operating in local mode, Albright said.

LEDs Make Conversion

Light-emitting diodes (LED) many orders of magnitude brighter than standard display LEDs are used to convert electrical pulses to light pulses, according to Univac. The LEDs use infrared light for greater efficiency; small injection lasers deliver the light waves in extremely high intensity in a straight line to the optical cable end.

At the receiving end, the light pulses are reconverted to electrical pulses by tiny photodetectors made of light-sensitive diodes or transistors. The end result is an optical transmission facility that has compatible electrical properties at each end, Univac said.

The technique is secure because coherent light cannot be tapped and detected by unauthorized persons. Any attempt to tap an optical signal would interrupt the light stream.

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International Dimensions Considered

Spain Working on Privacy Protection Measure

By G. Russell Pipe
CW Staff

MADRID, Spain — "DP power poses serious threats to the private lives of Spaniards," according to a recent headline in the Madrid newspaper *El Pais*. This message belied the long, conscientious work done by parliamentary writers of a new Spanish constitution and by an interministerial committee that has drafted a comprehensive data protection bill.

Spain is preparing to take its place among the other European countries in responding to the privacy issue and its international dimensions.

The draft of the Spanish constitution prepared by an all-party parliamentary group asserts, "Law will limit the use of DP in order to safeguard the personal honor, the integrity and the relationships of citizens." This provision requires legislation for its implementation. A project with this as its objective was initiated in 1974, long before the present government was installed.

An interministerial committee decided in 1974 privacy legislation should be adopted prior to the implementation of a proposed universal personal number. The task of preparing a draft text was given to the National School for Public Administration which together with several experienced members of the government, held seminars and collected documentation, then submitted a draft text to the Prime Minister in 1976.

Reportedly it includes three elements:

- The principles of data protection which include the right of access, limit on the use of personal data to the purpose for which It was collected and the erasure of obsolete data.
- A licensing system involving administrative permits for public and private data banks and the creation of a national register of data banks.
- A section on transborder data.

Transborder Transfers

The transborder provisions call for licensing both the import and export of personal data by any communications medium or vehicle so long as the data's subsequent use is in DP installations or systems.

Precise conditions for foreign data transfers are set out. Article 24, for example, states that prior authorization must be obtained for the transmission of data abroad and that application for the authorization may be made at, or subsequent to, the time a data bank is established.

Article 25 states that the authorization for the transborder transmission of data must specify the data to which it relates, the potential addresses and the means of transmission.

Article 26 states that authorization to transmit data abroad, regardless of when it is granted, must be entered in the national register of data banks.

Article 27 states that the administrator of the data bank must retain copies of all data transmitted abroad that bears a name and address so the relevant authority can carry out any necessary inspections. Article 28 states that data banks outside national territory may not transmit personal data to terminals in Spain without prior authorization from the Minister of the Presidency of the Council.

This authorization will also be necessary for the transmission into Spain of personal data that will be stored in data banks situated in national territory.

Furthermore, a security deposit is necessary before data transfers can be made. The amount of the deposit is to be "determined in each particular case as an indispensible condition for authorization," the draft stated.

Cabinet Approval Needed

The Council of Ministers, or cabinet, must approve the draft law before it can be submitted to the Cortes (parliament). Delays because of other national priorities have postponed introduction of the legislation.

It is understood, however, that these delays are unrelated to the measure.

During the law few months, the political parties have recognized the privacy issue, and public discussion has began which may result in parliamentary amendments, it has been reported.

One expression of concern was an essay printed in *El Pais* by Jose F. Beaumont. He cautioned that what has been called "data processing power" is nothing more than the possibility of centralization and control of information on individuals offered by these data storage techniques and devices.

Personal IDs Feared

In Spain, Beaumont explained, there are at least three large data bases operated by the government; they are used for car registration, taxpayers registration and social security information. Universal personal identifiers have been officially rejected, but they are emerging in the form of a national identity card that bears a personal number. Such cards are used for taxation purposes, automobile licenses and in police files, Beaumont noted.

The computerization of personal records is extensive, according to Beaumont, with more than 70% of the Spanish working people receiving paychecks processed by computers. "DP will have serious social consequences," Beaumont said, "if all the data relating to every Spaniard who is registered in at least 100 files, is interrelated."

But limitations designed to protect privacy have been established for the national census and for business information, he indicated.

Spain, through its own legislative action and as a new member of the Council of Europe, seems to be moving progressively in the privacy field.

Spain to Host Conference On World Informatics

Special to CW

ROME — The global future of information, computers and telecommunications will be the subject of a 10-day Intergovernmental Conference on Strategy and Policies for Informatics, set for Aug. 28-Sept. 6. Jointly organized by the Intergovernmental Bureau for Informatics (IBI) based here, the United Nations Educational, Scientific and Cultural Organization (Unesco) and the Spanish Government, the conference will be held this year in Malaga-Torremolinos, Spain.

More than 100 national delegations will debate "policy rather than technical issues," according to IBI Director-General F.A. Bernasconi.

Informatics, sometimes called information policy, is a technique for the more effective use of information for planning and decision making, with the support of computer/communications systems.

Laws in 60 Nations

More than 60 third world countries have adopted specific laws and created authorities over planning, procurement, development of indigenous industries, an interface with telecommunications and sociocultural implications of informatics applications.

At a recent symposium in Washington, D.C., Bernasconi said informatics is important to the U.S. because the equipment and services are a major source of U.S. exports and developing countries are the growing market for American sales.

According to U.S. state department officials, the U.S. will send a delegation to the conference. Whether the conference will strengthen national commitments to informatics and drafts a program of international cooperation, remains to be seen.

Conference Agenda

The IBI General Assembly has called on the conference to consider:

- Accelerating the transfer and application of computer/communications technology to developing countries with special regard to their adaptation to local conditions.
- Initiating programs in all countries for indigenous capabilities in information resources.
- Encouraging developing countries to take a more active substantial role in formulating international data transmission policies.
- Integrating informatics with major national educational, industrial, communications and social policies.
- Recognizing the power of informatics in affecting national sovereignty and democratic control over the destinies of nations.

The conference will explore the relation of informatics to the new international economic order and may call for a new world information order. "If there is an information war coming," one U.S. DP executive said, some of the first volleys may be fired there." Accordingly, several American multinational corporations are anxious to have observers at the conference.

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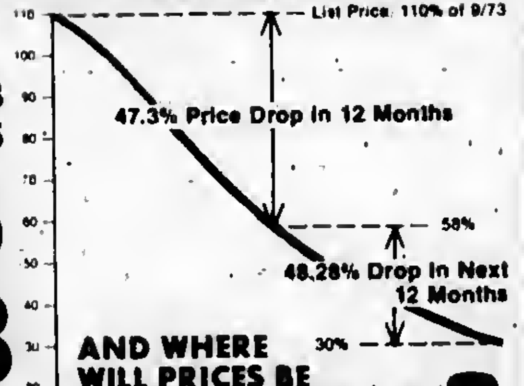

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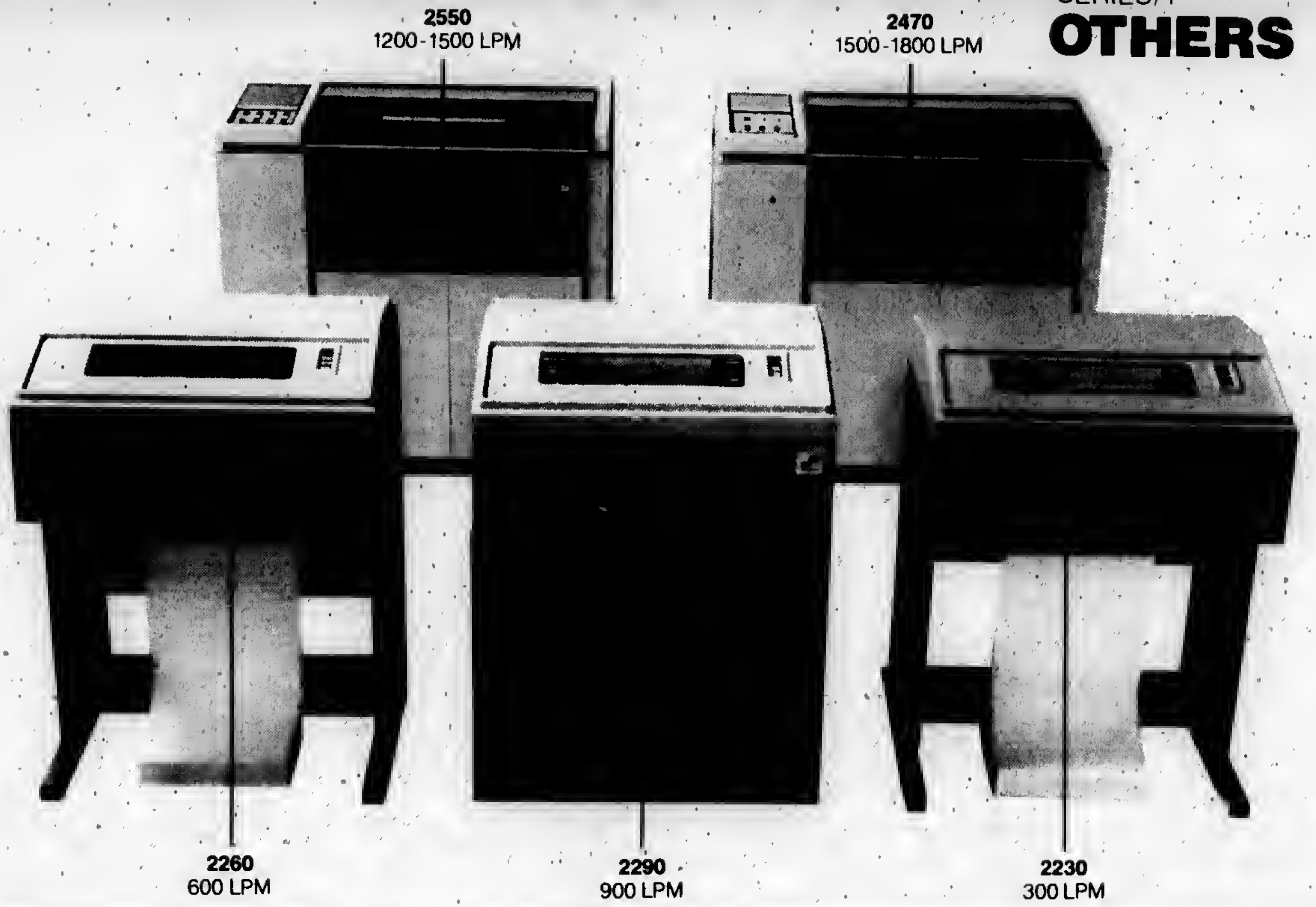

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View on DDP: Users Like It Even If It Can't Be Defined

By Ann Dooley
CW Staff

ANAHEIM, Calif. — Many DPers see distributed data processing (DDP) as the wave of the future and the best thing that could happen to a user, but at the same time they cannot agree on what DDP is, Thore Thorensen, a consultant for Advanced Computer Techniques, Inc. told a recent Computer Expo '78 audience here.

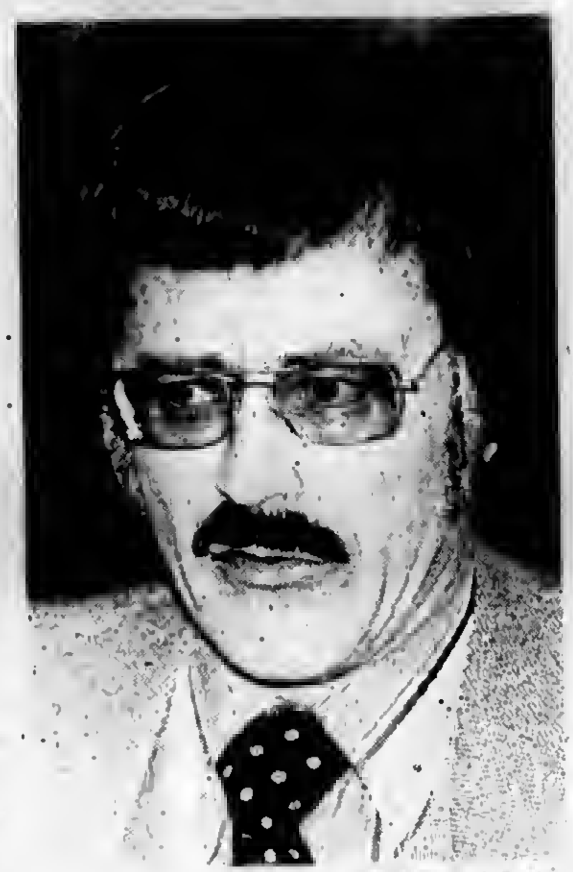
The state of the art in the computer industry has changed significantly since the early '60s, when data processing was concentrated in one large-scale general-purpose computer, Thorensen noted. This approach maximized the cost-effectiveness of computing hardware.

Eventually terminals appeared enabling a remote user to be connected to the central data base. But this approach was still fully centralized since the terminal's only function was transmitting data and not processing, Thorensen said.

In the early '70s, a revolution occurred and it became a sin to use a large computer when a smaller machine could do the work, Thorensen recalled. In this decentralized environment, two or more machines would replace one large one.

These physically dispersed and stand-alone computers were advantageous when a business was spread over a large geographic area. The computers could be identical machines spreading the load, doing identical or dispersed duties, Thorensen said. It was even possible to put the small computers in the same place and still be decentralized, he pointed out.

The decentralized method was not introduced by the large manufacturers but by the independents, and it was based on the fact that several small machines cost less than one large one, he explained.



CW Photo by A. Dooley

Thore Thorensen

The present distributed environment is midway between the centralized and decentralized approaches; there are still several small machines, but they are now connected, he said.

Elements of a System

Outlining the elements of a DDP system, Thorensen said they include at least one CPU — the processor and primary storage; peripherals, communications equipment and data entry equipment.

The software usually includes standard control functions, support functions and applications customized to the user's specifications and data. The DP staff includes operators, programmers, support staff and management, Thorensen said.

Two DPers might look at the same distributed system and disagree about whether it was distributed, Thorensen said. A usual definition of DDP includes more than one processor with some or all of them handling different functions at one or more locations. The processors would be physically interconnected and would adhere to some common standard of communication, according to Thorensen.

What occurs is a "cooperative autonomy"; the machines are as independent as in a decentralized environment, but also work together, he noted.

Hazy Future

Although a data base is often thought of as a centralized, unified concept, a distributed system can disperse the data base locally near each user, according to Thorensen. However, this dispersal can cause control problems, he noted.

It doesn't really matter whether a system qualifies as "distributed" not as long as it works, Thorensen told the audience. However, if DDP is the wave of the future, it is a very hazy one, Thorensen cautioend.

The important question is what DDP provides for the user, he pointed out. DDP system performance can provide throughput in batch or response in on-line environment, he said. A facility situated closer to the user cuts communication problems and costs and can permit multiple users to multiple functions on one system, he added.

Students Named Award Winners

NEW YORK — Four students have been awarded scholarships sponsored by the National Science Foundation that will enable them to attend the Association for Computing Machinery's History of Programming Languages Conference in Los Angeles June 1-3.

The four, selected by the conference's organizing committee, are John M. Favaro of the University of California at Berkeley, Bruce I. Galler of the University of Michigan, Helen M. Gigley of the University of Massachusetts and Richard J. Miller of the University of Illinois.

The students were chosen on the basis of their knowledge of programming languages, their interest in history research and their commitment to participation in selected conference sessions.

Sponsored by the ACM's Special Interest Group on Programming Languages (SigPlan), the conference is intended to provide information on the early development of programming languages, to preserve the history of the languages.

Vendor Guilty of Breach

Store-to-Door, Univac Both Losers in Legal Suit

By Howard Karten
CW Staff

SACRAMENTO, Calif. — Store-to-Door Supermarkets, Inc. (STD) and Univac were both winners — and losers — in a suit and countersuit decided recently in the U.S. District Court for Eastern California here.

STD, the plaintiff, was awarded $102,000 from Univac for breach of contract while Univac won $245,000 in a countersuit for monies due from the lease and servicing of a Univac 9400 system [CW, Dec. 5].

However, it is not clear who the net financial winner of the case is, since STD is now defunct and has no assets. Further, Univac is estimated to have spent close to $1 million — and possibly more — in pressing the suit.

Novel Concept

STD was designed as a novel concept in grocery retailing. The original plan called for customers to phone their orders to clerks in a warehouse, who would then enter the orders into a Univac 9400. A printed list generated by the system would then have been used by other clerks to assemble the order for delivery the same day.

In its suit, STD contended that it experienced problems arising from computer failures from its first day in operation and that within three days it was forced to go to next-day delivery. STD went out of business two months after that, claiming computer difficulties as the reason.

Among the allegations made by STD in its suit against Univac was that Univac personnel had insufficient experience and capability to do the project and that they were, in fact, Cobol trainees inexperienced in on-line applications.

In its countersuit, Univac sought to recover approximately $1.3 million which it claimed STD owed for contracted software, a one-year management contract and a five-year lease on the hardware.

Charles D. Chalmers, the attorney representing STD, said the jury's award to Univac was inconsistent with its finding that Univac was guilty of breach of contract. Although he did not know if STD plans to appeal the verdict, he said he will move for a new trial since he believes Judge William H. Orrick Jr. made some judicial errors in the case.

The errors alleged by Chalmers include Orrick's rulings on admissability of evidence and errors in his instructions to the jury.

Bay State Board Gives Burroughs Promis Contract

By Brad Schultz
CW Staff

BOSTON — The Proposal Review Board of the Massachusetts Committee on Criminal Justice (CCJ) has voted unanimously to allow implementation of the first statewide Prosecutor's Management Information System (Promis) by Burroughs Corp.

The vote agreed with the earlier recommendation of a CCJ bid protest hearing officer [CW, April 3].

Burroughs can now go ahead with the $815,000 deal it won from the Massachusetts Supreme Judicial Court (SJC) last November to support the software package with its B1800 series hardware.

Refutes HIS Objections

Responding to a protest by Honeywell Information Systems, Inc., the CCJ held a hearing to consider the arguments of HIS and CCJ General Counsel John L. Tobin against the SJC and Burroughs. HIS and Tobin claimed that the SJC DP center evaluation team improperly evaluated responses to its August request for proposal (RFP) and that the Burroughs response failed to meet the RFP requirements [CW, March 6].

The hearing officer refuted these contentions in her ruling on the matter, however, recommending the Review Board allow the Burroughs proposal.

The runner-up $1.2 million HIS bid, along with those of eight other vendors, was rejected by the evaluation team. HIS was the only contender for the award to mount a sustained protest.

Call for Papers

FOURTEENTH MEETING OF THE COMPUTER PERFORMANCE EVALUATION USERS GROUP (CPEUG), Boston, Oct. 24-27, 1978.

The theme of the conference will be the role of measurement, evaluation and prediction technology in the major areas of the DP life cycle: planning, acquisition/development and control. Topics include workload modeling, benchmarking terminal systems, installation auditing and performance metrics, standards, prediction and management.

Send two copies of abstracts, summaries of tutorials or summaries of workshops by May 15 to Terry Potter, Program Chairman, Digital Equipment Corp., ML 3-3/E87, 146 Main St., Maynard, Mass. 01754.

COMPCON FALL '78, Washington, D.C., Sept. 6-8, 1978.

The program will focus on communications networks. The Short Notes session will provide an opportunity to present new work or applications; the presentations are restricted to five minutes.

To participate in the Short Notes session, submit a 250-word summary by Aug. 1 to Shirley Ward Watkins, National Bureau of Standards, Technology B212, Washington, D.C. 20234.

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Takes Electronic Measurements

Detector 'Calms' Mailed Bombs

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — The increase in terrorist activities over the last few years has prompted development of a computer-based letter-bomb detector.

The device was designed by Dr. William Gregory, a physics professor at Georgetown University and director of the school's Technology Transfer Program, and two colleagues who do not wish their names disclosed for security reasons.

It was given the acronym Calm — Capacity, Altitude, Lbs., Metal — to denote some of the particulars it measures to detect bombs.

System Description

Calm consists of a box attached by cable to a cabinet containing a CPU. Currently a Digital Equipment Corp. PDP-11 or a Computer Automation, Inc. Alpha LSI-2 is used. The box is fronted with a two-foot slot into which the mail is fed. Inside, various electronic measuring devices, which Gregory would not describe to avoid giving away the system's mechanism, measure such properties as weight, size and amount of metallic content.

The data from each measuring device is transmitted to the CPU, which is programmed to compare the characteristics of the piece of mail with those of harmless mail.

If the probability of the letter being dangerous is high, a warning signal is sounded. The danger level signal can be adjusted by the user, but at the recommended level the system sounds a false alarm only one or two times for every 10,000 pieces of normal mail examined, Gregory said.

Although the program is written in Assembler, a user can interrogate the CPU in Basic to learn the specific properties of a piece of mail. The entire process takes from 5 msec to 10 msec to complete and is designed for use by nontechnical personnel.

There are no similar devices in existence, he stated. Those devices that do exist, but are not accurate, include a very expensive nuclear-based machine, X-ray machines and metal detectors, he said.

Calm took approximately two years and $150,000 to develop. The price is currently $45,000 to $50,000, although that should go down as the number manufactured goes up.

Three systems are currently being used. One has been installed in a government agency for the past 14 months without any problems, he said.

The entire market for such a machine, which would consist mainly of multinational corporations, would be about $25 million domestically, he estimated.

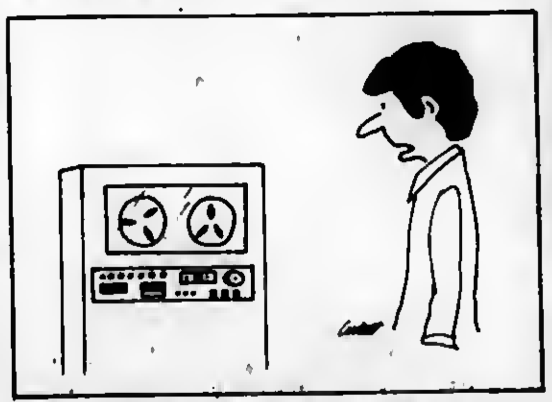
Book Discusses Government DP On Local Level

NEW YORK — *Computers and Local Government: A Manager's Guide* is being offered by Praeger Special Studies here.

The book is described as a practical guide to developing and operating an urban information system.

According to the publisher, the book is based on a survey and analysis of literature in the field.

In hard cover only, the book costs $12.50 from Praeger Special Studies, 200 Park Ave., New York, N.Y. 10003.



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Focus on Processing Not Enough

Managing Data Seen Sign of User Maturity

By Don Leavitt
CW Staff

SAN FRANCISCO — As an organization matures in its experience with DP, it will tend to shift its concern from managing processing to managing data, according to consultant Richard L. Nolan.

The changeover begins as the organization's application library and the cost of processing the programs has gone out of control, the former Harvard Business School professor told attendees here at the recent Conference on the New EDP Economics, sponsored by International Data Corp.

To bring those costs back under control, management typically begins charging users for services. But, Nolan noted, the uses don't understand "and certainly can't do anything to limit their use of" EXCPs, disk access and other such "very arbitrary" billing units.

Once billed, the users begin to get seriously concerned about what's going on in the DP department. At the same time, perhaps because of user pressure, the DP staff has acquired a data base management system and has begun to move applications over to it, the consultant continued.

All of this activity does not in fact break the upward climb of DP costs, Nolan acknowledged, but it does finally bring the DP operations to the point that they reflect quite accurately the operations of the organization as a whole.

The accounting for services provided in an enlightened environment is expressed in terms meaningful to the user. DP management feels competent to set up standards and controls to limit excesses: the DP organization focuses primarily on data administration, he said.

In this mature setting, the application "portfolio" is essentially stagnant, Nolan said, but that is not a real problem since the systems in place are workable ones that suit the organization. Growth is well planned and all concerned are working smoothly together.

Identifiable Stages

Many organizations may be in that happy state by the late 1980s, he said, but there are identifiable stages of growth through which each must pass to reach maturity. Costs trace an S-shaped curve if the stages are plotted across a sheet of paper.

Costs are low during the initiation stage and there is good front-end planning for the first functional cost reduction applications. Whatever department utilizes those applications usually houses the DP organization, Nolan noted.

DP management control is lax or nonexistent at that time and most users have a "hands-off" attitude toward the whole idea of DP, he said.

"Contagion" was the word Nolan used to describe the second stage which he said is driven by a desire to get as much on the computer as possible. The application portfolio proliferates but the programs are poorly done. Programmers become identifiable. DP management is more lax and users are superficially enthusiastic, Nolan recounted.

Costs skyrocket until the third phase, which sees the onset of consolidation and control — or attempted control — of the chaos created earlier. Middle management takes shape in the DP organization and formalized project plans become the management style.

This is the time end users begin to see the strange billing units over which they have no possible control and which lead to the shift from management of processing to management of data. Data is something users feel they can understand; processing is outside their scope of interest, Nolan said.

NFPA Enhances Fire Reporting

BOSTON — The National Fire Protection Association (NFPA) has revised its planning and reporting system for fires and similar incidents by incorporating recommendations from 31 communities now using the system.

A computerized data management tool, the Uniform Fire Incident Reporting System (Ufirs) is geared to any municipality or country in which the fire department responded to at least 250 calls per month, an NFPA spokesman said.

Community Data Base

Ufirs builds a community data base from which information can be analyzed to measure the extent of any local fire problem; support budget requests and code changes; evaluate code enforcement programs; guide fire prevention programs; plan for future fire protection needs; improve allocation of resources; and study fire control activities, according to the spokesman.

Ufirs can also be applied to management of community police, water, planning, building, health and sanitation, electricity and gas and tax assessment, he noted.

Ufirs costs $3,250 from NFPA at 470 Atlantic Ave., Boston, Mass. 02210.

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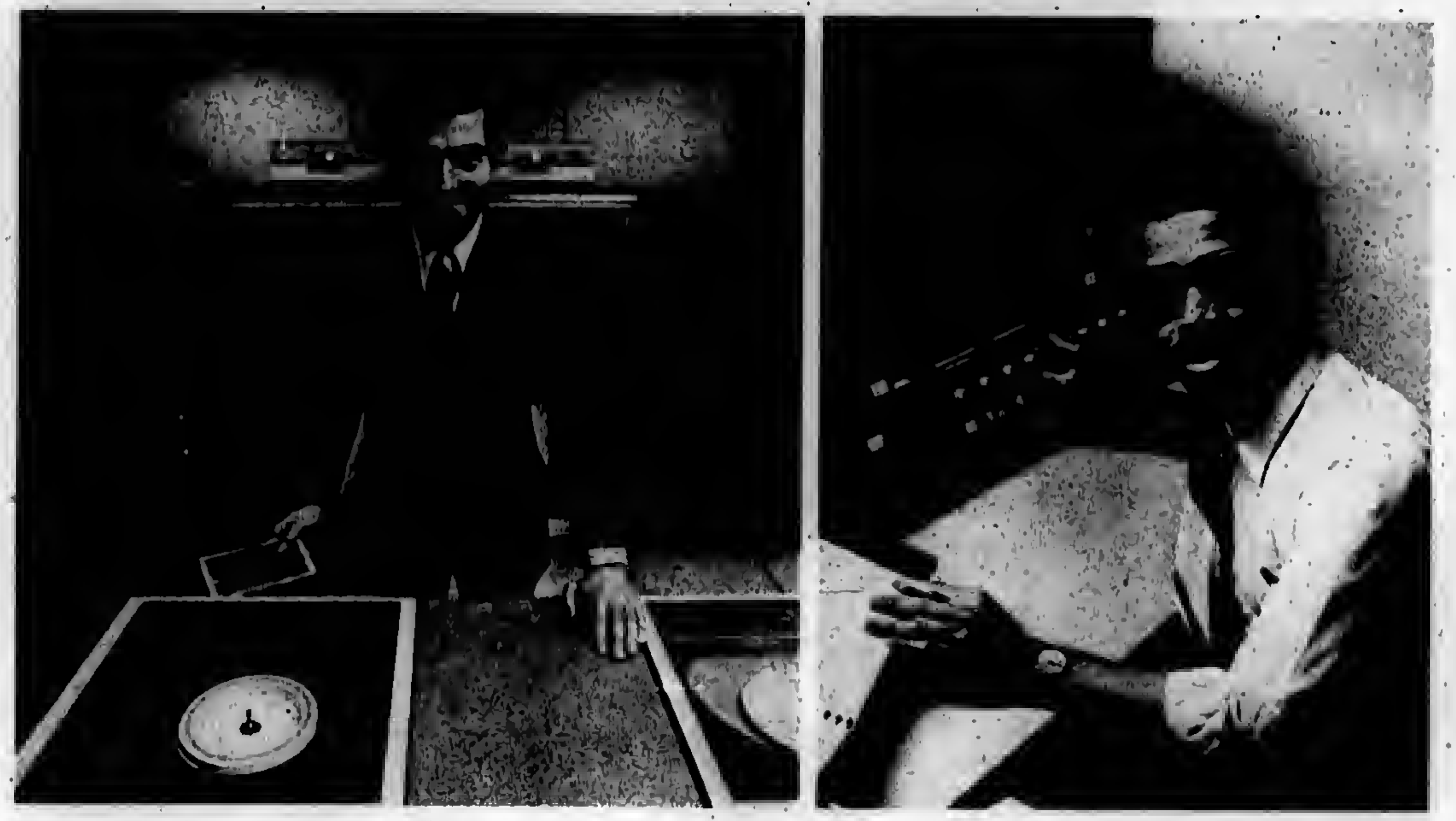

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Untraceable Data Flaws Seen Major Problem

By Marguerite Zientara
CW Staff

TORONTO — The major problem surrounding computers in industry is that inaccurate or invalid information may be put into a data bank, and there is no way of knowing or ascertaining who input the information, according to John A. Morand, a lawyer and director of Comtech Group International Ltd. here.

Morand spoke at the recent Data 78 telecommunications conference here in a session that also included a presentation by Inger Hansen, a lawyer and Canada's recently appointed human rights commissioner.

Morand said that despite passwords and access codes, a "brilliant individual" can crack any data file. If someone were very determined and had the time, he could go so far as to apply for a job, take it and learn the security methods, then leave the firm and access its files, he said.

Privacy should be protected in six major areas, he said. First, citizens must be protected from each other, from corporations and from government. Further, corporations must be protected from corporations and from government and governments must be protected from other governments.

Morand then introduced Hansen who discussed Part IV of the Canadian Human Rights Act, which she described as a total reversal in government policy regarding personal information.

The act, which was passed by Parliament in July and became effective March 1, gives the individual citizen the basic right to find out "what the government has on you," Hansen said. The act allows a citizen to apply for the correction of any information with which he does not agree. If that request for correction is denied, there is at least a notation that the request was made.

If the request notation is not acceptable to the citizen, he can apply to Commissioner Hansen, who in turn can report to Parliament, urging the appropriate minister to accept her recommendation and make the change in the record, she said.

A citizen also has the right to know to what administrative use the information has been put, Hansen said.

Prohibits Nonderivative Uses

The Human Rights Act also prohibits nonderivative use of personal information except when otherwise provided by law or when the individual doesn't object. For example, the government is not required to consult a citizen if the information about him will be used for statistical purposes; however, if the information on a citizen will be passed from one governmental agency to another, a citizen has a right to complain, she explained.

Under the act, the government is required to publish a yearly phonebook-sized index to be placed in every major post office in the country. The index will be organized by governmental departments and will indicate any data banks containing personal information maintained by those departments, Hansen explained.

If a person wants to see that portion of a data base pertaining to him, he must fill out an application indicating the identifying number of the data bank and send it to the government department. The department then has 30 days in which to either respond with the information or simply acknowledge the request, in which case it has 30 more days to respond with information, Hansen said.

The department may send copies of the information or arrangements may be made, in the case of a large file, for the individual to appear to examine the file and select sections he may want copied. The service is now free, but a charge may be incurred if an individual asks twice for the same information, Hansen said.

Of the 1,500 data banks maintained by governmental agencies in Canada, Hansen said, 22 are exempt from disclosure and those are concerned with either the country's security or with criminal investigation. In the case of the exempted files, a citizen is not allowed to even know if information about him is included in it.

Since being appointed human rights commissioner on Oct. 1, Hansen has had wide powers of investigation, but no real power to act, she said. She acts as a mediator, examining fairly and advising forcefully and consistently if an individual is not receiving information to which he is entitled.

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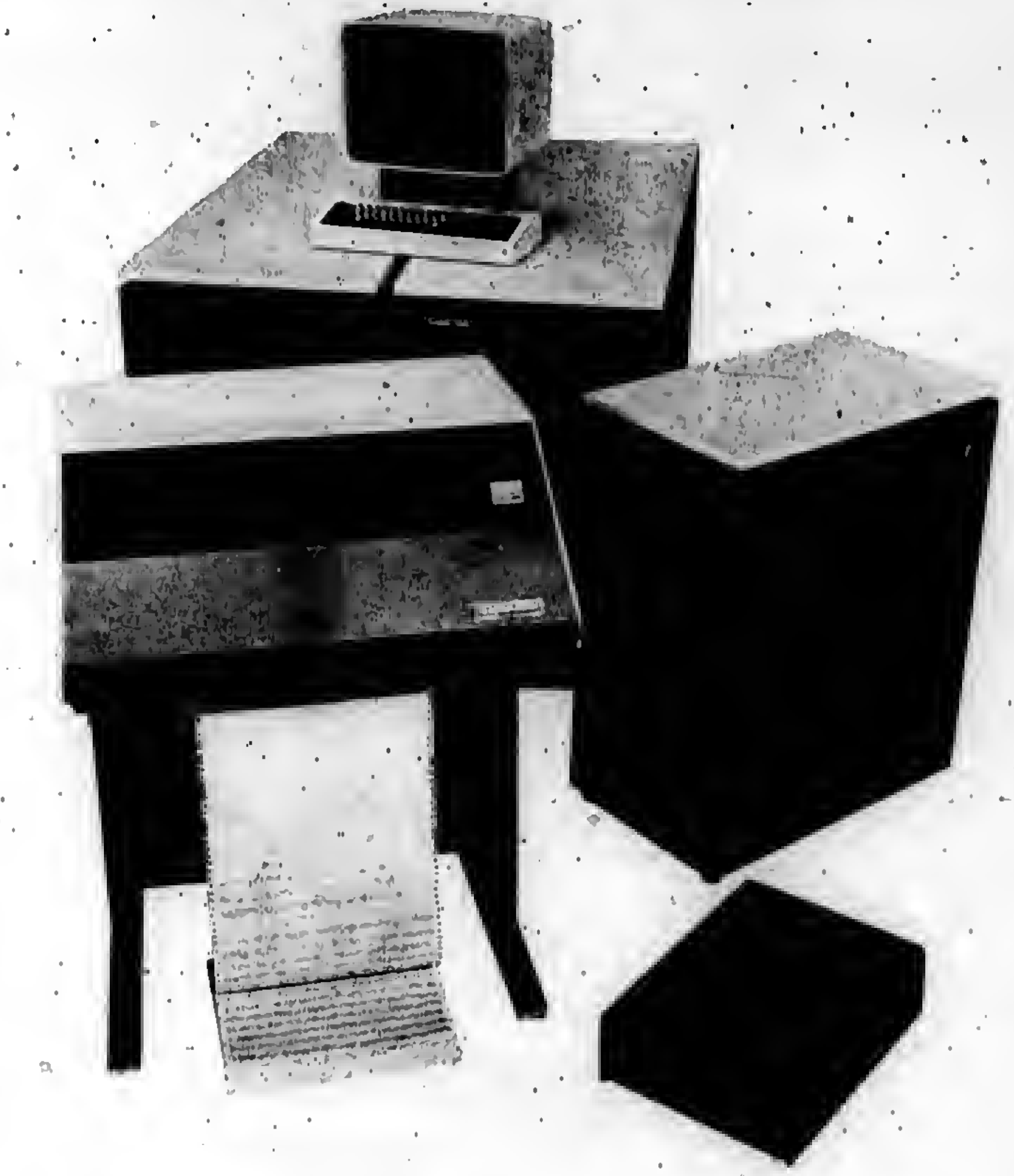

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NTIA Filling Top Jobs

WASHINGTON, D.C. — High-level jobs in the Commerce Department's National Telecommunications and Information Administration (NTIA) are now being filled, according to Administrator Henry Geller.

Leland Johnson will come from the Rand Corp. to be deputy associate administrator for policy analysis; the current assistant director of the Office of Telecommunications Policy's International Communications Office, William L. Fishman, will be Johnson's deputy.

William Lucas will also leave Rand and will become associate NTIA administrator for telecommunications applications. The OTP assistant director for government communications, Donald M. Jansky, will be associate administrator for federal resources under the new agency. OTPer Stanley Cohen will be Jansky's deputy, Geller said.

A 'Centsless' Situation

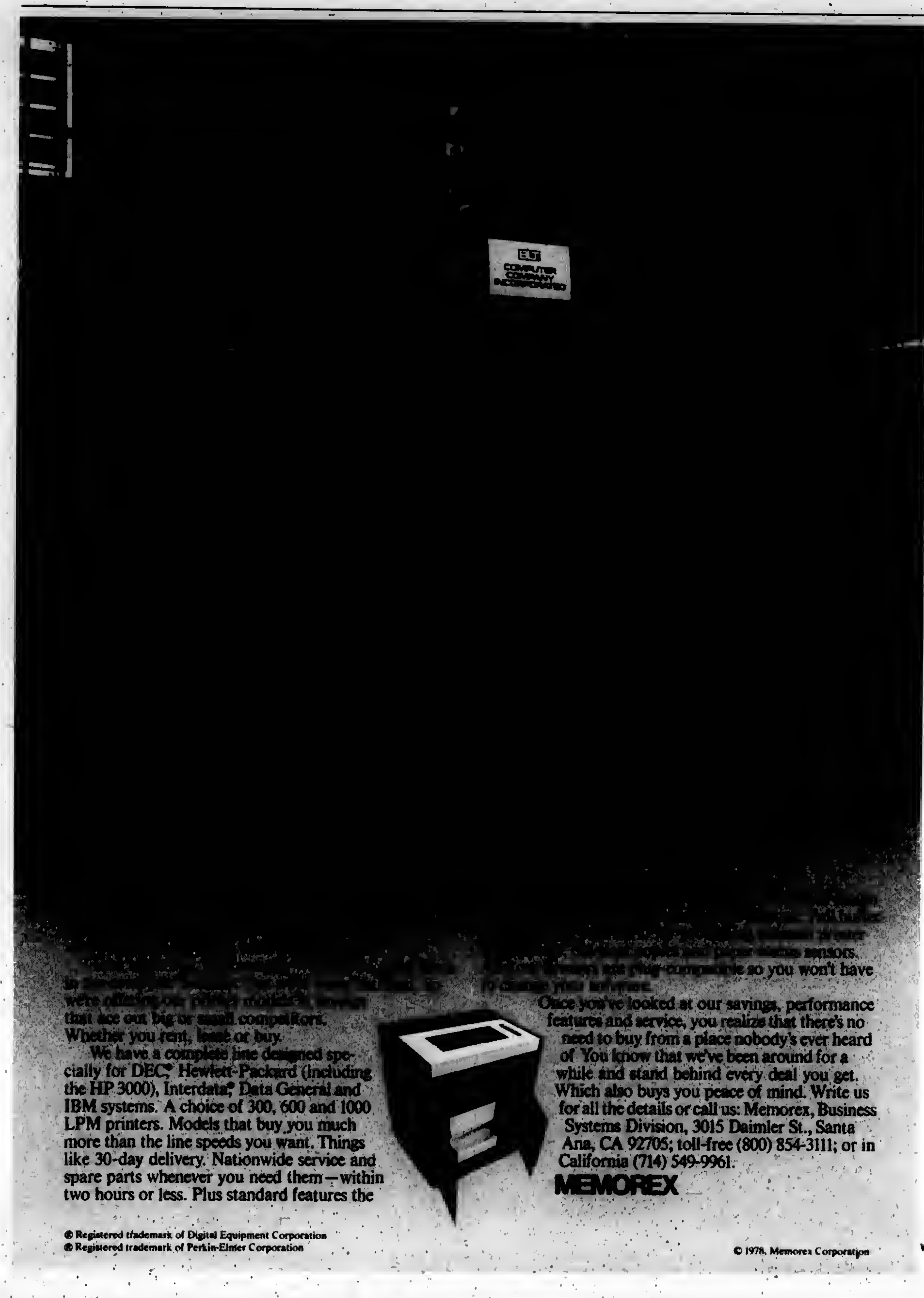
By Tim Scannell
CW Staff

PROVIDENCE, R.I. — Anthony DiCostanzo was given a firsthand lesson on impartiality and common "cents" when he was notified here by the city's computer to pay off his automobile taxes or face penalties of 8% a year beginning April 25.

The problem surfaced when DiCostanzo received a bill stating that he had underpaid the city tax on his car by one penny. "I was amazed," DiConstanzo said. "It cost them 13 cents to mail it, plus the [work of many] people."

Acting City Solicitor Ronald Glantz, considering the economics of the situtation, decided to pay the penny himself and appease the penurious computer. "We send out approximately 40,000 bills and this happens maybe 100 times," Glantz stated. The computer will bill anyone, no matter how little he owes, and "the clerk of the county usually pays it rather than send out a statement," he said.

Glantz noted, however, that even though DiCostanzo's bill is paid, he shouldn't expect a receipt. "That costs 13 cents," he pointed out.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Budget Benefits Seen in Career Training Plan

By Don Leavitt
CW Staff

SAN FRANCISCO — "Career planning" in too many installations consists of assigning people to training courses to solve immediate needs. With such an approach, it's not surprising that training budgets are typically the first to go in a crunch; consultant Norman Carter said at a recent Computer Expo 78 workshop here.

The president of Development Systems International advocated a more comprehensive planning program. It might cost more to implement, but it will have a number of benefits, Carter said.

Giving people a clear picture of how they can advance within an organization, what skills are needed at each position and how those skills can be acquired does not amount to "a plea to double the training budget," but one to use it more efficiently, he said.

Intelligent planning might even lead to a budget cut, he noted, adding that in his view on-the-job coaching may be more effective and certainly cheaper than classroom courses. In any case, a serious approach will lead to better measurement of how well training expenditures are being used, Carter continued.

In answer to a question from the audience, he said development of a substantial career pathing plan generally takes nine months to a year "almost regardless of how big or small the organization." Typically the effort requires one full-time person and one part-timer with additional help "up front" if the project is for a big staff.

With a real plan, training would be beneficial to both the individual and the organization as a whole. It might make an employee better able to cope with a current assignment or better equipped to move to a new one, he said.

Fringe Benefit

Yes, some training can be used as a fringe benefit without any direct applicability if it is the type of training the employee feels he wants, Carter told another questioner. But he warned the skills learned in such training should be put to use within six months or the training would be a waste of time.

That warning applies to any training, "fringe benefit" or not, he said, urging the use of small classes of people who have an immediate need for whatever is being taught. There is no purpose, he contended, in trying to teach "everyone in the whole department" something as detailed as JCL coding.

Unlike training, promotions should never be used as fringe benefits. Promotions should entail real changes in work to be done and, whenever possible, changes in work location, Carter responded to still another query.

Some organizations "promote" people from Programmer Level 1 to Level 2 just to give them more money, but that's a bad practice, he said. "Let's separate money and promotions. Someone who deserves a raise for what he is doing should be able to get the additional money without being forced out of a work slot he likes."

In the same vein, he noted later, programming is not necessarily the most sensible path out of operations work. There is a feeling nowadays that a move into direct user support areas might be more appropriate.

In any case, it's probably best to encourage all employees to develop within their own jobs — if that's what they want to do — and to talk about their interests and potentials on a one-to-one basis with their respective managers.

Summer Day Camp to Emphasize Hands-On Computer Instruction

By Brad Schultz
CW Staff

ORANGE, Conn. — A summer day camp billed as a new concept in computer education and recreation for junior and senior high school students will convene here in July with donated hardware from Wang Laboratories; Inc.

Campers will learn to program in Basic and emphasis will be placed on a "hands-on" approach, according to Dr. Michael Zabinski, a Fairfield University professor of physics and engineering who will direct the camp's two half-month sessions.

"Our philosophy is to motivate students by presenting material in exciting, meaningful ways with examples they can relate to and identify with," Zabinski said, noting the campers will be able to play various games routines and will probably visit the computer facilities of nearby Yale University.

Zabinski was inspired to develop the "Computer Day Camp" because "computers are fast becoming an important educational consideration as students need to be prepared to live in a computerized society.

Zabinski, shown introducing students to interactive programming, has planned a summer day camp to provide computer instruction to junior and senior high school students.

"Both parents and students are aware of the computer revolution and are certainly interested in computer literacy," Zabinski said. "The purpose of the camp is to provide students with ample opportunity to use the computer for simulations, modeling and other instructional applications.

"In the process they come to understand the potential as well as the pitfalls involved in using computers. [Camp] units in social studies can concentrate on the uses and abuses of the computer and the resulting impact on society.

"The notion that students tend to learn from the sum total of their experiences can be realistically and effectively applied to the teaching of computer literacy," he said.

Franchising In Mind

The upcoming summer sessions are seen by Zabinski as a pilot for franchising the camp in the future. Zabinski and Wang may decide to market the associated documentation and instruction with Wang's hardware and software, he said, noting this prospect is contingent on the success of this summer's pilot.

Wang donated its products to the camp "because we are very interested in the educational marketplace . . . and we'll get exposure among the young students," Wang sales manager Robert Carr said.

The vendor is donating five PCS-2 CPUs, each with 8K bytes of memory, and one 16K-byte WCS-20 CPU. All units will have dual diskette drives and CRT terminals. Wang will also provide one card reader and one line printer, Carr said. Basic is hard-wired into each unit.

The camp will cost $190 per camper per two-week session, including books and supplies but not including lunch. Enrollment will be limited to 20 campers per session, with Zabinski and two local high school teachers serving as instructors.

The camp will be held daily from 9 a.m. to 4:30 p.m. at Amity Junior High School here in Orange. The first session will run July 5-18, the second July 19-Aug. 1.

Additional information on the camp is available from Zabinski at 382 Hitching Post Drive, Orange, Conn. 06477.

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Automating to Manage Growth

Emerging Nations Must Stretch DP Dollars

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The computer and communications concerns of the U.S. are very remote from those of the developing countries, S. Karoui, president directeur general of the Centre National de L'Informatique in Tunisia, told a symposium of representatives from the U.S. and developing nations here recently.

Caught up in the effort to acquire computer and communications systems without squandering scarce capital resources and in the attempt to use and maintain these systems efficiently, developing nations like Tunisia are a long way from encountering the "information age" the U.S. has entered, Karoui said.

Sponsored by the American Association for the Advancement of Science (AAAS) and the Intergovernmental Bureau for Informatics (IBI), the symposium dealt with "informatics," or computer and communications technologies, for national development.

Mexico and Zaire also sent representatives to the conference to hear what the Americans had to say and to voice their frustrations with and hopes for the further development of these technologies in their nations.

Representatives from the embassies of Brazil, the Gabonese Republic, Italy, Chile, Iran, France, Morocco and Argentina attended the symposium as observers along with U.S. government and industry members.

"Developing countries have many urgent and acute problems. In most cases their independence is recent. Everything is a priority," Karoui said.

"Informatics is a must to properly manage all the functions necessary to ensure the growth of developing countries," he added.

Started on Wrong Foot

Karoui contended that most developing nations started off on the wrong foot with computer and communications technologies. "We started too late. The first computer was introduced in Tunisia in 1968," he said.

Available applications were limited to such tasks as billing and payroll. "We were told to buy an IBM 370/135 or a 370/145 to handle payroll for 2,000 people. Informatics was initially very wasteful for our countries," Karoui stated. "And the developed countries did not help us at all," he added.

Dondi-Bungu, a member of Copiz, Zaire's Permanent Council of Informatics, reiterated Karoui's concern over the exploitation of developing nations by major computer manufacturers. He likened the outflow of his country's capital to pay for these machines to "hemorrhaging" and said Zaire has centralized computer acquisition in order to stop the waste of scarce resources.

The developing countries are not interested in manufacturing their own systems. "The manufacturers are too strong. We don't intend to waste our time, energy and money on building computers. Our concern is to use computers as management tools," Karoui said.

Both Dondi and Dr. E. Melrose, Director d Ciencia e Investigacion Coordinacion General Educacion Superior, Ciencia y Technologia in Mexico, expressed the need to train more of their own countrymen to be systems analysts, programmers and systems engineers.

High National Priority

Transfer of technology must go hand in hand with transfer of knowledge, Dondi said. "Education and training in informatics is a high national priority," he added.

With the help of the IBI, which considers itself the only intergovernmental organization that promotes the introduction and use of information technology in developing and developed nations, Zaire is establishing a national institute for informatics, Dondi stated. He said his country will soon ask for the cooperation of the developed nations.

Dondi also suggested that many of the developed nations are overcomputerized and may find our central acquisition policies helpful," he said.

Karoui indicated he expects Tunisia to have a policy on training for computer specialists by October. Education for those who will maintain Tunisia's computer systems is a must, he said. "We want less dependence on the builders and suppliers of computers."

Sharing Problems

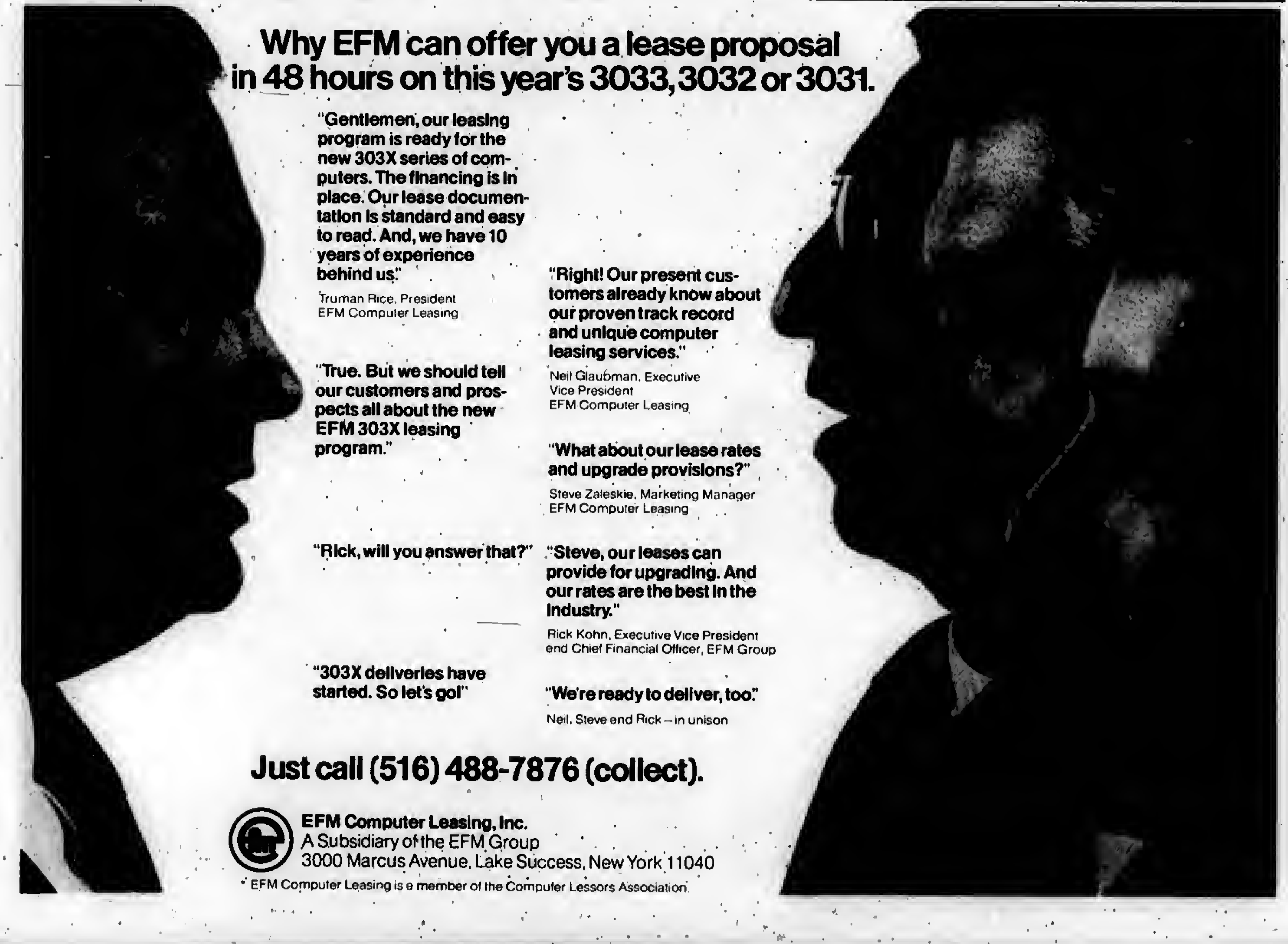
In addition to centralizing their internal computing functions, the developing nations will be talking to each other, sharing common problems and solutions, Karoui told the symposium attendees. They will exchange applications and techniques for dealing with the computer suppliers.

Both the U.S. and the United Nations can contribute substantially to the development of computing and communications in developing nations by providing money and expertise, Karoui stated.

The UN's 1979 conference on science and technology may well be a forum for the developing nations on their computer and communications needs, a U.S. observer suggested.

Dr. H.R.J. Grosch, president of the Association for Computing Machinery (ACM), was moved by Karoui's remarks, in particular, to tell the developing nations that the exploitation they are facing now from the manufacturers occurred in the U.S. in the 1950s and early 1960s. "Believe me, we have suffered in the same way ourselves," Grosch said. "We were at the mercy of the manufacturers — IBM

(Continued on Page 18)



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Calendar

May 15-17, Chicago — **Computer-Communication Network Design and Analysis,** sponsored by Columbia University School of Engineering and Applied Science. Contact: Columbia University, Conference Center, 360 Lexington Ave., New York, N.Y. 10017.

May 15-17, Atlanta — **Commercial Applications of Minicomputers,** sponsored by American Management Associations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

May 15-19, Atlanta — **16th Annual Association for Educational Data Systems (Aeds) Convention.** Contact: Convention Registrar, Aeds Headquarters, 1201 16th St., N.W., Washington, D.C. 20036.

May 15-19, Atlanta — **Computer Technology: The Educational Catalyst,** sponsored by the Association for Educational Data Systems (Aeds). Contact: Dr. James E. Eisele, Program Chairman, Aeds Presessions, Office of Computing Activities, University of Georgia, Athens, Ga. 30602.

May 16-19, Los Angeles — **Fiber Optic Communications Systems,** sponsored by Integrated Computer Systems, Inc. (ICS). Contact: ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405. Also being held May 30-June 2 in Toronto.

May 17, Hartford, Conn. — **Greater Hartford Chapter of the EDP Auditor's Association Meeting.** Contact: Allan Nierenberg, Price Waterhouse & Co., 1 Financial Plaza, Hartford, Conn. 06103.

May 17, New York — **IV Phase Users Group Meeting.** Contact: Peter C. Daikos, Vice-President, IV Phase Users Group, P.O. Box 902, New York, N.Y. 10008.

May 17-19, San Francisco — **Structured Design and Programming,** sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

May 17-19, Dallas — **Government Project Management,** sponsored by New York University, School of Continuing Education. Contact: New York University, 360 Lexington Ave., New York, N.Y. 10017.

May 20, Los Angeles — **11th Annual Spring Systems Seminar on Man-Machine Relationships,** sponsored by the Association for Systems Management and the Association for Computing Machinery. Contact: Richard Cantor, 10609 Willowbrae Ave., Chatsworth, Calif. 91311.

May 21-24, Houston — **Management of Information Systems,** sponsored by the American Society for Information Science (Asis). Contact: Asis, 1155 Sixteenth St. N.W., Washington, D.C. 20036.

May 21-24, Chicago — **Conference on Combating Computer Crime,** sponsored by the International Security Conference (ISC). Contact: ISC, 2639 S. La Cienega Blvd., Los Angeles, Calif. 90034.

May 22-4, Cherry Hill, N.J. — **Data Entry Management and Supervision Seminar,** sponsored by Management Information Corp. (MIC). Contact: MIC, 140 Barclay Center, Cherry Hill, N.J. 08034.

May 24-27, Thunder Bay, Ont. — **Medical Group Management Association of Canada Convention.** Contact: R.R. Babcock, Port Arthur Clinic, 194 Court St. North, Thunder Bay, Ont. P7C 1T5, Canada.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

Third World Acquiring DP

(Continued from Page 17)

and Univac — at first. That is part of the growing pains of learning about computers," he added.

Richard Tanaka, past president of the International Federation of Information Processing Societies (Ifip), told representatives of the developing nations that by working through the United Nations Educational, Scientific and Cultural Organizations (Unesco), Ifip hopes to institute a plan for traveling seminars on informatics. Such a seminar was held in India a few weeks ago to train the local people to meet their computing needs.

"The goodwill of the technical people in the industry hasn't been tapped enough," Tanaka said.

Grosch suggested that organizations like Ifip, Unesco and IBI might band together to form a corporation like the Rand Corp. The corporation would seek to be manufacturer-independent, he said.

Investments

Karoui of Tunisia suggested that another way to get the manufacturers to be responsive to the needs of developing nations is to force them to invest in these countries if they want to do business with them.

"The developing countries are looking to the U.S. manufacturers, and not to the U.S. government, for help in this area. Why isn't a country like the U.S. interfacing with these nations as a government?" Bernasconi asked. "Japan is. That's the message I want to leave you with."

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Coordinating Organization Proposed

User-Researcher Communications Gap Decried

By Marguerite Zientara
CW Staff

TORONTO — There is a serious need in the computer community for an organization that includes high-caliber commercial professionals as well as scientific researchers to bridge the communications gap between the two, according to Nathan Fichman, systems/support analyst at Perkin-Elmer Data Systems of Canada, Ltd.

Fichman presented his theory in a session entitled "Closing the Gap Between the Scientific and Commercial User Communities" at the recent Data 78 conference here.

Universities presently engage in much misdirected research that is useless to the commercial user in the planning, design and implementation of distributed processing systems, Fichman said.

Publication-Oriented

The on-line/real-time researcher typically works in a vacuum detached from reality, Fichman said, and in addition is publication-oriented rather than result-oriented. Within the constraints of limited resources, he is forced to make oversimplified assumptions that enable him to solve his model, but render it useless to user communities, Fichman asserted.

The on-line/real-time user faces the problem of minimizing the investment, the operating expenses and the risk, thereby maximizing the benefits of his system. However, this user cannot recognize the relevant data he should collect in order to use the right variables in evaluating the projected cost and performance of a system, Fichman said.

Furthermore, most of the data he needs is in unusable form and not centralized, he added.

Benefits to User

The creation of a nucleus of commercial and academic professionals would enable researchers to overcome their resource limitations and validation problems and would provide relevant informational tools to the user community, resulting in reduced risk and reduced cost, in setting up their systems, Fichman said.

Fichman presented a simplified model for the planning, design and implementation of a system.

First the user should determine the current status of the system in terms of capital and operating costs, performance, equipment utilization, storage volumes and processing workloads.

Next he should define future plans as characterized by required performance levels storage volumes and processing workloads, typically over a three- to five-year range; and plans for new application systems, Fichman said.

Then he should get input from vendors indicating the cost and performance of new products and their compatibility with equipment currently used by the organization as well as information on conversion costs and time frames.

Another step is to define the requirements and objectives after analyzing the current status and future plans.

Design Alternatives

Then the user can design alternative solutions based on skill and known properties of various similar designs. Next, a comparative analysis of alternatives can be made through a high-level simplification that enables the analyst to control the complexity of the systems under investigation.

After this the plan should go to top management, who will consider corporate policies and control in making a decision.

Finally, Fichman said, implementation involves such aspects as project planning, system development, testing and conversion.

The use of these steps as a reference framework for research will help focus research on relevant issues and needs will enable both communities to cooperate and communicate with a sense of common purpose, will decrease the risk and cost of implementing and operating on-line/real-time systems and will provide researchers with a sense of achievement from having produced something useful, Fichman said.

Cedpa Picked As DPMA Unit

PARK RIDGE, Ill. — The executive council of the Data Processing Management Association (DPMA) has recognized the California Educational Data Processing Management Association (Cedpa) as a provisional special interest group in education within DPMA.

Cedpa, composed of 200 members from educational and governmental institutions, was founded 15 years ago.

Under DPMA rules, a provisional special interest group can be organized when the DPMA executive council is petitioned by a group of at least 50 people, none of whom need to be DPMA members except the president or chairman of the group.

The current Cedpa president is Sam Price, DP manager at the University of California School of Medicine at Davis, Calif.

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Directory of Executives Out

PHOENIX — Applied Computer Research's semiannual "Directory of Top Computer Executives," now available, includes 1,100 new listings.

Entries in the main section of the publication are listed in geographic order, by city within state, as opposed to the previous organization by industry classification. There is, however, a cross-reference for 12 different industry and government classifications.

The latest edition contains the largest increase in listed installations for any single issue since the directory was started over five years ago, according to the company. Most of the increase was attributed to the addition of government health services and federal, state and local government users.

The data base used in compiling the directory has been computerized and may be purchased or rented on tape for special applications.

The directory costs $75 for single copies with additional copies for $45, from P.O. Box 9280, Phoenix, Ariz. 85068.

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Programmed Nutrition Data Peps Up Student Athletes

By Ann Dooley
CW Staff

SYRACUSE, N.Y. — Football and basketball players at Syracuse University here get pep talks from an automated "coach" about their diets and what they can do to improve their performance in the nutrition game.

The idea of analyzing food intake by computer was started by Prof. Sarah Short, who has used computer-assisted instruction with her nutrition students for the last 10 years.

At the coaches' request, Short began to analyze players' diets in addition to her regular work with her nutrition classes, he said.

Food Code

Students and players indicate the kinds of food and amounts they have eaten in a typical day and Short breaks that information down into portions and translates that into grams.

Each food is given a code number, according to Short, who enters the food number and the number of daily grams consumed into the university's IBM 370/155 via a CRT terminal. The computer is programmed with more than 3,000 nutrients found in common foods and, when accessed, provides information on the exact amount of nutrients in a person's diet and compares it with the recommended amounts, Short said.

The computer is also given information about each person's daily activity and can indicate the difference between the calories used in exercise and the calories ingested, Short explained.

The system also breaks down the athlete's daily intake into food groups such as fats, carbohydrates and proteins and indicates their relationship to each other because the amount of food eaten is often not as important as the combination in which it is eaten, Short noted. The nutrition percentages are based on recommended daily allowances from the National Research Council, she added.

The students — especially the players who have to spend large amounts of money to feed themselves — are delighted with the system, Short noted.

Recommended Calories

The recommended number of calories to be consumed by an adult male is 2,000, but Short found one wrestler consuming as much as 14,000 calories. "The football players seem to eat more than the basketballers and the wrestlers go from eating very little to a large amount," she said.

What Short found especially interesting, she said, was that the sports players' diets didn't vary much from those of the students in her nutrition classes, even though the players were able to burn up more of their food intake in exercise.

Short, who started the program herself, said much of the first programming was done with "horrible mistakes," but she has since handed the task of programming to her son, William, a doctoral candidate at MIT.

The system is not programmed to tell students how to improve their diets since that is what her students are expected to learn from her course, Short said.

Short's students use the program to devise a well balanced menu for a family with different tastes and nutritional requirements. "But we've found that regardless of how exotic a family's tastes and habits may be, the computer can accommodate any special diet so long as we give it the proper information," she noted.

Students could even plan ethnic menus such as Middle Eastern, Chinese or Italian, Short said.

Continual updating occurs on the system as nutritional standards change and nutrition discoveries are made, she added.

Nominations Now Welcome For Inventors Hall of Fame

WASHINGTON, D.C. — The Department of Commerce Patent and Trademark Office has announced the call for nominations to the National Inventors Hall of Fame for 1979.

According to selection committee chairman Ralph King, each nomination should include the full name of the living or deceased inventor, identification of the specific major invention or inventions for which the nominee is known and the U.S. patent numbers for each invention. Any other pertinent facts deemed relevant to the nomination should be included.

Inventors are selected on the basis of patented inventions that have benefited the people of the U.S., according to King, who noted the selection committee will be comprised of representatives of 33 technical societies.

The National Inventors Hall of Fame was founded in 1973 by the National Council of Patent Law Associations; Thomas A. Edison was the first inductee to be honored. Other inductees have included Lee DeForest for a vacuum tube and Vladimir K. Zworykin for a CRT, both in 1977, in 1978 and Luis Walter Alvarez for basic radar systems.

Nomination forms can be obtained by writing to the National Inventors Hall of Fame, c/o J. Ralph King at Lowe, King, Price & Markva, Suite 210, Building 1, 2001 Jefferson Davis Highway, Arlington, Va. 22202.

The deadline for submission is Aug. 1.

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By John C. Scott
Special to CW

LEAVENWORTH, Kan. — A programmer training course that incorporates multilanguage learning, hands-on hardware training and production shop experience would be a good course anywhere. At the U.S. Penitentiary here, however, such a course is as valuable for a prisoner's rehabilitation as it is for his education.

The success of the course is measured not only by the number of graduates placed in the DP industry, but also by the recidivism rate (the number of released prisoners who have returned to prison). As rehabilitation, the course works; judging by the number of employed graduates, it works well.

Computer training at the penitentiary is a two-year vocational training course split equally between one year of classroom instruction and one year in an actual production environment. Students are admitted into the class on the basis of length of sentence, score on a programmer's aptitude test and an in-person interview with staff members.

If accepted, the student begins an intensive one-year classroom curriculum. Classes are in session eight hours a day, five days a week.

A strong foundation is built with a basic introduction to DP. Once a student has learned the fundamentals and gained experience in flowcharting, he begins to code in basic Fortran. He must write a minimum of 10 programs in Fortran; each designed to teach a concept and to be slightly more complex and difficult.

CPU Available

There is an NCR Century 201 at the institution so students can expect at least one turnaround per day, and they have ample time for both writing additional programs and debugging old ones.

Once the initial exposure to the system has occurred, and the student has completed the first set of Fortran programs, he graduates into NCR's assembler language, Neat/3. The same process takes him through Cobol Levels I, II and III, JCL and RPG.

Because the in-house system also acts as a terminal for the IBM 360 at the Department of Agriculture, advanced students must learn IBM languages in addition to the NCR ones.

At intervals, two students at a time are assigned to work with the operator in the computer room. The assignment is for a full week, and the experience is quite comprehensive. The school shares time with a private industry so the student gets a realistic view of what a commercial site would be like.

On-the-Job' Experience

One year after entering the course and at least 50 programs later, the student "half-graduates." He is again evaluated by both educational supervisors and production staff and is either terminated or "hired" as a result of the interview.

If hired, the student is assigned to a team within Computer Industries, a branch of Federal Prison Industries, Inc. A staff team leader integrates him into a team and assigns work for an outside contractor, usually the Department of Agriculture. The team leader is also responsible for teaching the student how to use the manuals and video equipment available.

Students have freedom in composing their own problems and have written both serious programs for model simulation as well as not-so-serious programs for crossword puzzle composition. Because of the security requirements of the institution and the sensitivity of the department to outside publicity, all programs must be approved by the respective team leaders before going into the computer.

Employable Graduates

The graduates of the program have proven to be highly employable. In companies where the training is unknown, there is a bit of initial skepticism at the level of education given.

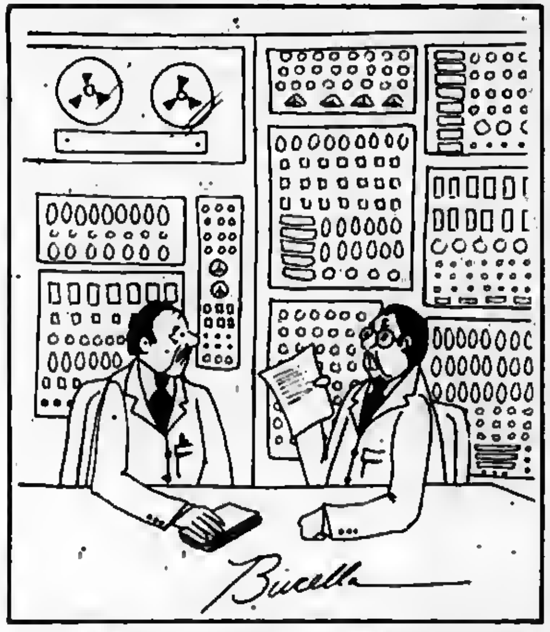
Once this reluctance has been overcome, however, the same employer will often ask for more men.

NCR, the company most familiar with the program, actively recruits at the institution and has hired quite a few men.

Academia has recently recognized the program to the extent that a local college gives 30 semester hours of credit toward its two-year degree in DP to all who complete the course.

Scott is serving a sentence for aiding and abetting a bank robbery and will be reviewed for parole in June. His long-range objective is to combine his background in programming, Arabic and the Middle East and work in computer sales.

Any interested party is welcome to write for more information on the program to: Beeler Gausz, Chief, Computer Industries, Federal Prison Industries, U.S.P., Leavenworth, Kan. 66048.



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Editorial

Refreshing Approach

The service firms are moving with a bang into the minicomputar arena, but they are taking a refreshing approach to the subject.

Automatic Data Processing, Inc. beat its service competitors to the punch with its introduction of the Onsite systems [CW, March 27] but was quickly followed by Keydata Corp. [CW, April 10] and now by National CSS, Inc. (Page 1).

All three of the servica firms are now essentially offering mini systems, and although aach has a slightly different wrinkle in its offering (see story on Page 79), they share one characteristic. Thay are essentially the first firms — except for possibly Amdahl Corp. and the other plug-compatible CPU makers — to approach system design from the software rather than the hardware point of view.

The firms are well established in the service arena, where they have been marketing for over a decade. This area is marked by its attention to software, rather than to hardware, since users of a service are more interested in what it can accomplish than in how it gets the job done,

So nona of these vendors chose to talk much about the hardware in their new offerings, but all stressed the systems' software and services. This is a refreshing change from the typical computer manufacturer, which generally likes to extol tha virtues of its new hardwara and ralegate software considerations to second place.

Perhaps the challenge from tha services side of the business will force the systems manufacturers — particularly in the mini area, where the absence of good software is obvious — to take a harder look at their approach.

For too long, many of these firms have been able to offer users excellent hardware and stick them with the problems of inadequate operating systems, a lack of higher level languages and data base management systems and a dearth of applications software.

But now users have an option, and by exercising that option they may force others in the industry to also begin meeting the real user needs in the software area.

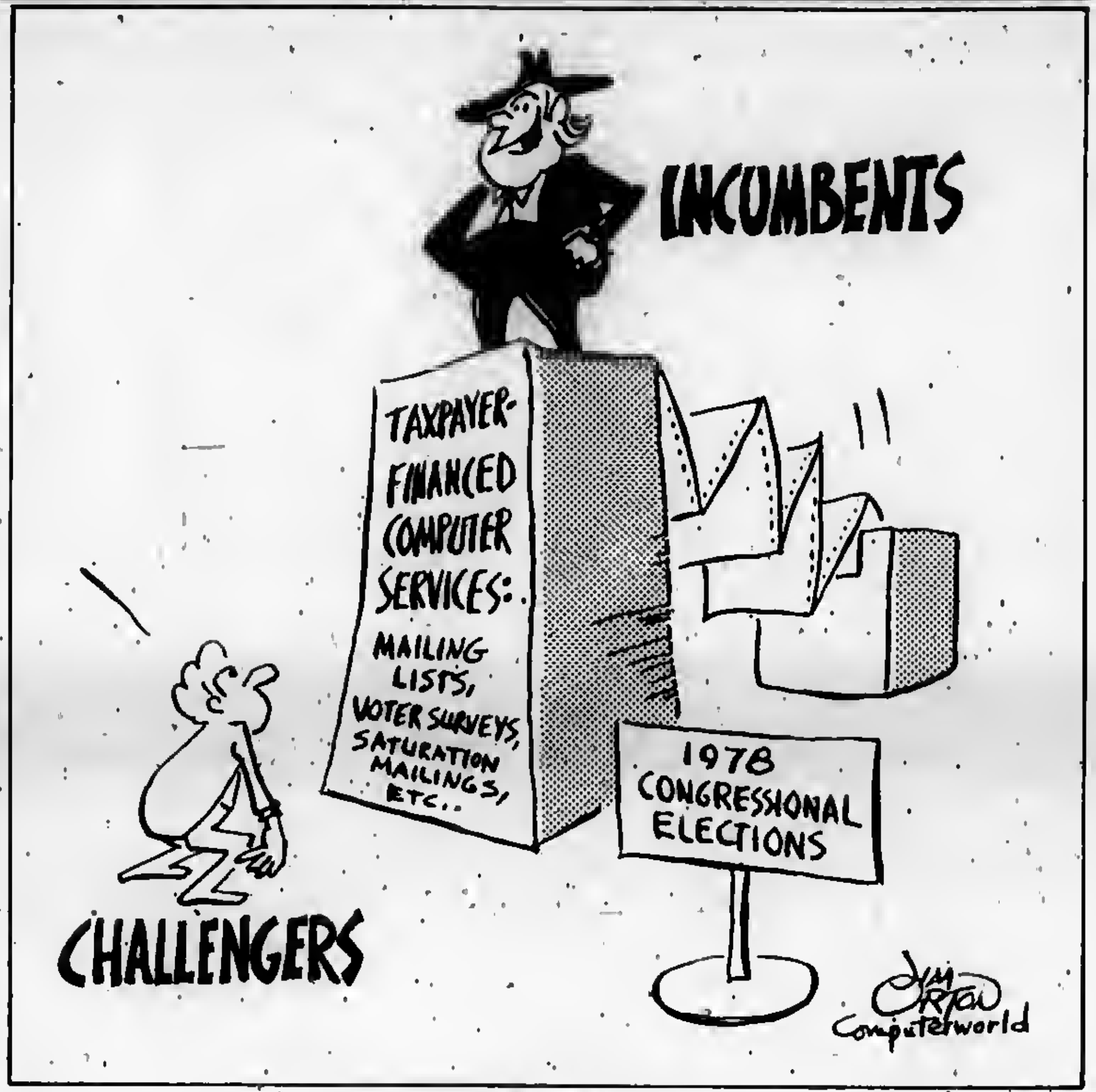
Only Time Will Tell

The importance of computer systems to modern society was clearly illustrated by recent stories on advanced cancer research and on tax collection [CW, April 10].

It was clear in the first case that the power of the computer to simulate chemical reactions had significantly shortened the process of finding drugs that may be effective in the battle against cancer. Without computers, the search for promising new drugs might take much longer — literally years or decades longer.

The other application may not be greeted with as much enthusiasm by most of us who have just finished filling out our tax returns, but it would be almost impossible for the income tax system in this country to work without the benefit of computers to process the claims.

So in less than 30 years, the state of computer use has progressed immensely from its first stirrings. With the research and development of new applications under way, one cannot but wonder at the changes that this technology promises in the next thirty years.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'Come an' Get Me, Baby!'

Data Past

Five Years Ago
April 18, 1973

WASHINGTON, D.C. — Computer verification of tax returns for fiscal year 1972 found that taxpayers made fewer errors than in previous years, according to the Internal Revenue Service (IRS). During that year, there were errors in 3.8 million returns, or an error rata of one in every 20 filed compared with one out of every 16 in 1971 and one out of every 12 in 1970, the IRS said.

— — —

WASHINGTON, D.C. — The Stanford Research Institute received a $21,000 grant to study how computers are — or could be — put to socially wrongful use. Under the direction of Donn B. Parker, the five-month study was to consider who the perpetrators of such crimes were, their motives, opportunities and methods; the attitudes of prosecutors and investigators; and whether 1973 laws were adequate for dealing with such abuse.

Eight Years Ago
April 22, 1970

WHITE PLAINS, N.Y. — IBM introduced a special-order device called the Multiple Terminal Communication Adaptor (MTCA) to enable users of IBM 2741 communications terminals or Teletype Corp.'s models 33 and 35 to link to a single 1130 system over as many as 16 half-duplex remote and local communications lines.

— — —

KANSAS CITY, Mo. — Businessman Bill Barber sued for $170,000 in damages after he was arrested for possession of a stolen credit card while at a meating in a St. Louis motel. The card was on the computerized "hot list" used by the motel to spot such occurrences and it took nearly an hour before Barber, tha authorities and the bank discovered his detention was a mistake. The cause of the embarrassment and inconvenience was found to be a simple keypunch error.

Letters to the Editor

Tsunami Clarification

In Chapter II, Part 2 of Tsunami [CW, March 27], Charles Lecht stated: "Performance of the Model M-180L (known in the U.S. as tha Itel AS/6) is claimed to be about 1.2 times that of IBM's 3033." This should have read "IBM's 3032." With so many different CPU model designations from so many plug-compatible vendors, this error could be misleading to your readers.

Additionally, the M-180L is not the same machine delivered to and marketed by Itel as the AS/6. Current performance ratings of the AS/6 should be nearer 1.1 times the IBM 370/168 (the 3032 was not the comparand in Itel's initial introduction and 3032 performance was an unknown). Prices quoted by Itel Corp. are more on a par with the 3032 since IBM's last price reductions on memory, depending on configuration options, not .75 IBM's price.

Marvin L. Silverman
New York, N.Y.

According to Charles Lecht, "Silverman's observations are correct. However, the differences between the Fujitsu M-180L and the Itel AS/8 are more subtle than dramatic." Ed.

Codasyl DBMS From IBM?

With regard to John Cullinane's commentary "Vendor Expects Codasyl DBMS From IBM" [CW, April 3], could it be that IBM's System R, being developed in San Jose, Calif., is the data basa management system that will be announced shortly?

Howard Rutiezer
Lake Bluff, Ill.

Seeing the Light

The Learner's Lexicon in the April 3 issue gave a definition of "pen light" as "a pen-like device with a light on the tip used with a CRT." This, unless I am badly mistaken, was an attempt to describe a light pen.

Many beginners in the field have the misconception that a light pen emits light. This is not the case. A light pen senses light coming from the CRT through a light-sensitive transistor or similar device. There is no reason I could imagine to attach a pen light to a CRT since a CRT is not light-sensitive.

J.T. Rowan
Opelika, Ala.

Behind the Times

The DP community is 25 years out of date. Most of its members use the Able, Baker, Charlie, Dog phonetic alphabet when quoting character strings. The aviation world realized the deficiencies of this alphabet in the early 1950s and adopted a revised version (Alfa, Bravo, Charlie, Delta, etc.).

Let's stop sounding like old war movies, use an up-to-date phonetic alphabet and let sleeping Dogs lie.

Alan Rocker
Toronto, Ontario

Amused by Lexicon Error

Just thought I'd write to tell you that the Learner's Lexicon in the March 20 issue went particularly appreciated.

While CW readers can usually find room for a chuckle or two among the Lexicon's various vague, misleading and occasionally outright false definitions, I'm sure the definition of OCR as "operating character recognition" [instead of "optical character recognition"] brought forth peals of laughter all over the country.

Timothy Stryker
Providence, R.I.

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- **40** Public Utility/Communication Systems/Transportation
- **50** Wholesale/Retail Trade
- **60** Finance/Insurance/Real Estate
- **70** Mining/Construction/Petroleum/Refining
- **75** Business Service (except DP)
- **80** Education/Medicine/Law
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- **90** Printing/Publishing/Other Communication Service
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'Avenues to the Top'

Reader Details Career Plan for MIS Director

By Jack Stone
Special to CW

A feeling of despair seems to be clouding career development plans of senior DP management personnel. These people, often identified with the title "director, management information systems (MIS)," are becoming increasingly frustrated at being passed over for openings in the top-level executive ranks. It is particularly grating to many DP managers who feel they have saved the company or government unit from disaster by their strong dedication and production.

Obviously, those responsible for selecting people for these top-level positions have strong opinions as to the experience requirements. It nets down to a broad range of experience throughout the organization so that these executives can communicate and understand organizational matters at a higher level.

Here is a thought-provoking letter from a reader who suggests a strategy for dispelling the gloomy career outlook for the MIS executive. Although the writer has a corporate point of view, much of what he says applies to government units as well.

Dear Jack:

I have read and enjoyed "The Human Connection" and its "gut-level" discussions on the people-related issues in the DP community.

The specific subject I want to address is "dead-end DP career."

I suggest that it's time for top MIS executives to stop complaining about not being appreciated by top management and to start identifying with the business opportunities, challenges and problems facing their companies. There are "avenues to the top" for experienced MIS executives. Let's look at the positive attributes of successful MIS executives and then match their skills with those required by high-level positions.

First, there's broad company knowledge. Most experienced MIS executives understand the totality of their company far better than every other top executive, except the chief operating officer or possibly the senior financial officer. Most line executives do not have a chance to get as involved with the workings of the total company as do MIS executives.

Expanding our responsibility to include business planning (corporate planning, long-range planning, etc.) is the avenue to top management for MIS executives. Most professionals in the corporate planning field have no practical line management experience and little awareness of operating problems and their solutions. Although they have some knowledge of computers, it is quite limited.

Merging MIS and business planning in the organization makes obvious sense.

Expanding further the responsibilities of the MIS executive over the long range to include strategic planning, mergers, acquisitions and divestitures should qualify the person for a position on the board of directors. Many company presidents have moved up from being vice-president of corporate development, few from vice-president of MIS.

The Human Connection

Line Management

Second, there's line management experience. Manufacturing and sales executives are experienced in delivering a tough performance against ambitious operating goals, using tight budgets and managing large, sometimes geographically dispersed staffs. The results of their performance are measurable and, in most cases, obvious. The range of their performances can result in success or failure of a company's business.

MIS directors have similar responsibilities, since many manage computer operations spread geographically through on-line, remote batch and distributed processing applications vital to the continued operation of the business.

Third, successful MIS executives have business planning experience. Here lies perhaps, their strongest hidden talent. For how many years have we developed MIS plans without an adequate structure of top-level planning. We are forced by our hardware and software development lead times to plan; we have no choice.

Finally, there's experience in dealing with government controls and, in some cases, labor unions. In a number of companies, the largest group of nonexempt employees work for DP and they have, on occasion, been unionized. As for government controls, the MIS executive is as close as anyone to such issues as privacy and communications tariffs and regulations.

Why must the top MIS executives only have DP working for them? Why not include development, facilities, word processing, communications, corporate records management, reprographics and a host of other "step-child" functions?

The position of vice-president of corporate development and management services" is a realistic career goal for the MIS director.

Fred Held, Director
Management Information Services
Mattel Toys Division
Mattel, Inc.
Hawthorne, Calif.

Tax Question Vexing

Tangibility Question Seen in Different Light

The Taylor Report
By Alan Taylor CDP

The vexing question of whether programs are tangible or not has been on my mind these past few days because of a hearing in the Puritan Life Insurance Co. challenge to retroactive tax assessment in Rhode Island.

The result of the hearing won't be known for some time yet, as the two sides have to provide briefs and won't even start that until after the hearing record has been completed. However, the action seemed to shed some different light on just what a program is and how it functions.

Basically, a program is simply a number. For example, 46382970573 . . . 579 is a program.

It could be valuable if someone knew what it meant and how to use and maintain it.

Of course, programs in normal use are long numbers, much longer than any with which we normally come in contact. A court reporter would probably take some 25 pages to write down even the simplest worthwhile program segment. To write down the program part of an inventory control system, for example, would be as endless a job as painting the Golden Gate Bridge. By the time the reporter had written the program down, it would have been revised so many times with changes in operating system versions, patches, enhancements and parameters that the reporter might just as well start over.

But a program is still just a number. If you want to see one, take a core dump. That will give you the current number for a program in your particular situation. It's highly unlikely that it is the same number being used in someone else's computer for the same function — even if it was originally specified by the same designer. There are so many things that change the number to a greater or less extent without anyone ever realizing changes are taking place.

What's more, it isn't the same number that was read in at the time the program was first entered. Tape numbers are coded and safeguarded. Other numbers are inserted to see that no mistakes have been made. There are also preambles and postambles, parity numbers and cyclic checks. All of this is very confusing to people who think programs are physically moved by being picked off the tape and put somewhere in the machine.

Shadows and Shades

In fact, the way number information is passed into the machine is by a combination of shadows and shades, rustles of springs and varying electromagnetic vibrations in the air surrounding the reading heads. Cards simply provide either patterns of shade and light, or of brush springs rustling, that are then changed by the microprograms built into most systems to voltage control signals applied to pulses. This involves no eating of the holes on the card or anything physical like that. In fact, readers are not absolutely necessary; one could dial programs in. It would take some time, but some program parts are often dialed in, particularly when the program is being maintained.

This brings up another point. Although we talk about purchasing a program, just having the program itself (the pure number, 25 or so pages long) is no good unless you like having a time bomb in your installation.

The value of a program comes from having it supported and from the way it fits into a system with other supported programs. And support normally has to start long before the program arrives at the installation.

Support for a program often depends on a team working off-site, on the developer's premises, and that team has to be available much longer than we may often think. In fact, as far as I can see, for most programs, support must continue until the output is finally discarded.

My point is that if a program's output is ever held in some archive and it should ever be challenged, then the possibility that the output is the result of a programming error has to be faced. And it takes a support program to be ready to face that possibility, potentially long after the program has been run for the last time.

Nor does the value of support come from the frequency of use — not even from receiving those monthly updates. It is the fact that support is there, as backup, that counts.

All of which is very alien to the loose way we normally talk about programs, systems and tapes. But then we use a loose language, one which was first used for oral, rather than written, communication.

In such a language, matters can often be ambiguous and the real facts only discovered after conversationally checking meanings.

It is good to occasionally get back to basics and look at what is being used and how the physical merged with the intellectual to create the great computer revolution, which has already gotten so far from its roots that many of us never even see inside a card reader.

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Part-Time Education Fraught With Choices

By Martin Feuerman
Special to CW

Reader Commentary

The prospective student hoping to enhance his educational background in DP and computer science has many programs from which to choose and many decisions to make.

A degree-granting nonproprietary institution is preferable to a nondegree program, in my opinion, because many DP job opportunities require a degree.

Nondegree programs have certain advantages, however, in that they are often tailor-made for a student's vocational needs. One can register for courses geared to the particular hardware or software one might use.

Degree programs, on the other hand, often tend to stress theory and concepts and minimize discussion of the idiosyncrasies and technicalities of particular machines and languages.

In actual practice, it might be best for a student to look for educational programs that have a good balance between the two.

The Association for Computing Machinery in New York, the Mathematical Association of America in Washington, D.C., and other professional organizations periodically publish information on computer science programs which could serve as guides to programs available in a student's geographical area. These guides, among other things, indicate numbers and types of degrees awarded, number of full- and part-time students enrolled, number of full- and part-time faculty, number of courses offered and the computer facilities available.

Questions to Ask

The following are some questions to ask when investigating a particular computer science curriculum:

- Are the instructors full-time or part-time? There are advantages to both. The full-time instructor probably has more of a commitment to the school, the curriculum and teaching. On the other hand, a practitioner from government or industry who teaches part-time can relate his experiences (computer and otherwise) to the class and add much insight to any computer science program.
- Are the course offerings listed in the college catalog offered every semester? A disadvantage with some schools is that their offerings, especially in the evening, may be quite limited. Find out at the outset if it is possible to obtain a degree by attending only in the evening.
- Can one register officially for just one course and sit in on other classes during the first week of school? Not only does this avoid a late registration fee, but if any other courses appeal to the student, he can always add them to his schedule. By sitting in on as many courses as possible the first week, one can see firsthand what to expect.
- Are counseling services offered by the department? If so, determine at an early date from the counselors what the course requirements are if you are going for a degree, as well as any general course requirements in other fields that may be imposed by the college.
- Can one contact the instructor before the course starts to find out more about the course? The same course given by two different instructors could contain very different material, and neither one might follow the course descriptions in the bulletin.

At the very least, contact the bookstore and determine what texts are required for the course. This could give you some idea about the nature of the course. Finally, determine if there will be any "machine time" or laboratory sessions associated with the course — an obvious advantage.

- Have courses given in the past been evaluated by former students? The results of such evaluations might help one decide which course to take.
- Does the college have a placement service? It might be of some assistance to you in finding a (better) job. Find out if the office maintains dossiers and letters of recommendation for students. You can use this office to serve as a repository for your credentials and letters of recommendation. This material could then be sent to prospective employers or college admissions offices at your request.

Incidentally, when you complete one or more courses with an instructor and you believe the instructor knows you well enough, request that he mail a letter of reference for you to the placement office. Instructors can easily forget their students after a lapse of time, so seek references when you have just about completed the course.

- What is the college's policy on auditing courses? If you audit courses officially, you will probably be required to pay the same fee as if you took them for credit. However, some instructors might allow

(Continued on Page 28)

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Front-End Loading Sometimes Only Way

By Miles Benson
Special to CW

Sociology of Computing

Quick now — software is by nature costly and unreliable. What do you as a manager do to correct that?

Answer (at least, today's standard answer): front-end load. Focus more energy on requirements definition. Get the design stabilized before the start of coding. Flush out errors early in checkout using reliability tools. The cost picture is scarier, says this answer, but the end result is cheaper and better.

Who can argue with that?

Well, Char Jannell can. Char has managed a lot of software projects for Ring-a-Ding Tel and Tel, from teeny report generators to big data base management systems. And, to be truthful, she believes in front-end loading.

But she also knows it doesn't always work. This is the story of one of those times.

The Aerospace Biz

Ring-a-Ding sometimes dips its software finger into the exotic world of aerospace biz, and this was one of those times. It had contracted to build a real-time communications system for the new Air Force Voyeur surveillance aircraft, and Jan was selected as the manager in charge.

A word of explanation is in order here. When the Air Force defines the specifications for a job to be done, it does it right. It makes every effort to leave no contractual stone unturned. "When in doubt, specify it" may well be the Air Force watchword.

This does not mean, of course, that it makes no mistakes. The quality of the finished specifications is still directly proportional to the knowledge and skill of the assigned personnel, whether they wear a blue suit or dungarees. And the Air force has its share of bunglers.

Still and all, you can depend on at least an appropriate quantity, if not quality, of specifications if you do business with the Air Force. And Voyeur was no exception.

When the Voyeur specs were delivered to Char's office, the transportation man made three trips just to get all the boxes in. And when they were unpacked, they overflowed her bookcase and spilled onto the floor. Just getting on board Voyeur, Char saw, was going to be a significant task.

It turned out, on second look, not to be as bad as she had thought at first. The shelves of specs contained all information on all components of Voyeur. Software was just one of the components. It was just a matter of isolating those requirements. Easy, right?

Clancy Walker was a top-notch Ring-a-Ding requirements man, and Char chose him to do the job. He plunged into the effort with alacrity, scissors and tape and began extracting and posting requirements, separating them by functional category.

Since nothing else could happen until the requirements were all known, Char did not add any further staff.

Emotional Meeting

After a week of requirements prospecting, Clancy began wearing a furrowed brow. After two weeks of it, he looked definitely worried. Char called him in for a conference.

"They just keep coming," he blurted even before he had sat down in Char's guest chair. "The more requirements I pull out, the more turn up. They're interlinked and intertwined and incestuous. One seemingly innocent phrase obviously contains no requirement, so I ignore it, but then another phrase elaborates the first and suddenly they are both requirements."

"Look here," he fairly shouted, "the spec says, over here, 'The computer downlink shall be capable of multibus operation.' No apparent software requirement, right?

"But then over here it says, 'Bus servicing shall be under interrupt control' and suddenly software is getting into the act. This stuff is driving me crazy," and by now he wos shouting.

Char decided to stay calm. After all, she thought to herself, requirements are never the death of a project. It may not have been an honest thought, she realized, but she needed it to stay calm.

Quietly and soothingly, in her best Transactional Analysis mode, she said "I see that you are very upset by this task, and I see that it is pretty complicated. Perhaps a new approach is in order, considering how tough this job is.

"Tell you what let's do. I've got a couple of spare recipe boxes at home. Why don't you bring in a flock of 3 by 5 cards, and we'll put each requirement on a recipe card and file them in a box.

"Each card can identify the source of the requirement in the spec and point to any implied requirements or related explanation. This way, we can get a handle on this problem."

It sounded simple enough, and

(Continued on Poge 28)

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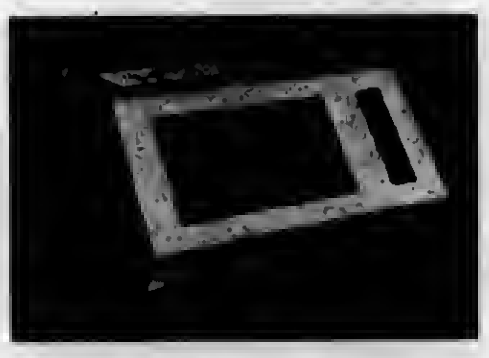

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Front-End Loading Sometimes Needed

(Continued from Page 26)

Clancy bought it. Char was pleased to have solved another personnel crisis.

Building a Cookbook

It was when Clancy asked for a third recipe box, and funding for more 3 by 5 cards, that Char's turn came to be alarmed. "You mean the other two boxes are filled?" she gasped.

Clancy showed her. They were not only full, there were a couple of dozen cards that had no place to go.

"Those requirements just keep coming out of the woodword," he lamented. "The recipe box system is working, but there's no slackening in the pace of turning up requirements. I just made a second pass through the top-level system spec and turned up 32 more that I missed the first time." He seemed to be near tears.

So, for that matter was Char. While Clancy was trying to wrap his arms around the diffuse Voyeur software requirements, her overall schedule was rapidly slipping away. If they didn't start soon, the software would be late. And Voyeur couldn't fly without it.

The software fat was in the fire, and hers along with it, Char knew. She had to break out of this bind. But how?

It takes a bit of gambler instinct to be a manager, sometimes. This was one of those sometimes for Char.

"All right, Clancy," she gulped, "I'm pulling you off the requirements job . . . " He looked startled. ". ... And putting you on the implementation team. Let's start building software" The pitch of her voice was just high enough to nullify the locker-room appeal she hoped the last sentence would convey.

"But how can we," said Clancy, "when we haven't identified all the requirements yet?" He said it with the conviction of a person who knows he's right.

"You're right, of course," Char consoled. "Except we have to, or we'll never finish on time. Here's how I see it, Clancy . . . only don't tell anyone later or I'll deny I said it. If you can't find all the requirements, then I'm willing to be sure the Air Force can't either. I don't care if they're all in the spec — if no one knows they're there, or what they imply, then they can't check for them.

"I want to gamble on that. I want you to satisfy the requirements you've found, and any others that come up at design review, and forget the rest."

Clancy nodded, a little stunned. "All right, boss," he said carefully, acknowledging that it was her neck and making it clear that it wasn't his.

And so they did. At the critical design review, the Air Force turned up a couple of new requirements Clancy hadn't found, but after that they were home free. Acceptance testing went off without a hitch, and so did delivery.

Which was just great, as far as Char was concerned. Except for two things.

First, it kept nagging away at her that there were a bunch of still unsatisfied requirements. What on earth were they, and what was the impact on Voyeur of not fulfilling them?

And then there was the second. How can you front-end load a project when the front end appears to be infinite?

The answer, Char had found, was that you simply couldn't.

Education Means Choices

(Continued from Page 24)

you to unofficially audit the course.

- Is financial aid available for part-time students? The financial aid office is there to serve you, so you might as well use it.
- If you have taken courses at other colleges, can you transfer credit to your new college? Also, can you get exempted from courses if you can prove you know the course material from previous training or job experience?

Points to Ponder

After making selection, but before actually enrolling in the course, there are some additional points to consider.

- Try to develop a well-balanced well-rounded program. For example, consider taking one or two courses in computer simulation techniques, even though your speciality may be data base management.
- Most instructors are either fairly receptive and/or are required to give conference hours. Make use of this opportunity, if necessary. Also, find out where the instructor can be reached by phone.
- Two regulations that part-timers should be aware of are residence requirements and time limitations for degrees. Some colleges may require you to be in residence (registered as a full-time student) for a minimum number of semesters.

Fortunately, the trend seems to be toward the elimination of this requirement. At many colleges, one can get associates, bachelors, masters, and doctoral degrees in computer science through part-time evening study.

Note however that there are usually time limitations on the completion of degree requirements.

Feuerman is in the Department of Information Processing at the College of Medicine and Dentistry of New Jersey in Newark.

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DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is asynchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLST.

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Business Gains Operating System in Basic

AURORA, Ohio — A Basic language operating system for business applications that features a continuous memory file system said to totally isolate the user from any sector, track or cylinder restrictions has been announced by Ohio Scientific.

The OS-65U operating system is specifically designed for business applications programmers and small business users and is based on Microsoft Corp.'s 6502 9.5-digit precision Basic. All operating system extensions are incorporated in Basic, allowing commands to be executed in immediate or stored program modes, a spokesman said.

The memory file system will support future bubble and charge-coupled device memories without user modification, the firm claimed.

The OS-65U supports one to four floppy disk drives, one to four 74M-byte hard disk drives, multiple terminals, multiple line printers and other I/O devices, such as modems and internal video display systems, the spokesman noted.

The OS-65U has the disk file syntax found in other extended Basics, including OPEN (file name), CLOSE (file name), PRINT (file) and INPUT (from file) statements. It accommodates sequential, random-access and index-sequential disk file slructures, typically with three to seven Basic statements, the spokesman continued.

The operating system provides multiple-level password security that can completely lock out programs and data files from users or can give them limited privileges — for example, a "read-only" capability. The system also offers complete program lists and modification lockouts to prevent copying of applications programs; it also has an error detection facility, the firm noted.

The OS-65U runs on any Ohio Scientific floppy or hard-disk-based CPU with 32K words or more of random-access memory and costs $199 per CPU license from the firm at 1333 S. Chillicothe Road, Aurora, Ohio 44202.

Reach Broad Employee Spectrum

Bechtel's DP Courses Called Successful

By Don Leavitt
CW Staff

AUSTIN, Texas — DP-related training or education has taken many forms, with varied success, in companies across the country, but at San Francisco-based Bechtel Corp., courses are being well received by DPers and nontechnicians as well, according to Jerry August.

Speaking at the semiannual meeting earlier this month of users of MRI Systems Corp.'s System 200, the data base instructor told an overflow audience that about 25% of Bechtel's 9,000 employees in San Francisco have completed courses offered by the international engineering and construction management firm.

There are eight divisions within Bechtel and each has projects that are independent of one another. It is this environment of autonomy that is supported by the central DP operation, including education.

Bechtel offers two types of courses, August noted: General subjects, taught at a conceptual level, are considered to be mainly for the student's benefit, so they are offered on the student's time. The specialized courses — including technical training on System 2000 — are recognized as beneficial to Bechtel, so they are scheduled on company time.

The education group produces a course catalog once a quarter, outlining what training is to be offered in the next three months. The catalog includes course descriptions, schedule, a suggested progression — "We don't have many real 'prerequisites' " — and an enrollment form.

The training is primarily provided in lecture form, although the data base-specialized courses, the only ones August described in detail, also include "hands-on" experience through terminals linked to the company's Univac 1110 mainframe.

Two three-hour courses, one on data base management concepts and the other an introduction to System 2000, are in the general "curriculum" open to all Bechtel employees. They have, in fact, attracted a broad spectrum of students and that has created a real problem in trying to find appropriate teaching material, he said.

More specialized are offerings on System 2000's basic and natural languages, and on the report writer feature, August continued. These take eight hours each, split into four two-hour sessions scheduled on Tuesday and Thursday of two successive weeks. Students are expected to do "homework" on terminals between the classroom sessions, he said.

Upon completion of any course, a student is given a certificate signed by both the instructor and the employee's work supervisor. These make the students feel good, August said, noting he has seen many posted on the wall of the employee's office or work area.

Although the training procedure is well established now, the instructor said he has "some trouble" getting up to speed on technical aspects of System 2000 for the courses, largely because they are given so infrequently. Despite that, things are working

(Continued on Page 30)

Guide to Applications Design Aimed at On-Line CICS Users

NEW YORK — An applications design guide intended for on-line users of IBM's Customer Information Control System (CICS) has been introduced by Telecommunications Technology Corp. (Teltech).

Teltech claimed this guide is the first comprehensive document to address all of the elements of a CICS Application System from project planning through project implementation, and said the guide should prove valuable to project management and highly technical personnel.

The guide is said to include detailed descriptions, analyses and commentaries on CICS project planning, project documents, controls, user relations, planning and selection of a file organization and DL/1 as a data base manager.

Other topics discussed include selection of a programming language, command-level programming, IBM 3270 design considerations, virtual storage considerations; recovery and restart planning and CICS programming standards.

Published in a loose-leaf binder, the guide is in updatable form and owners will be informed of subsequent page replacements, additions and expansions as they are released by Teltech, a spokesman said.

The *CICS Applications Design Guide* costs $45 per copy, plus $2 for postage and handling if a check is not sent with order. The firm is at Suite 303 East, 200 Park Ave., New York, N.Y. 10017.

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Operating System Features Language Independence

PLEASANTON, Calif. — Small CPU software can be enhanced by the interlanguage communication feature of an operating system introduced by Processor Technology Corp. (PT).

The firm's disk operating system (PTDOS) allows programs written in one language to communicate with data in another language, according to a PT spokesman, who said high-level languages that can take advantage of this feature include extended Basic, Fortran, Focal and Pilot.

For example, he noted, a program running in Fortran can access data created in Basic and then edit other data written in Focal.

PTDOS permits raw data created under its own text editor or assembler to be accessed by these high-level languages. This feature reportedly simplifies the programming of complex data manipulation applications, such as word processing.

PTDOS runs on PT Sol CPUs, including the Sol-20 terminal CPU with built-in keyboard and Helios II disk memory sytsem.

Costs of integrated systems including PTDOS and Helios II start at $5,995. The firm is at 7100 Johnson Industrial Drive, Pleasanton, Calif. 94566.

Counties Get Tax Package

DAYTON, Ohio — A package allowing county agencies to record and process property tax payments has been introduced by NCR Corp. for use with its I-8200 CPU family.

The Interactive Tax System is designed for counties with up to 40,000 separate tax parcels. Data is entered by operators, who are prompted by CRT-displayed instructions, and the data is immediately posted to all files concerned, an NCR spokesman explained.

The data can also be entered into the system from magnetic tape cassettes. NCR 250 electronic cash registers, located in the agency treasurer's office, record details of a tax payment on a cassette as the transaction is made; and, at day's end, the cassette is loaded onto an I-8200 CPU for the processing of its data, the source added.

The system is designed so that a number of departments — usually the tax assessor's office and the treasurer's office — can have access to the information through the CRTs.

Twenty separate but related programs comprise the package, allowing the storage and updating of information on property tax payments; assessment data collection; change-of-evaluation notice printing; cash receipt reportage; and the printing of tax statements and various reports.

An NCR I-8230 or I-8250 for use with the system requires a processor with 64K memory, 25-million-byte-capacity disk unit, CRT and line printer.

The Interactive Tax System costs $3,000 from NCR, Dayton, Ohio 45479.

Text Editor Runs on PDP-11

APPLETON, Wis. — The System for Interactive Text-editing, Analysis and Retrieval (Sitar) developed by Lawrence University includes 20 different program modules that function under Digital Equipment Corp.'s RSTS environment on PDP-11s.

Under Sitar, all files are conceived as single-character strings from which any substring, defined by an instruction statement, can be retrieved and displayed on a CRT for inspection or modification, a spokesman explained.

Sitar creates, copies and truncates files and works with either disk or magnetic tape media. It can format and print a file, keying on codes embedded in the text, for use in letter writing, maintenance of address files and documents subject to change, he added.

The system can accumulate a file of "hits" satisfying a search pattern and may use special characters signifying any character, letter or any punctuation, in order to generalize or particularize the search pattern and set boundaries on the search effort.

The spokesman added that Sitar's instructions are English command words "that mean exactly what they do." One of the things they do, he said, is to "keep a hole" for insertions at the point of editing a file, rather than creating a new file including the changes.

With development funded by grants from the National Endowment for the Humanities and the Andrew Mellon Foundation, Sitar runs in a 16K user space on any PDP-11 under RSTS. The package costs $500 for nonprofit organizations, $900 for others and is available from The London Stage Project, Lawrence University, Appleton, Wis. 54911.

Bechtel Courses a Success

(Continued from Page 29)

well, he said.

It wasn't always that way. The data base courses started in 1975 and were so general in scope that they were little more than "slide shows," with no "hands-on" exposure to the topics being presented. But the demand for quality — and quantity — increased as the data base administration group took shape and spread the word on the potential benefits of the data base approach.

Working with MRI, August developed manuals appropriate to the subjects he wanted to teach, he said.

Perhaps the most important lesson he has learned is that the subject matter must be paced slowly enough to be absorbed by the students. Enthusiastic discussions of the system's niceties before the basics are well established can destroy the course's effectiveness.

"You must gain control over yourself to be effective," he warned the users at the conclusion of his presentation.

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NATIONAL –SPECIAL LEAR SIEGLER ISSUE–
INFORMER

April 17, 1978

LEADING SCIENTIST CONFIRMS EXISTENCE OF INTELLIGENT LIFE AT LSI

Every 5½ Minutes The World Gets A Little Dumber *Page 9*

* * *

Project X Connected With UFOs? *Page 14*

* * *

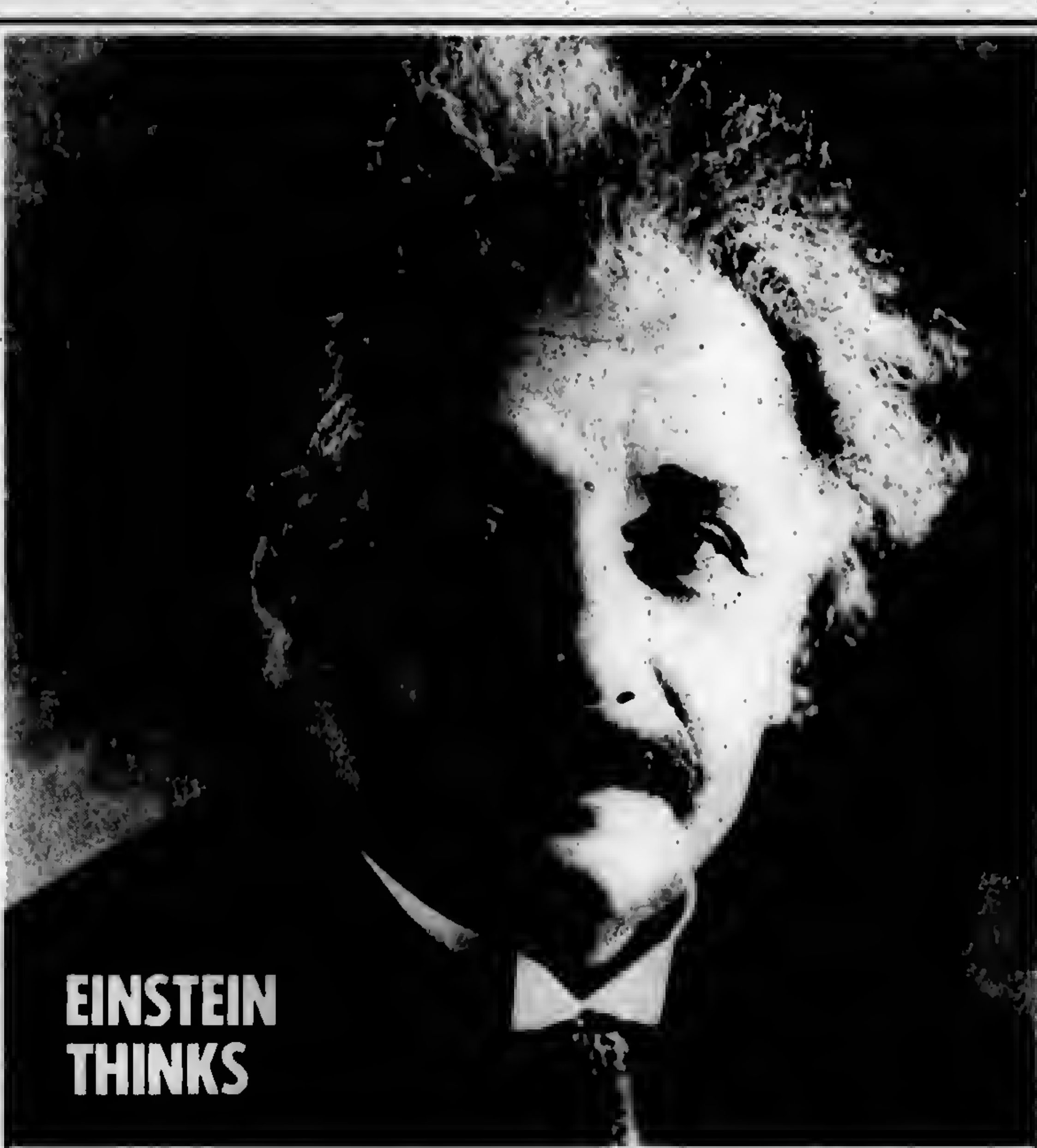
Project X Rated Tops in Interest, Readers' Poll Shows *Page 11*

* * *

Link Found Between Dumb Terminal and Ballistic Printer *Page 20*

* * *

Thousands Losing Sleep Over Project X *Page 8*



Professor Albert Einstein, noted physicist ond formulotor of Theory of Relotivity, hod obsolutely nothing to do with Project X. PHOTO

A top-ranked, noted scientist has confirmed rumors that Lear Siegler's secrecy-shrouded Project X is indeed hard at work on new, mind-boggling devices.

The famous scientist, who prefers to remain anonymous, asked that he be identified only as Dr. ________.

Concerning the mysterious Project X, Dr. ________ declared that LSI's primary intent was to use Project X as a vehicle through which to "totally dominate this year's National Computer Conference (NCC)." Dr. ________ told the INFORMER that, based on scientific deductions, and on several unsavory contacts the Doctor inexplicably retains, the evidence of Project X is irrefutable. At the very least, LSI is developing new, smart terminals, highly intelligent terminals, fantastic new printers, and even an incredible terminal controller. Dr. ________ told us he had suspicions that the terminal controller was in fact so intelligent and capable that it could, in certain instances, actually replace Homo Sapiens. We at the INFORMER feel his worries are exaggerated.

There remains little doubt, however, that Project X is indeed as large and all-encompassing as the INFORMER felt it was when we began this investigation. The ramifications of Project X are awesome and imply a total domination not only of the NCC, but of the entire computer industry — if not now, then surely in a few months' time.

It also seems clear that only a corporation with the stature, experience, and expertise of Lear Siegler, Inc. could hope to pull off an industry-shaking endeavor such as Project X. Already world-renowned for its unparallelled Dumb Terminal and Ballistic Printer, LSI prefers not to rest on its laurels. Instead, a top-priority, broad-spectrum undertaking like Project X is initiated and, according to Dr. ________ and other INFORMER sources, breathtakingly close to success.

What strange and wonderful revelations is Lear Siegler bringing to the world behind the bolted doors of Project X? Will we all have to wait until the NCC to find out how Lear Siegler plans to stun the computer industry? And is Dr. ________ correct in his logical, scientific deductions concerning Project X?

There is something even more mystifying about this silence on LSI's part. An informant working in Lear Siegler HQ, who shall remain nameless, told the INFORMER at presstime that LSI has had the audacity to actu-

(Please turn to page 3, column 2)

TI Adds Pascal to Mini's Repertoire

HOUSTON — A Pascal software package said to be suitable for systems applications because its compiler and several software modules are themselves written in Pascal has been introduced by Texas Instruments, Inc. for the firm's DS990 packaged disk-based minicomputer systems.

Applications traditionally written in Fortran or Algol are within Pascal's domain, a TI spokesman indicated, explaining that Pascal is a general-purpose block-structured language known for its ease and speed of use and for its maintainability.

The 990 Pascal executes in the multiuser environment of TI's DX10 disk-based operating system, adding the benefits of more than 170 interactive user-oriented commands plus 240 utilities, he said. In addition, DX10 supports Cobol, RPG-II, Business Basic, Basic and Fortran IV, he noted.

Included in the 990 Pascal software object code license are a Pascal compiler and runtime library, a nester utility for standardized source indentation, a configuration processor to support separate compilations of nested program modules and a reverse assembler that outputs Pascal object modules in 990 Assembly language source format, according to TI.

The minimum hardware requirement for 990 Pascal is the TI DS990/4 system containing a TI 990/10 minicomputer with 128K-byte memory; a 10M-byte disk drive; a TI 911 CRT; a single-bay desk enclosure; and a DX10 software license.

In conjunction with announcing the Pascal availability, TI said that from March 6 through June 30, purchasers of DS990 packaged systems can select at no charge one programming language license from Cobol, RPG-II, Business Basic, Basic, Fortran IV or now, Pascal.

The 990 Pascal software object code license with its one-year software subscription service costs $1,500 to $2,000, depending on media desired, the firm said from P.O. Box 1444, Houston, Texas 77001.

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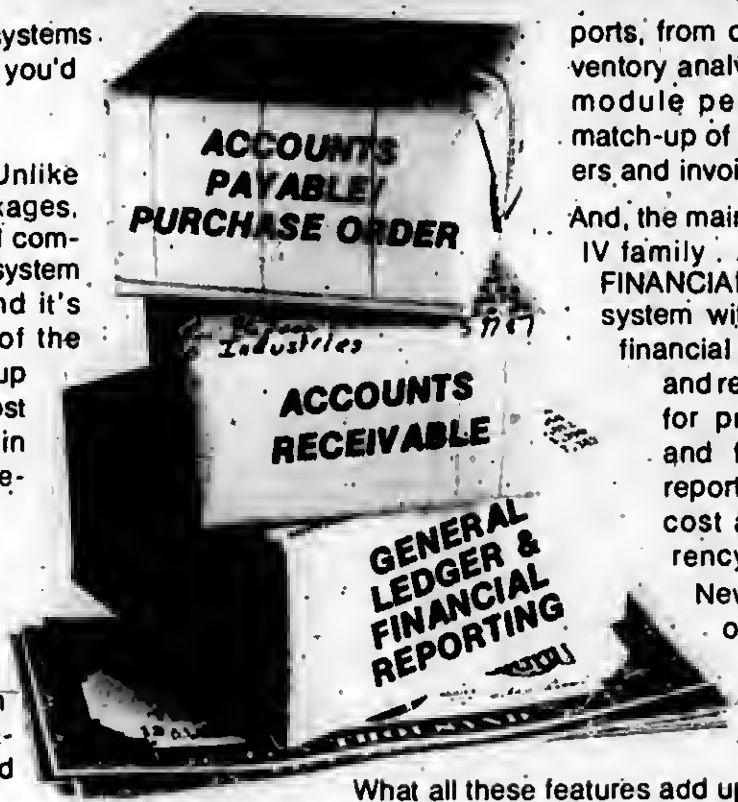
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Package Beefs Fortran Power For Megamini

OCEANPORT, N.J. — An enhanced Fortran hardware/software package has been introduced for its 8/32 Megamini CPUs by the Interdata Division of Perkin-Elmer Corp.

The Fortran Enhancement Package has Fortran runtime library (RTL) routines implemented in Interdata 2K writable control store, allowing execution that is two to three times faster than Interdata's Assembly-level implementation, a spokesman said.

The routines are completely transparent to the user programs and "generate the most accurate results in the minicomputer industry," he claimed.

The package is said to benefit users with real-time applications including statistical analysis, process control, simulation and graphics display. It offers exponentiation and trigonometric functions in single and double precision, Interdata said.

Overall performance improvement varies with the extent these routines are used, the spokesman noted. About 1.5K of the writable control store is employed to implement the Fortran runtime library routines, while the customer can use the remaining .5K to add his own functions, thus customizing the facility and presumably enhancing performance even more.

A software development package is included that features a microassembler for microprogram writing and a support program with debugging capabilities.

The Fortran Enhancement Package costs $6,300. Perkin-Elmer's Interdata Division is at 2 Crescent Place, Oceanport, N.J. 07757.

Micro DBMS Set as Workshop

PHILADELPHIA — A series of four one-day hands-on workshops for its Micro-Seed data base management system (DBMS) has been scheduled by International Data Base Systems, Inc. (IDBS). Designed to familiarize with DBMS techniques and Micro-seed, those devloping small business systems, the sessions are also directed at anyone desiring an introduction to Codasyl DBMS concepts, IDBS said.

Covered in each session will be an introduction to data base management, logical and physical data structure design, the Codasyl data Definition Language (DDL) and Codasyl Data Manipulation Language (DML).

At the end of the day, participants will have the opportunity to design and implement their own applications on the Micro-Seed DBMS, a spokesman said.

"A microcomputer is a terrific teaching tool because of the immediate reality that it imparts — there is no mysteriously distant computer," Dr. Rob Gerritsen, IDBS president, noted.

The workshops are scheduled for Fridays in Philadelphia on May 12, June 30, July 28 and Sept. 15, with additional dates and locations to follow, the spokesman said.

Tuition will be $195 with discounts for multiple registrants. IDBS is at 3700 Market St., Philadelphia, Pa. 19104.

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Misnomer for Other Software

'DBMS' Label Stuck on Too Many Packages?

By Stephen L. Robinson
Special to CW

Data Base Corner

In a recent reader commentary [CW, March 13], I responded to L.B. Towner's article on the future of data base management systems (DBMS). I have since received quite a number of calls and letters from people who misinterpreted my column.

I was not downgrading the present set of Codasyl recommendations (my commentary noted that non-Codasyl DBMS are borrowing some of the excellent features of Codasyl); I was *not* claiming that existing Codasyl implementations are inferior to non-Codasyl packages; and I was *not* saying that one should not consider or acquire Codasyl packages.

I did say that one should not rule out a data base package simply because it is not Codasyl; I said one should not select a data base package simply because it is Codasyl; I also said I do not believe the Codasyl standards, even if accepted tomorrow, would impact the enhancement of existing non-Codasyl systems, nor would they deter the development of new non-Codasyl systems.

Basically, the gist of the article was; "Don't buy a book by its cover" — or a data base package by whether it is Codasyl.

Now that I have hopefully clarified my views on Codasyl data base standards, I would like to pose a question for vendors, users, academics and philosophers: Just what is a DBMS anyway?

I recently came across an announcement for a "DBMS for S/360, 370" that said, "The input/output system (IOSYS) is a comprehensive data base management system for all IBM 360/370 environments."

The announcement pointed out that IOSYS can be used as a replacement for Isam, Vsam, sequential and other access methods.

That's nice, but which is it — a DBMS or an access method? Indeed, what is the difference between a DBMS and an access method? A DBMS and a communications package? A DBMS and a report writer? A query facility? A file handler?

I have sent for the literature on IOSYS, so I will be in a position to judge for myself whether I consider it to be a DBMS or an access method. However, I am clearly not the DP industry. It would probably be helpful to everyone if a standard set of definitions existed to categorize such software.

Most industries have such standard categories. A person who wants to acquire a piano does not have to peruse literature on organs, harps and bagpipes, because they do not advertise themselves as being pianos.

A person looking for a DBMS, however, is likely to end up investigating bare-bones access methods, report writers, edge-notched card systems and query languages, to name but a few. Not that there is anything wrong with such systems, but why must they call themselves DBMS?

To answer my own question, because that's the latest buzzword, and buzzword items sell. I for one am distressed. It's not that we don't have truth in advertising in DP, but that we can't agree on what the truth is.

Case of Data Boss/2

If you're still not convinced there is a problem, I refer you to an item in the March 20 *Computerworld*. Data Boss/2, a DBMS (there's that acronym again), was described by its vendor, Florida Computer, Inc. as meeting " 'two-thirds' of the specifications of a Codasyl-style DBMS."

However, according to the article, Data Boss/2 does not support Cobol programs. Indeed, it apparently supports only Basic and Basic Plus.

I don't know about the Data Boss people, but I consider the Data Defintion Language and Data Manipulation Language to be equal components of the Codasyl specifications.

Data Boss also apparently does not support CALC and VIA modes of data storage, SET logic for interfile record relationships and subschemas. How then can Data Boss/2, missing well over half of the Codasyl specifications, be two-thirds of a Codasyl-style DBMS?

Let us ask another question. Why does the vendor go to the trouble to cloud the advertising of what is apparently a useful package by claiming it is Codasyl? Answer again: It probably helps sell the product.

I would welcome views from readers on what they consider a package needs to be a DBMS, data managment system (DMS), a report writer, a query facility, an access method, a file management system (FMS) and any other package classification that has to do with the storage, maintenance and display of data.

In addition, if you spot any examples of glaringly deceptive advertising in such products, please forward them to me at S.L. Robinson & Associates, 517 N. Pennsylvania Ave., Morrisville, Pa. 19067.

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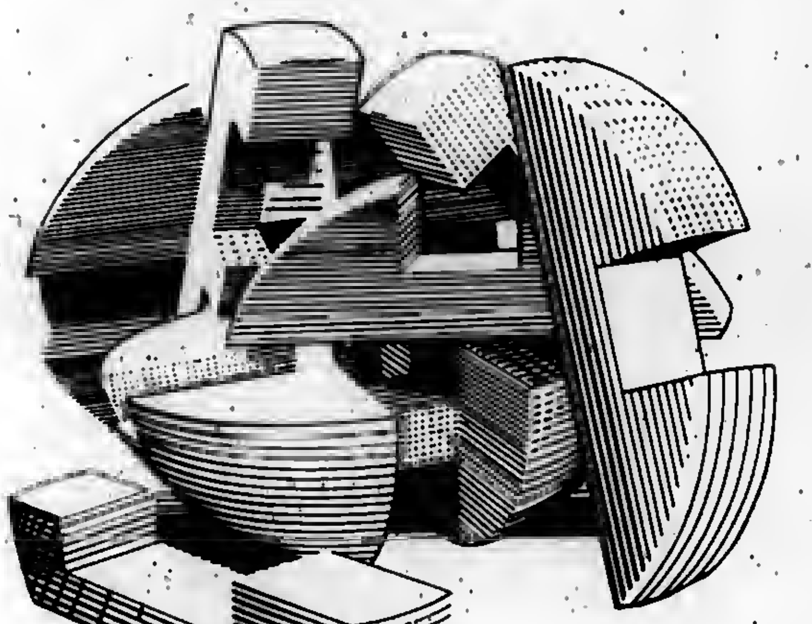

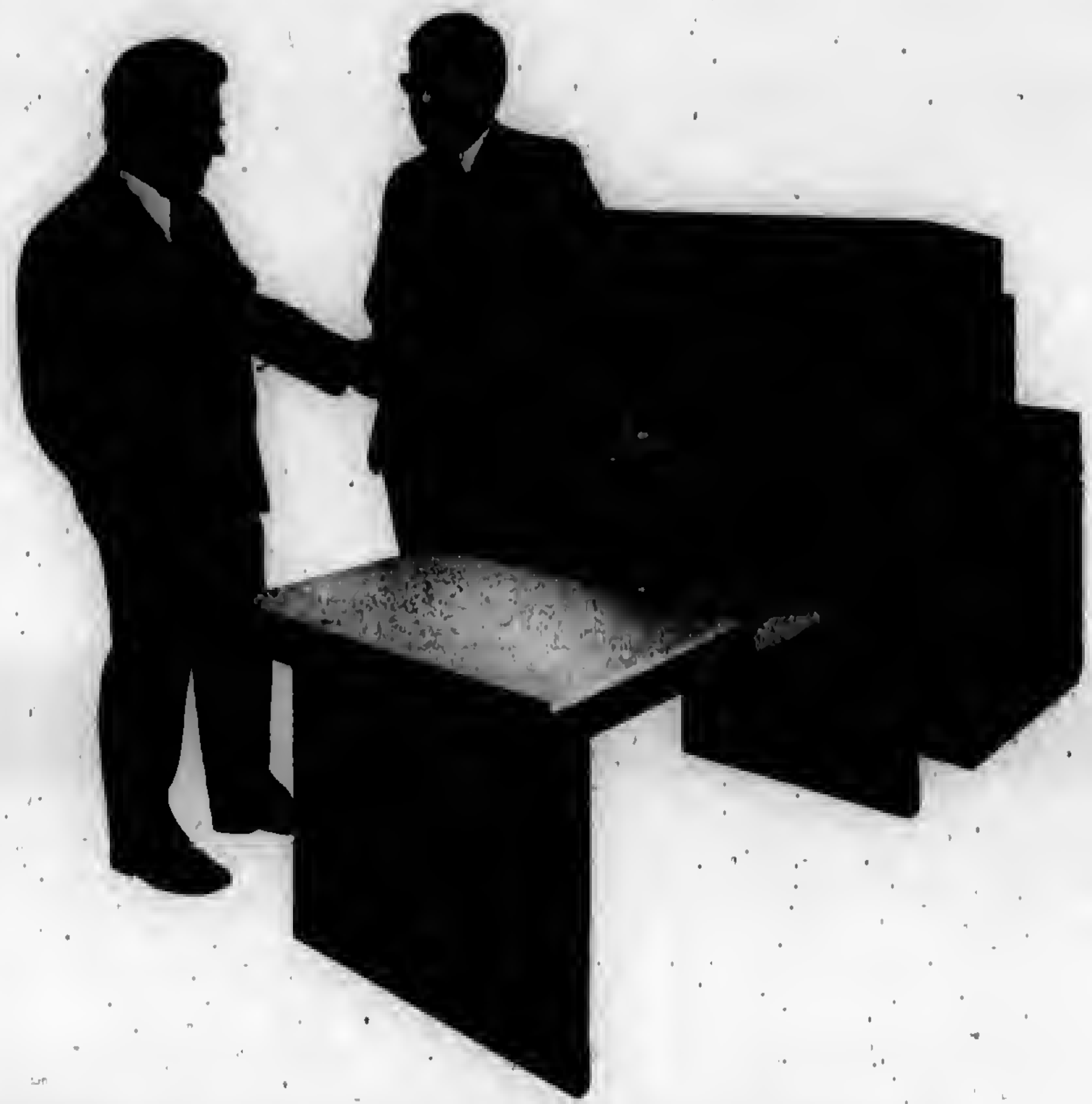

On the left is Joseph D. Vitolo, Executive Vice President, **Bank Leumi Trust Company,** New York, N.Y.; on the right, Thomas Hanson, NCR District Manager and Financial Systems Specialist.

"NCR eased us through a period of exploding volume," says Joe Vitolo of fast-growing Bank Leumi Trust.

NCR's HANSON: Joe, how can you grow through four NCR computers in just three years?

VITOLO: Well, it's a great story, Tom. The answer is rapidly increasing volume. During those three years, Bank Leumi Trust enjoyed extraordinary growth. We went from just 6,000 to almost 100,000 accounts–from $250 million to $1.28 billion in assets.

HANSON: Did changing computers hurt your operations in any way?

VITOLO: Absolutely not. In fact, our operations actually increased in sophistication. During that same time frame, we became the first major New York commercial bank to go into full online operation.

HANSON: If I need an example of NCR's Migration Path Engineering, Bank Leumi may just be the best there is.

VITOLO: You're talking about the relatively easy transition from system to system?

HANSON: Yes. NCR builds more continuity into its systems than any other full-line mainframe supplier. We ease those painful conversions from our entry-level systems step-by-step all the way up to the biggest 8000 series systems, the Criterions. That's "Migration Path Engineering".

VITOLO: That's what helped make our speedy growth possible. We've gone from the NCR Century 101 to the Century 251 to the Century 300 to our present NCR Criterion–the 8570. Each time, we seemed to have capacity to burn. But our growth continued to surprise us.

HANSON: And what happened to your software as you changed systems?

VITOLO: Our basic software system didn't change. It just ran faster. We didn't have to rewrite it for the new system.

HANSON: But you did rewrite, eventually.

VITOLO: That's precisely the point, Tom, as you well know. We rewrote only when the application software was at the end of its normal life cycle – when we would have rewritten even if the hardware had not changed. The software was not obsoleted by the change in systems. And when we rewrote, we used the enhanced command structure of the larger system.

HANSON: And how does that experience compare with the jump from Century to Criterion, from generation to generation?

VITOLO: Exactly the same. The Criterion 8570 is a virtual machine, which means that it can function as a Century–it runs our old programs somewhat faster, and without modification. But when we rewrite our software, we will do it in NCR COBOL 74 to gain top efficiency in programming and operations both. Because the Criterion can operate as a COBOL 74 virtual machine, too.

HANSON: And you are still protected in case you continue to grow. There are two larger Criterions available.

VITOLO: And an even bigger family waiting in the wings, I understand.

In the NCR office near you, there is an account manager like Tom Hanson who knows your industry and migration path engineering. An important reason why NCR is a leader in the field of general purpose computer systems worldwide.

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Complete Computer Systems

Package Supports Fortran

Subroutines Back PDP-11 in Lab

MAYNARD, Mass. — A packaged set of Fortran-callable subroutines said to perform a variety of common analytical laboratory tasks has been introduced by the Digital Equipment Corp.'s Laboratory Data Products Group.

Called LSP-11, the package can be run with Fortran on all current PDP-11 CPUs — the PDP-11/03 through the high-end PDP-11/70 minicomputer. All subroutines are involved with processing data acquired by other laboratory system software.

The LSP-11 package is comprised of subroutines for peak processing, interval histogramming (with or without reference points), Fast Fourier transform, phase angle and amplitude spectra, power spectrum and correlation functions, a source said.

The LSP-11 works with the RT-11 operating system, supporting Fortran IV/RT-11 and with RSX-11M supporting either Fortran IV/IAS-RSX or Fortran IV-Plus, he added.

"Many laboratory researchers have been forced to do time-consuming programming . . . developing data reduction routines from scratch. Often, they would prefer to concentrate on their applications instead of having to develop analytical programs."

"LSP-11 frees them from time-consuming program development by providing powerful tools that can be easily integrated into their application programs," he continued. "The ability to use the same source language programs with the full spectrum of PDP-11 computer systems makes possible the development of system-independent application programs."

LSP-11 is licensed at $300. DEC is in Maynard, Mass. 01754.

Free Guide Helps Users Size Up Data Dictionaries

CINCINNATI — A "Data Dictionary/Directory Evaluation Criteria" guide is being offered here for free.

The guide is based on research and experience of information systems development groups, the firm said, noting the publication stresses both the logical business aspects of information systems development and programming considerations.

The guide also provides tips for the evaluation of Pride-Logik, the firm's information systems and data resource dictionary/directory.

Copies of the guide are available from M. Bryce & Associates at 1248 Springfield Pike, Cincinnati, Ohio 45215.

Cibar Schedules Five Courses On Structuring

COLORADO SPRINGS, Colo. — A professional development seminar series designed to acquaint participants with structured program design methodologies and structured programming in Cobol and PL/I will be presented at several locations by the Cibar Systems Institute.

The two-day, four-session meetings covering design methodologies will focus on basic functional decomposition, composite design, program structure based upon data structure and stepwise refinement.

In covering structured programming in Cobol or PL/I, the seminars will include such topics as top-down design, hierarchy charts and program style.

The seminar will be given in San Francisco, April 24-27; Los Angeles, May 8-11; Washington, D.C., May 22-25; Chicago, June 12-15; and Dallas, June 26-29.

Tuition is $90. Cibar is at 2850 W. Serendipity Circle, Colorado Springs, Colo. 80917.

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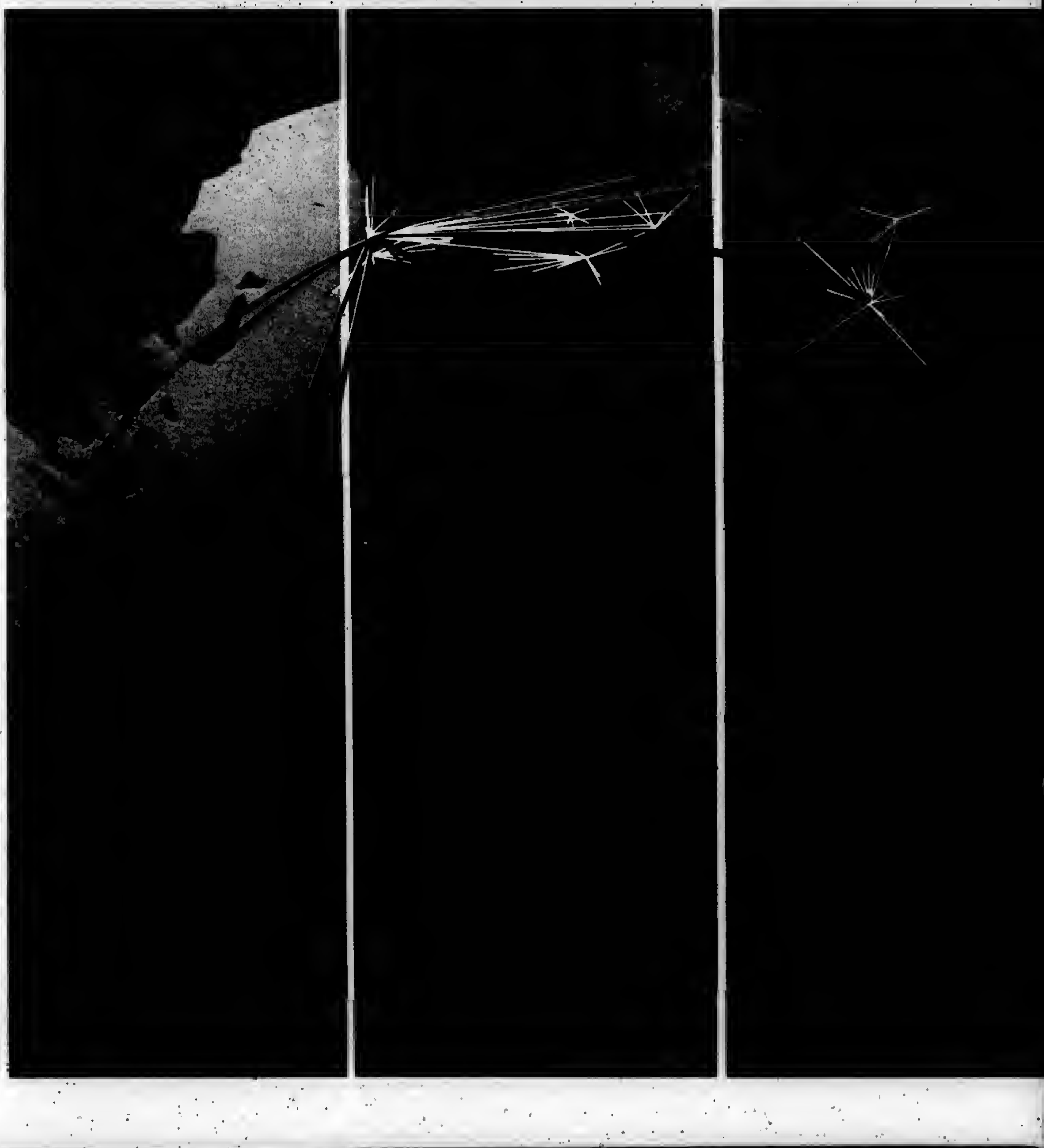

Written in Cobol

Program Written as Chess Buff's Research Aid

By Brad Schultz
CW Staff

ENGLISHTOWN, N.J. — A Cobol program that determines every possible legal move from any point forward in a chess game and performs other chess analysis — for example, finding "inevitable" mates — has been written here by one R.C. Smith and submitted to the U.S. Chess Federation for evaluation.

"R. Smith's Chess Explorer 1" (RSCE-1) was designed as a research tool for chess buffs. It does not play chess with anyone, but will generate quite an array of "trivia," Smith said.

For instance, the program automatically generates the information that after the first three half-moves — white, black, white — there are 8,902 possible three-move games, Smith explained, adding that the program also breaks down white's 8,902 possibilities as:

White	Number Of Moves
Queen's rook	100
Queen's knight	880
Queen's bishop	278
Queen	340
King	120
King's rook	100
King's knight	880
King's bishop	278
All pawns	5,926

From any point forward in the game, RSCE-1 can "play" and record on tape with printout every possible legal move for as many half-moves as the user requests, Smlth said.

Typically the user would stipulate very few half-moves, Smith indicated, pointing out that 400 two-move games would be generated if someone requested the first two half-moves from the game's opening; but if someone requested a large number of half-moves, the system in theory would be committed to a tremendous amount of computation.

To cut down on the number of distinct games under scrutiny, the user may specify that on any three iterations only certain pieces can move, Smith said.

'Inevitable' Mates

To facilitate discovery of "inevitable" mate opportunities, the user can specify, for example, that white is the "aggressor," he continued. This would mean that, when white moves, only those moves placing the black king in check are accepted and written to the tape.

Under this option, all possible valid black moves are played and written to the tape. Only those moves taking the black king out of check would be valid and written to tape for the next iteration when white would again try checking the black king, Smith explained. This cycle would be repeated until black had no response, assuming such a state could exist.

Mates obtained via this method are written on an "exception listing," which is reviewed against the full printout of all games after each iteration, allowing determination of which discovered mates are inevitable, rather than simply "bad" moves by the opponent, Smith said.

With RSCE-1, the user has the option of playing on a "mini" chess board. For example, the board might consist of just 24 squares — instead of the conventional 64 — and involve four pawns, a king, bishop, knight and castle for each side, he noted.

Smith claimed the program can play on any size or shape board with appropriate adjustments for en passant, castling and pawn conversion routines.

RSCE-1 has the dubious distinction of probably being the

(Continued on Page 38)

processing will work for you?

At Hewlett-Packard, we began distributing the computer workload around our factories in 1967. Then, in 1971, we instituted a worldwide systems network that has helped us grow to $1.36 billion in shipments, with 42 percent of our business in computational products.

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We began with the basics.

Small systems went to work in our factories, automating the testing of circuit boards and, later, hand-held calculators. The next step was linking these minicomputers with other factory systems so they could relay data and programs. The obvious need then was to tie these computers into an information network so that key managers could make decisions based on accurate, up-to-the-minute data.

As we continued to grow, we connected our widespread sales offices with the factories. Today we have 130 high-speed communications systems in 94 locations, sending compressed data via satellite and phone lines. About 12 million words a day come into our California headquarters. Yet the cost is phenomenally low. For example, we can send a ten thousand word message to Toronto in one minute for 85 cents. On a teleprinter, it would take 16 hours and cost $800.

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One major reason our distributed processing approach works so well for us is the same reason it will work for you. It's extremely flexible.

You don't have to choose between a star network, or a circle, or a string. Our way, you can have any or all of them. And you can hook up an HP network for as little as $5,000. You won't have to throw out your old equipment, either. Some non-HP computers and peripherals are still carrying a share of our workload. There's no reason why your present systems can't do the same for you.

The keystone of our system is the HP 3000, a powerful general business system. It communicates with the HP 1000, a computer generally dedicated to design, test and control applications in the factory. (Both can also link directly with an IBM mainframe.)

Most long-distance communications between sales office and corporate headquarters are handled by the HP 2026, which can also take care of on-site editing. This keeps information (much of it off-loaded from the central computer) on-hand for local use, shrinking the amount of unusable data funneled to headquarters.

We've just introduced new software for the HP 3000 that makes it an even more powerful management information tool. You can, for instance, sit down at your computer in New York and use all the processing power and data base of your Los Angeles computer—or any other HP 3000 in your network. Software is also available to tie HP 1000 systems together in a plant-wide information sharing network. So you can find out exactly what's going on in your business—from the ground up.

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There's not much point in building good computers unless the peripherals are just as good. That's why we make our own printers, video terminals, disc and tape drives, and data entry devices.

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1100/OS Gets Conversational RJE

DALLAS — Time-sharing with a special remote job entry (RJE) feature is now available with University Computing Co.'s (UCC) 1100/OS.

Conversational Time-Sharing (CTS) provides "conversational" RJE, allowing the user to create and edit programs and data in an interactive mode and then submit them for batch processing, a UCC spokesman said, noting CTS allows the firm to address the lowspeed, interactive time-sharing marketplace.

With CTS, the user receives diagnostic line-by-line syntax checking and program compilation, he said, adding that the user can interrupt his program during execution to edit and then resubmit the job, enhancing control of his output and associated costs.

Basic, Fortran and Cobol are available with CTS as well as the UCC relational DBMS (DBIV) — all in interactive mode. CTS is also said to support 30 char./sec Ascii terminals.

The cost of CTS varies with the particular user situation, the firm said. UCC can be reached at 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

Chess Research Tool Programmed in Cobol

(Continued from Page 37)

only chess program written in Cobol, Smith said, noting Assembly language would have been more appropriate. He explained that since his own programming experience has largely been with Cobol and this project had to be conducted in his own free time, he wanted to stay with a familiar medium.

The program employs two tape drives and 57K of core and runs in an IBM 370/158 VS environment, he said, adding that communication with the program is accomplished through control cards filled out by the user.

Not a Player

"I should point out . . . that I'm not a chess player by training, aptitude or inclination and, further, that I've no knowledge of what work has already been done in the field of computer chess," Smith wrote U.S. Chess Federation Executive Director Martin E. Morrison.

"Briefly, my academic background is in philosophy (a long time ago) and my business experience has been in commercial DP . . . Currently, I'm a systems manager with a major consumer goods company," he stated.

On Own Time

"Accordingly, I've undertaken this project purely on my own time in response, initially, to my philosophical interest in the problem of being able to theoretically play and record all games and more significantly in the problem of what could be done with such knowledge if it were available," he added.

R.C. Smith can be contacted at 20 Chaucer Road, Englishtown, N.J. 07726.

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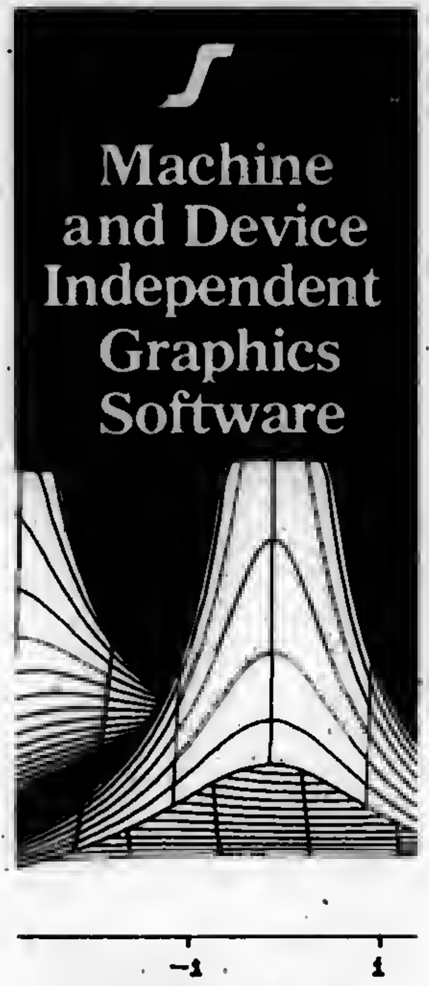
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By Encouraging Competition

FCC Sparked Services in Canada: Sharp

By Ronald A. Frank
CW Staff

TORONTO — If it were not for the Federal Communications Commission (FCC) in the U.S., many communications services now available in Canada would not have been introduced, according to Ian P. Sharp, president of I.P. Sharp Ltd.

Speaking at the opening session of the recent Data 78 conference here, Sharp said Bell Canada has tended to react to FCC actions. If the U.S. commission did not favor competition and innovation, fewer Canadian communications services would be available to users.

Common carriers are in the business of protecting and enhancing revenue. This is what the Dataroute and Datapac services in Canada were aimed at, he said.

Carriers are attempting to eliminate private-line networks by replacing them with measured service. The carriers will not be allowed to stop offering private lines but instead will implement rate hikes totaling 50%, Sharp predicted. General Electric Co. has already been refused flat-rate private lines to Hong Kong, and there will be no private lines within France by mid-1978, he said.

CW At Data 78

CW Photo by R. Frank

Dixon Doll

Consultant Dixon Doll told session attendees that a debate will develop in the next few years over the merits of private vs. public data nets. Although packet nets are becoming more widespread, many users want to stay in control of their destinies and therefore prefer private-line links, he said.

Many organizations have vested interests in the shape of future networks and some could use pricing to push the method they favor most, he said. Up to now, there is no evidence that pricing has been used as a weapon, but this is a real possibility, according to Doll.

The computer industry and the communications industry are both looking for ways to expand, and as new technology is developed, the historical boundaries between the two are becoming blurred, he said.

Substantial modifications are required today for users to shift from in-house private nets to public nets. The special Systems Net-

(Continued on Page 40)

Variety of Terminals Gain Link to Packet-Switched Net

By a CW Staff Writer

TORONTO — Daedalus Micro-Electronics Ltd. has introduced one of the first terminal interface devices for packet-switched networks.

Shown at the recent Data 78 conference here, the DME 101 is a microprocessor-controlled unit that allows users to attach IBM 3270 binary synchronous terminals, as well as 2780, 3780 and 360/20 workstations, to the Canadian Datapac network.

The initial version, called the Datapacer, allows users to interface to the packet net without making the terminals directly compatible with the Snap protocol required on Datapac, according to a Daedalus spokesman.

The Datapacer reportedly uses LSI technology and an EIA RS-232 "crosspoint controller" designed for packet technology. A resident firmware supervisor controls internal "resources" and data paths. Customer-selected options are said to be maintained by a read-only memory accessible from the supervisor.

The controlling firmware consists of a Network Transmit Controller (NTC), Device Transmit Controller (DTC) and the Supervisor/Crosspoint Controller (SCC). The NTC is the Datapac transfer and control interface, dedicated to data and control

(Continued on Page 40).

IBM Software Strategy Held Basis of Four User Problems

TORONTO — IBM's decade-long strategy of placing all communications software control at a central mainframe site has presented four major problems to users, according to Robert Budenstein of Paradyne Corp.

Speaking at a recent Data 78 session dealing with the economics of virtual data links, Budenstein told attendees that transactions between the mainframe and remote peripheral devices within IBM nets are controlled by the mainframe "through a front end driven by complex and costly teleprocessing software systems."

The first of the four problems is the cost of the personnel needed to develop and to maintain such IBM teleprocessing software as Btam, Tcam, Rtam and, most recently, Vtam. In many cases, an organization must assign its most highly skilled software engineers to the task of teleprocessing system design and maintenance, he noted.

The second issue network builders must face, according to Budenstein, is the time involved in developing and maintaing teleprocessing software.

The third is the cost of equipment at the central site, as well as at remote locations. This issue, too, is directly affected by the complexity of teleprocessing software.

(Continued on Page 40)

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IBM Strategy Seen Impacting Users Four Ways

(Continued from Page 39)

The fourth problem involves communications line charges. With all network control at the central site, a separate line is normally required for each remote peripheral device, making even small networks prohibitive for many prospective users, he said.

Evolutionary Development

The evolution of centralized communications control began at a time when all computing was local, Budenstein pointed out. Systems were simple, consisting typically of a central processor, a card reader and a line printer. One small software routine allowed the user to read cards while another permitted printing.

Even when multiple card readers and printers were added, he recalled, there was little need for concern with error detection or recovery because each of those peripheral devices was connected directly to the processor.

Concern with error conditions arose when card readers and line printers were installed at remote sites; users then had no adequate means of determining the quality of communications lines. IBM responded by developing a "dumb" box, initially the 270X, Budenstein said.

The function of the 270X was to take a data stream coming from the central processor and convert that data for transmission down two-wire or four-write communications lines. The 270X had a built-in error detection capability, but no means of correcting the errors it discovered. That job was left to the mainframe, he noted.

Satisfactory Protocol

Considering the Binary Synchronous protocol then in use, Budenstein explained a block of data was transmitted and the system had to wait for acknowledgment (ACK) or negative acknowledgment (NAK) before transmitting the next block of data or retransmitting the first block.

That protocol was satisfactory because users at that time were just getting their feet wet in communications, he said; line speeds were limited to 2,400 bit/sec or less and few people dreamed of requirements beyond that.

Attempt at Improvement

In its Systems Network Architecture (SNA), IBM is attempting to improve the efficiency of that communications scheme, Budenstein said. One phase of those attempts has involved the elimination of Binary Synchronous protocol in favor of a more continuous transmission of data.

To that end, IBM supplied a protocol in which seven blocks of data can be transmitted before an acknowledgment is required, Budenstein said. Theoretically, a response would have been received from transmission of the first block before transmission of the seventh block.

At the same time, some of the communications functions which had previously been handled in teleprocessing software were moved into the front end, formerly a nonintelligent device, which grew to become the 370X.

With responsibility for Network Control Programming, the front end became a computer requiring as much as 180K bytes of memory. The basic communications scheme remained the same, however, including a front end and remote communications protocol.

That communications scheme results in relatively low communications speed and low efficiency, he contended. IBM rarely allows line speeds as high as 9,600 bit/sec and limits the number of remote peripherals possible in a network, he said.

Virtual Data Link

The concept of a virtual data link evolved when the decision was made to eliminate the telecommunications protocol altogether rather than work around it, according to Budenstein. The use of similar "boxes" at both ends of a communications line, or at each node within a distributed computing network, provides an efficient alternative to the IBM front-end structure, he said.

This alternative makes extensive use of technology that was unavailable when the IBM front-end structure was originally developed.

The PIX communications scheme from Paradyne Corp. does not involve the shifting of teleprocessing software; instead, devices are defined in such a way that software is not necessary, Budenstein said. Once the data has been transmitted from the mainframe to the PIX controller, it can be transmitted downline from that device in Sychronous Data Link Control (SDLC) protocol along any transmission system.

Intelligence at both ends of a communications line improves the flexibilty with which peripherals can be located at remote sites. A front end communicating with a 2780 over a single line, for example, cannot communicate with additional devices unless multiple lines are established, he said.

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Agency Sparked Offerings

(Continued from Page 39)

work Architecture (SNA) Datapac interface available in Canada is a "scaffolding approach." IBM has to accept the fact that packet nets already provide a variety of functions.

The implementation of datagrams on packet nets is still two years away, the consultant said, and major contenders are jockeying for position while IBM sits back to see what happens.

Palle Kiar, director of the computer communications group of the Trans-Canada Telephone System, agreed, saying there will be less emphasis on technology and more on applications needs. Many countries are implementing public nets and some of these will jump right into packet technology, thereby bypassing earlier types of networks, he said.

Richard Taylor, president of Data Crown Ltd., served as conference chairman, welcoming attendees and predicting that computers and communications will create a Canadian infrastructure that ultimately could replace autos and food processing as Canada's largest industry.

Data 78 was the first Canadian conference dedicated to data communications and recognizing the importance of this area, Taylor said.

Terminals Gain Packet Net Link

(Continued from Page 39)

transfers on the Datapac network.

The SCC and the NTC are capable of transferring data buffers and handshake control transfers across the Canadian packet network, the spokesman said.

The DTC was described as the "dialogue-dependent interface for host and terminal."

Although presently available only for use on the Datapac network, a spokesman said the unit will be provided also for Telenet and Tymnet networks in the U.S.; the Infoswitch network in Canada; and the Transpac network in France.

With the DME 101, users can mix protocols and vendors and the requirement for network interface machines is eliminated, the company said.

Prices in Canada for the Datapacer are $200/mo per synchronous device port and $300/mo for eight asynchronous devices. The unit is limited to 9,600 bit/sec because this is a limitation of the Datapac network. The DME 101 can operate at speeds up to 50 kbit/sec, Daedulus said.

In addition to IBM devices, the spokesman said, Daedulus is considering support for Honeywell Information Systems, Inc. and Univac terminal protocols. A Synchronous Data Link Control/System Network Architecture (SDLC/SNA) capability is reportedly being planned and DME 104 will soon be available in the U.S.

Daedalus Micro-Electronics is at 191-18 Nugent Ave., Scarborough, Ont. M1S 3B1, Canada.

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Terminal-Based Net Details PBX Malfunctions

SEATTLE — PBX system malfunctions at Pacific Northwest Bell here are being diagnosed with the aid of a terminal-based system that classifies problem areas by customer, type of PBX, geographical location and other variables.

Using AT&T Dataspeed 40 CRTs, the system enables the phone company to conduct the analyses necessary to pinpoint trouble trends or areas by accessing the Tymshare, Inc. DP network. It also enables management to set priorities for preventive maintenance of PBX systems and to determine future manpower requirements for maintenance.

The analysis is done on an IBM 370/168 CPU at Tymshare's Cupertino, Calif. DP center.

According to Chuck Trapp, customer service staff supervisor, the system has greatly reduced the paperwork involved in PBX maintenance since it went into operation last May.

Developed by Tymshare's telephone industry marketing group, the system which uses Cobol, is now in operation throughout the Washington-Idaho area. This area includes 26 customer service operating units (CSOU) responsible for the maintenance of 762 PBX systems.

The system provides PBX maintenance supervisors with an estimated routine maintenance report, a master equipment test list, a PBX work schedule, corrective and preventive maintenance reports and district inventory reports summarized from CSOU to district to division to department.

The system also enables phone company managers to order special reports in a virtually unlimited variety of formats for comparison and analysis, Trapp said. For example, if a marketing executive is receiving numerous complaints about a particular kind of PBX, reports can be ordered to determine whether the problem is with a specific component or within a particular CSOU.

Pacific Northwest Bell's PBX maintenance was a manual system prior to the installation of the Tymshare system, Trapp said.

The data base is stored in Tymshare's CPU in Cupertino, which handles all the processing. Telephone company personnel communicate with the CPU via the Dataspeed 40 CRTs.

"From the over 700 PBX systems now included in the system, we receive approximately 2,500 to 3,000 trouble tickets each month," Trapp said. "Previously we had to read these tickets, compile them and manually analyze them.

"Now the information on the tickets is entered into the CRT and the analysis is done automatically. And it's summarized from one level to the next to give us a better overall picture of what's going on," he added.

The Tymshare system produces among other reports a district inventory that lists by district the telephone number of each customer, the address, the type of PBX, the location of the PBX and the number of stations the customer has.

This report has relieved district managers of the burden of manually preparing quarterly inventory reports, Trapp said.

"I enter the initial inventory into the computer creating a data base," he said. "That data base changes very little after that, but when equipment is added or subtracted from a PBX system, I simply add that information to the data base and we have an up-to-date inventory list in the computer.

"I'm extremely pleased with the results we've been getting from this system," he added. "It's relieved the field supervisors of a tremendous amount of paperwork while providing us with more comprehensive analyses than we've ever had before."

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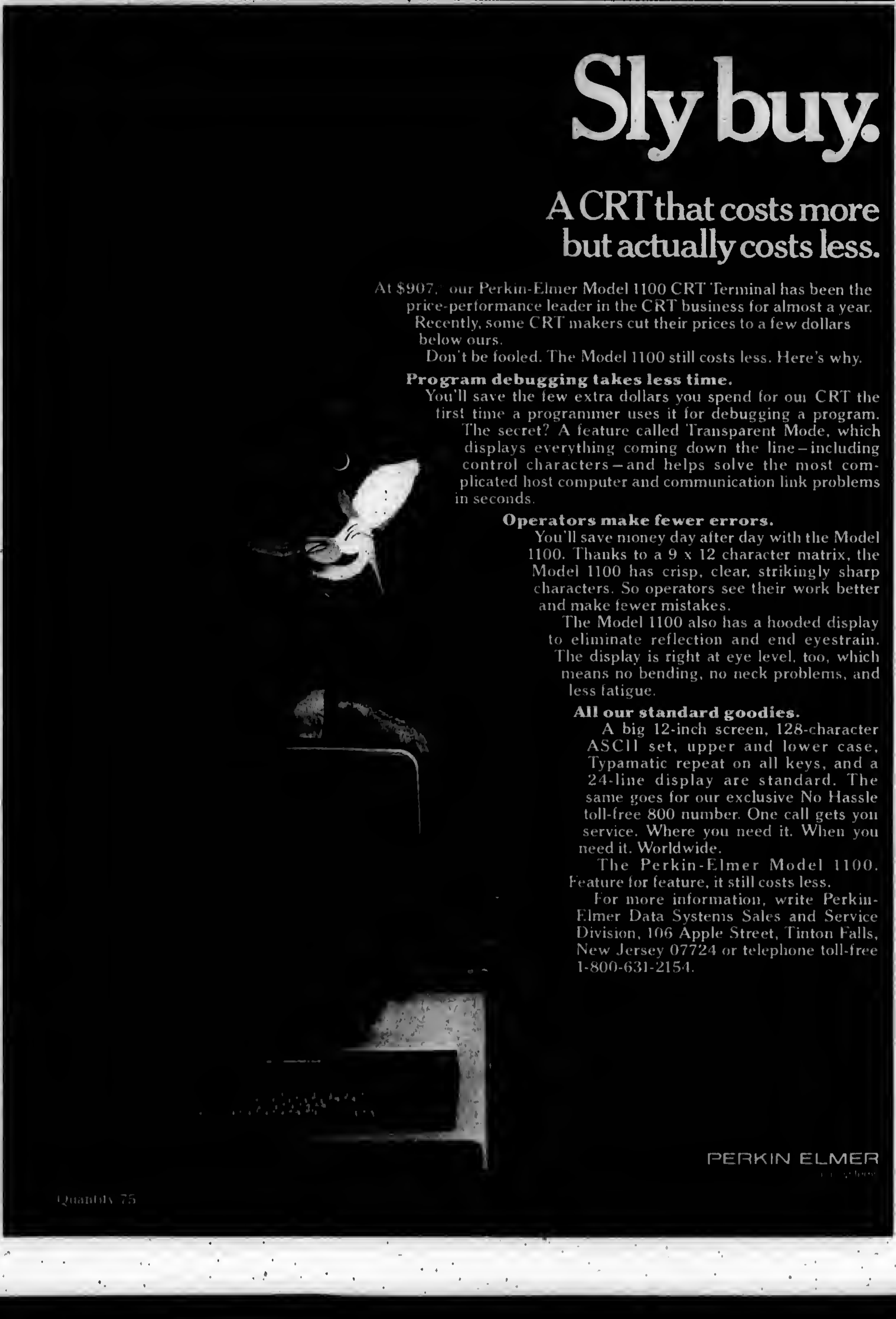

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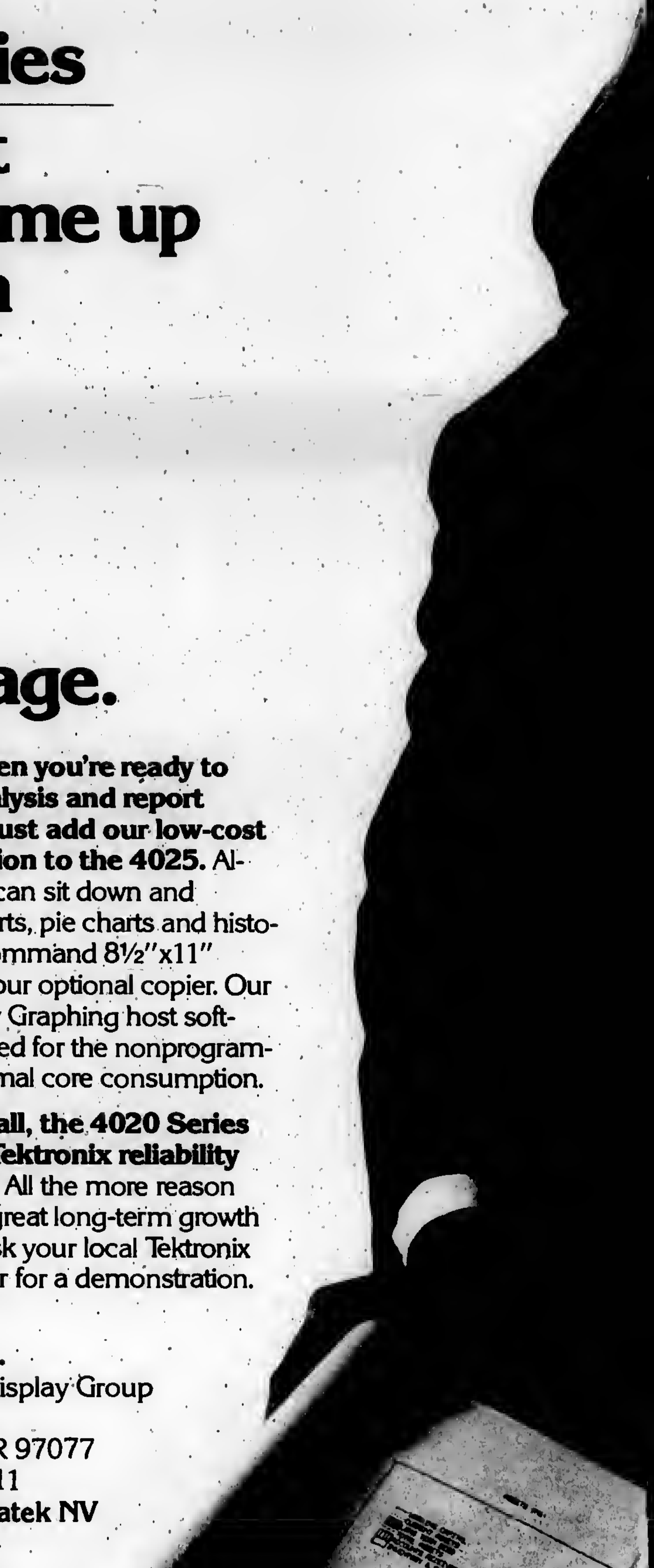

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Olivetti TC 800 Terminal Gains Dual Keyboard

NEW YORK — Olivetti Corp. has introduced the TC 800 dual-keyboard financial terminal system, an enhancement of the TC 800 financial terminal sytsem line.

The dual-keyboard TC 800 is an on-line terminal system that can be configured either as a two-workstation stand-alone unit or as a two-workstation satellite system in a clustered master/satellite terminal environment, Olivetti said. In either type of configuration, the TC 800's resident intelligence provides for teller prompting, transaction processing and simultaneous editing and verification at both workstations, a spokesman noted.

On-line communications connection is controlled in the TC 800 stand-alone terminal and accomplished through the TC 800 master terminal in a clustered master/satellite configuration. Transactions can be processed off-line by either configuration with no change required in operator procedures, according to the spokesman.

Three CRT Units

Three different CRT units are available, offering screen capacities of 260-, 480- and 1,920 characters. Numeric and alphanumeric keyboard/consoles with up to 38 function keys and an optional magnetic stripe debit/credit reader are also available.

For printed output, the choices include document/passbook printers and optional document feeders and integrated magnetic stripe reader/-encoders and four auxiliary printers with speeds from 100 char./sec to 600 lin/min.

For program and data storage, floppy disk, disk cartridge, magnetic tape cassette, 7- and 9-track magnetic tape and punched card devices may be included, Olivetti said. An optical character wand for reading optical character recognition (OCR) documents is also available.

Micro With ROM, RAM

Each TC 800 has its own microprocessor which includes read-only memory (ROM) for controlling program execution and random-access memory (RAM) for application programs and host computer interface. Each terminal unit also has 16 I/O channels to support the components which make up the workstations.

Either single- or dual-keyboard workstations are developed by connecting the desired combination of components to the TC 800 control unit. A dual-keyboard two-workstation unit typically includes one controller, two keyboard/consoles, two CRTs and one passbook printer.

The TC 800 intelligence is resident in each terminal and is thus shared by, at most, two workstations. In addition, each keyboard/console has four teller identification keys to provide for teller changeover or an optional debit/credit plastic card reader, Olivetti said.

The price of a typical dual-keyboard TC 800 with one controller, two CRTs, two keyboard/consoles and a passbook printer starts at about $12,500. Olivetti Corp. Financial Terminal Products is at 500 Park Ave., New York, N.Y. 10022.

Course to Cover Digital Satellites

WASHINGTON, D.C. — A course in "Digital Satellite Systems and Technology" will be given June 12-16 at George Washington University here.

The course is designed for engineering managers, engineers and others who need an understanding of the concepts of digital satellite systems and the technology involved in their implementation.

Background Provided

The topics covered will provide the background necessary to design and evaluate the digital satellite systems which will play a major role in the communications systems for the future, according to a spokesman for the university.

Both the central system concepts and practical implementation issues will be discussed so participants can obtain a balanced view of the area, he added.

The course fee is $575. Further information is available from the Director, Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

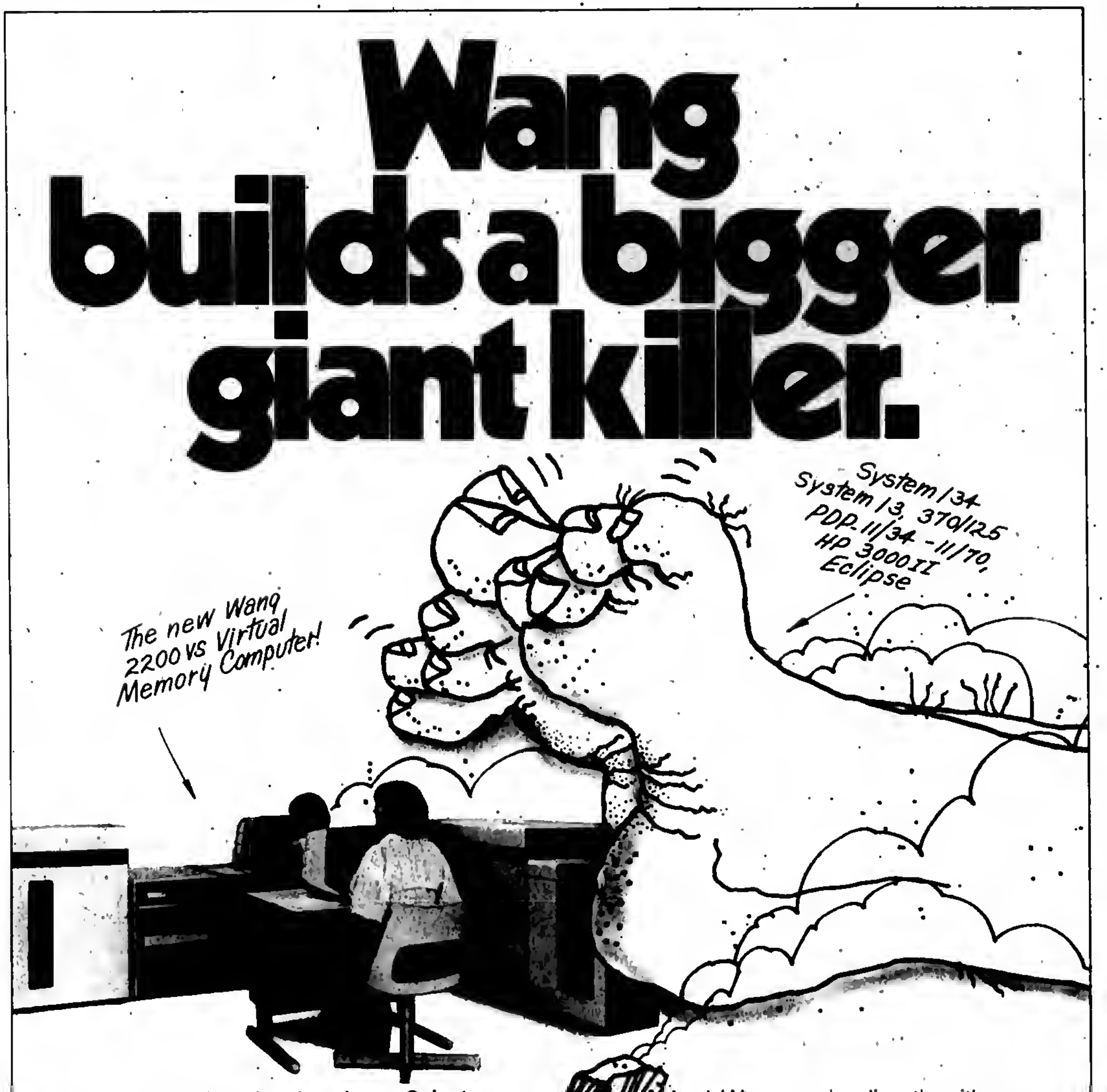
Datec 32 Works For Bell 103/113

CHAPEL HILL, N.C. — The Datec, Inc. Model 32 acoustic coupler provides Bell 103/113-compatible duplex or half-duplex 300 bit/sec data communications, according to a spokesman.

Both transmitter and receiver incorporate crystal-controlled CMOS digital integrated circuits for FSK frequency generation and discrimination. A signal-quality carrier detector circuit eliminates false carrier indication and permits channel establishment with signals as low as -55 dBm, he added.

A single female connector provides both EIA RS-232 and 20mA teletypewriter-compatible interfaces. Simultaneous operation of two data terminals is possible with a terminal splitter attachment, Datec said.

Priced at $395, the Datec 32 is available from the firm at P.O. Box 839, Chapel Hill, N.C. 27514.



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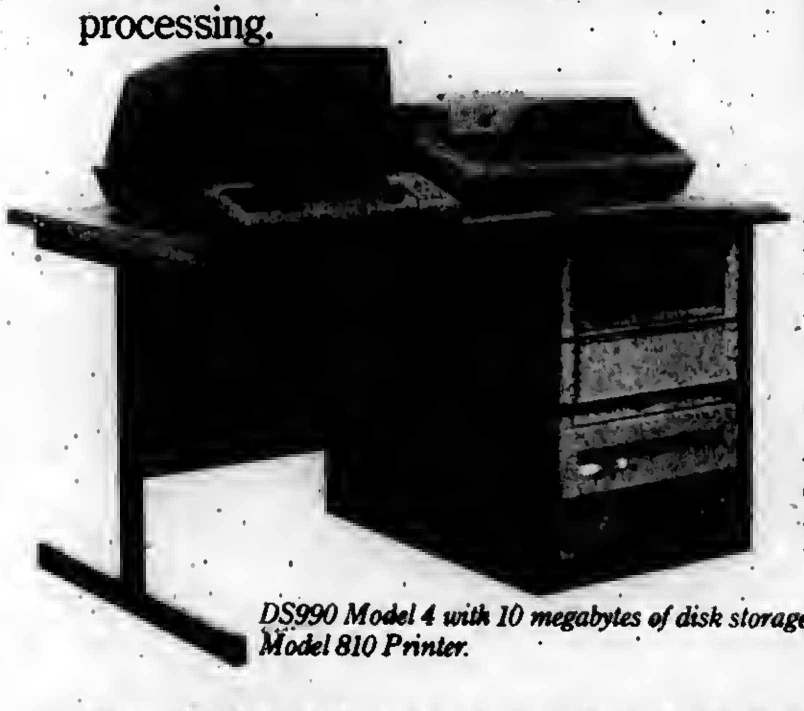

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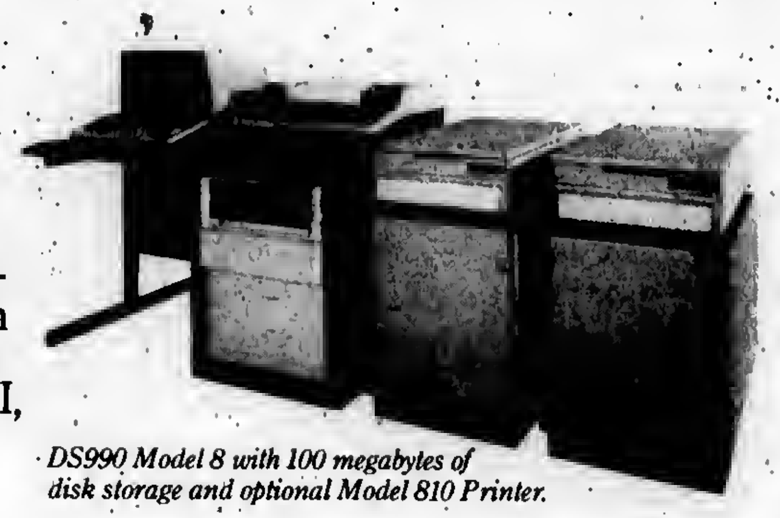

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Auto Parts Inventory Net Improves Service

ATLANTA — Genuine Parts Co. (GPC) enables National Automotive Parts Association (Napa) jobbers and their customers to share the benefits of a terminal-based inventory control system. The resulting improvements in service are said to include instantaneous recall of any part in the current inventory.

The network reportedly reduces costs by increasing the sales capacity of the salescounter staff by 30% and by improving inventory turnover for the stores in the Napa chain.

The system, called Total Automotive Management Systems, was designed to be operated by existing store personnel and performs point-of-sale invoicing, inventory updating and price updating. It also provides business summaries such as sales and inventory analyses, lost sales reports and measures of gross profit per sales counterperson, a spokesman said.

The terminal system was designed for the Napa jobber having a store volume as small as $25,000/mo. The system requires minimal changes in the operation of the store.

To join the Tams network, the jobber purchases a turnkey minicomputer system from GPC, a national Napa distributor headquartered here, officials explained.

System Operation

When a requested part is keyed into the system, its price and availability are displayed. If the part is purchased, an invoice is printed and the inventory is automatically updated. If the part is not available from stock and the customer wishes to order it, the required information is keyed into the system and stored until the end of the day, a spokesman said.

At the end of the day, the Tams system automatically produces required reports and prepares the minicomputer for communication. During the night, the GPC DP center located in the jobber's region polls the minicomputer for its order and accounting transactions.

The DP center processes the information and communicates the order to one of GPC's Napa distribution centers. The distribution center fills the order the next business day by delivering the part before the jobber's store opens the next morning, a spokesman noted.

Also during the night, the regional center polls the minicomputer for the second time to communicate to the jobber the status of his order and inventory data. The minicomputer processes this information and automatically updates the inventory with the items shipped or back-ordered and any price changes or other inventory maintenance data.

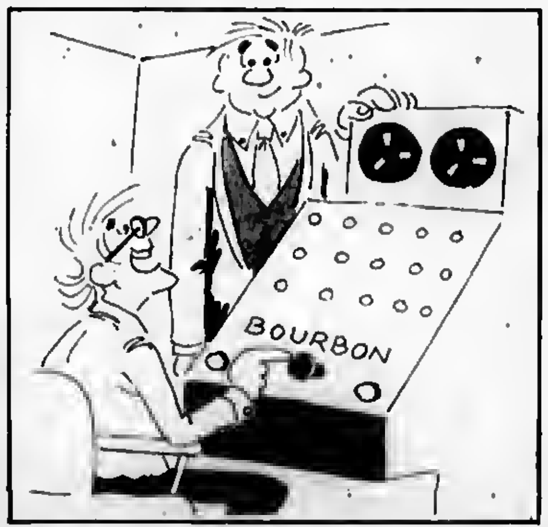
Hardware Set-Up

The system located in the jobber's store consists of a Data General (Corp.) Nova 3 with a 64K-byte memory, a 10M-byte disk, a Model 6031 diskette, Model 6012 CRTs and a Model 6040 Dasher printer. Should the jobber's store volume exceed the capacity of the standard Tams system, he can upgrade this configuration by adding disk and main memory capacity, officials noted.

To minimize communications costs, the system communicates with the regional center over full duplex 1,200 bit/sec asynchronous dial-up phone lines using a Vadic Corp. modem. Each regional center communicates with the jobber's system with a satellite processor consisting of a Nova 3 configuration similar to the jobber's, but also including a Model 6020 magnetic tape subsystem and a synchronous line adapter.

The satellite processor communicates with an IBM 360/40 host located in the regional center via tape or over 2,400 bit/sec synchronous dial-up lines. The regional center communicates with the distribution center's IBM 360 CPU over 4,800 bit/sec synchronous dial-up lines.

The Tams network will eventually be available to most of the Napa jobbers served by the 39 distribution centers operated by GPC from the company's seven regional DP centers located in Atlanta, Ga.; Memphis, Tenn.; Denver, Colo.; Columbus, Ohio; Portland, Ore.; Fresno, Calif.; and Middletown, Conn., the spokesman said.



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Pay-by-Phone Capability Offered as Turnkey System

SEATTLE — Telephone Computing Service, Inc. has introduced the turnkey 354 system which reportedly allows any financial institution to offer a telephone bill paying system in three months.

The system comes equipped with a Digital Equipment Corp. PDP-11/34 processor, two teller CRTs, two DEC RK05 expandable disks and one 100 line/min printer.

As the system is expanded, interactive and batch processing are performed simultaneously; account balances from the host can be loaded automatically via magnetic tape, a spokesman said.

Several options are available to provide for automatic account balance updating on the host, he added, including an IBM 2780 communications package interface, IBM floppy disk interface, magnetic tape interface, or use of Pay-by-Phone activity records encoded in magnetic ink character recognition (Micr); the words can be handled by existing check processing equipment.

The system can support a multiinstitution environment as well as an optional voice-response unit. Preauthorized and post dated payments are standard features.

The system generates monthly and year-end statistical reports for management as well as an annual budget report for customers.

Beginning at $65,700 or $1,500/mo leased, an institution can obtain a system capable of expansion to 15,000 Pay-by-Phone accounts. The price includes operations, training and implementation support, including documentation package.

Telephone Computing Service is at 1115 Eastlake Ave. East, Seattle, Wash. 98109.

Free Catalog Overviews Communications Publications

NEW YORK — Users who need a concise overview of current books available in the area of telecommunications can get a free 32-page catalog from The Telecom Group.

Including both technical and general publications, the catalog provides an indexed listing that covers most aspects of telecommunications, including topics that apply to corporate communications operations.

The catalog includes hard-cover volumes with a listing of the books written by James Martin. Also included are descriptions of soft-cover instructional books and periodicals.

The catalog includes recommended packages depending on level of expertise and area. As an example, "beginning data communications users and/or managers" are advised to start with five selected volumes.

The library contains books from 30 publishers. The volumes were selected by Harry Newton, a telecommunications consultant who is president of the Telecom Group. A search service is available for users seeking books not in the library.

The publication is available from The Telecom Library, Suite 11-C, Three Sheridan Sq., New York, N.Y. 10014.

IDS 3901 Unit Includes Diskette

VAN NUYS, Calif. — A fast-access intelligent buffered terminal has been introduced by Interdyne Co. The Model IDS 3901 uses a 5.75-in. industry-standard diskette drive and is RS-232C compatible, according to a spokesman.

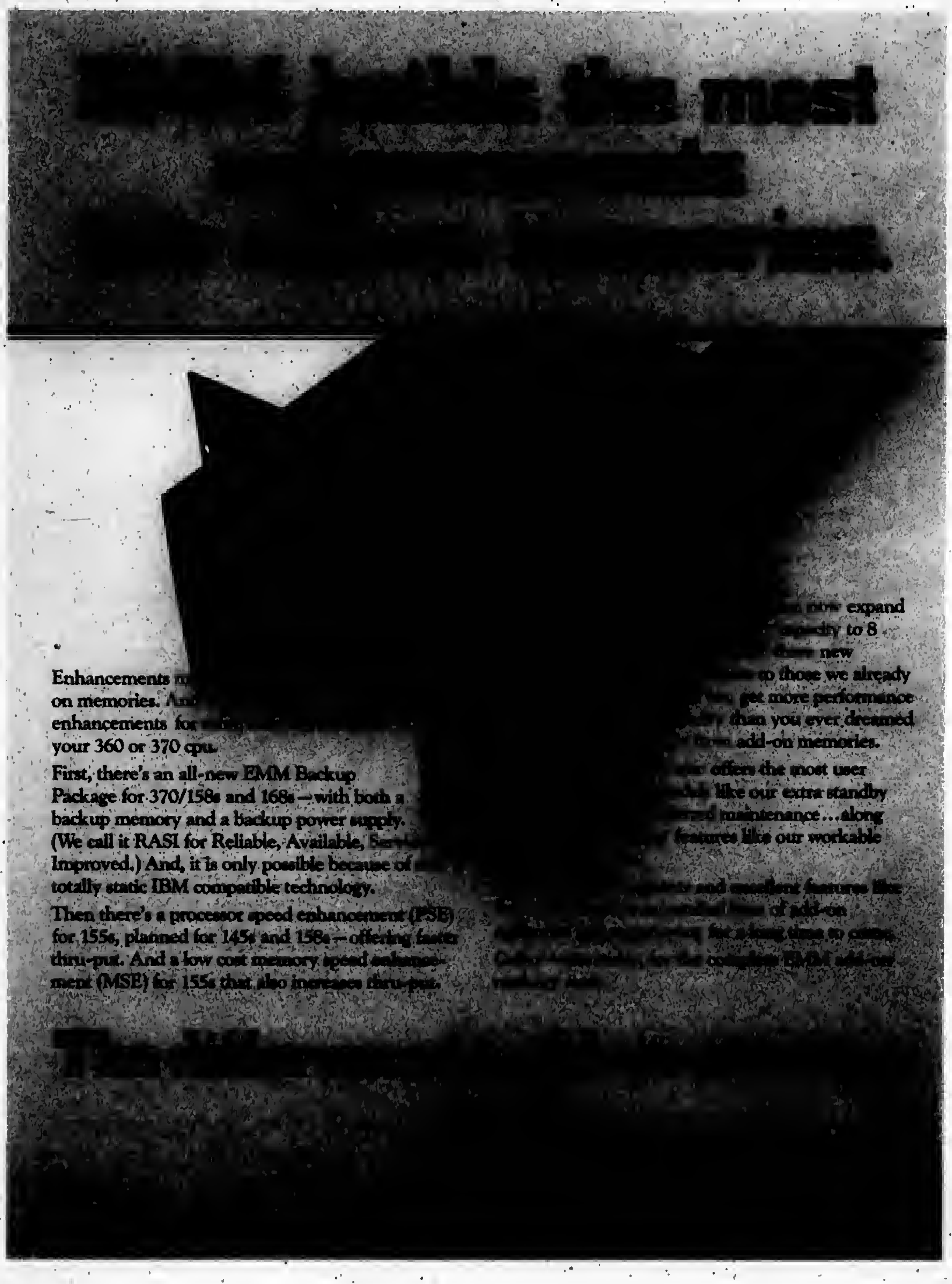
Average access time is .6 sec. The unit has a fully editable data buffer holding up to 128 characters and a block rewrite capability and allows insertion of blocks or entire paragraphs into previously written text, he added.

It includes an automatic high-speed block search and verify as well as character pattern search under operator control or prerecorded instructions. It is controlled by 30 Ascii commands and outputs 13 plain English messages.

Other features include storage of 143K bytes formatted per diskette, switch-selectable asynchronous transmission rates from 110- to 19,200 bit/-sec Ascii text as well as transparent binary modes and auto error check and retry, the firm said.

By adding the IDS 3901 to CRT-keyboard, users can have an intelligent system with store and forward capability for program preparation and loading, data entry and storage, text editing and off-line printing, Interdyne said. The command structure and performance is similar to Interdyne's serial Interfaced Cassette System, ICS 3801, but has faster access time, it noted.

The IDS 3901 costs $2,050 from Interdyne at 14761 Califa Street, Van Nuys, Calif. 91411.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Enhancements [illegible] on memories. [illegible] enhancements for [illegible] your 360 or 370 cpu.

First, there's an all-new EMM Backup Package for 370/158s and 168s—with both a backup memory and a backup power supply. (We call it RASI for Reliable, Available, Serv[illegible] Improved.) And, it is only possible because of [illegible] totally static IBM compatible technology.

Then there's a processor speed enhancement (PSE) for 155s, planned for 145s and 158s—offering faster thru-put. And a low cost memory speed enhancement (MSE) for 155s that also increases thru-put.

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[illegible] and excellent features like [illegible] of add-on [illegible] for a long time to come. [illegible] the complete EMM add-on [illegible]

Port Selector Enhanced

CHERRY HILL, N.J. — Infotron Systems Corp. has expanded the capabilities of its Timeline 450 port selector. The 450 extends CPU terminal-handling capability by having incoming lines contend for available ports rather than dedicating ports to lines which may not be in use; users can add terminals without having to add computer ports, Infotron noted.

The enhanced model accommodates both synchronous and asynchronous input at mixed speeds to 9,600 bit/sec. UP to 254 lines can contend for up to 32 ports; up to 32 of the 254 lines may be synchronous and contend for up to 16 of the 32 computer ports, according to a spokesman.

Port selectors handling all asynchronous traffic to 1,200 bit/sec will allow the 254 lines to contend for as many as 124 ports, he said, adding the units already in the field can be upgraded with the enhancement.

The port selector connects the incoming call to the first available port in the desired computer and passses the ABR character through to the front end. The ABR feature recognizes 110-, 134.5-, 150-, 300- and 1,200 bit/sec.

A typical system of asynchronous and synchronous lines with 16 lines and eight ports costs about $6,000. Infotron is in Cherry Hill Industrial Center, Cherry Hill, N.J. 08003.

FCC Authorizes AT&T To Add 42 Cities to DDS

BEDMINSTER, N.J.— AT&T has received authorization to add 42 more cities to its Dataphone Digital Service (DDS), bringing the total to 66.

The company said the Federal Communications Commission (FCC), after initially accepting a recordkeeping system, granted the authority to expand the service. The commission previously gave conditional approval to the expansion last June 8.

DDS is a private-line service used to transmit data in digital rather than analog form. The service utilizes Data Under Voice technology to transmit data over a generally unused portion of microwave channels.

The 42 new metropolitan areas include: Birmingham and Huntsville, Ala.; Phoenix, Ariz.; Anaheim, Inglewood, Mountain View, Oakland (East Bay), Sacramento and San Diego, Calif.; Wilmington, Del.; Jacksonville and Orlando, Fla.; Indianapolis, Ind,; Des Moines, Iowa; Louisville, Ky.; New Orleans, La.; and Springfield and Worcester, Mass.

Other Locations

Also, Omaha, Neb.;, Charlotte and Raleigh, N.C.; Trenton (Hamilton Square) and Camden, N.J.; Albany, Buffalo, Rochester, Syracuse and White Plains, N.Y.; Akron, Cincinnati, Columbus, Dayton and Toledo, Ohio; Oklahoma City and Tulsa, Okla.; Seattle, Wash.; Allentown and Harrisburg, Pa.; Providence, R.I.; Memphis and Nashville, Tenn.; and Salt Lake City, Utah.

The service was first offered in December 1974 and is currently available in 24 cities. It now provides end-to-end digital data transmission at speeds between 2,400- and 1.544M bit/sec.

Last July, the company also asked for authority to expand the service to an additional 30 cities. These, if added to the latest FCC authorization, would bring the total to 96. That request is still pending with the FCC.

The first cities in the authorized 42 will be added before the end of this year, with all added to the DDS network by early to mid-1979, a spokesman said.

Model 43 Teleprinter Offered With Coupler

PARK RIDGE, Ill. — The Model 43 teleprinter from Teletype Corp. has been introduced with an acoustic coupler by Management Response Corp. (MRC).

The desktop terminal features a full Ascii character set and buffered 10- or 30 char./sec operation, according to a spokesman. It prints up to 132 upper/-lower case char./line on regular paper.

Equipped with the acoustic coupler, the Model 43 is available for $1,285 or, on lease, $38/mo.

MRC is at 660 Busse Highway, Park Ridge, Ill. 60068.

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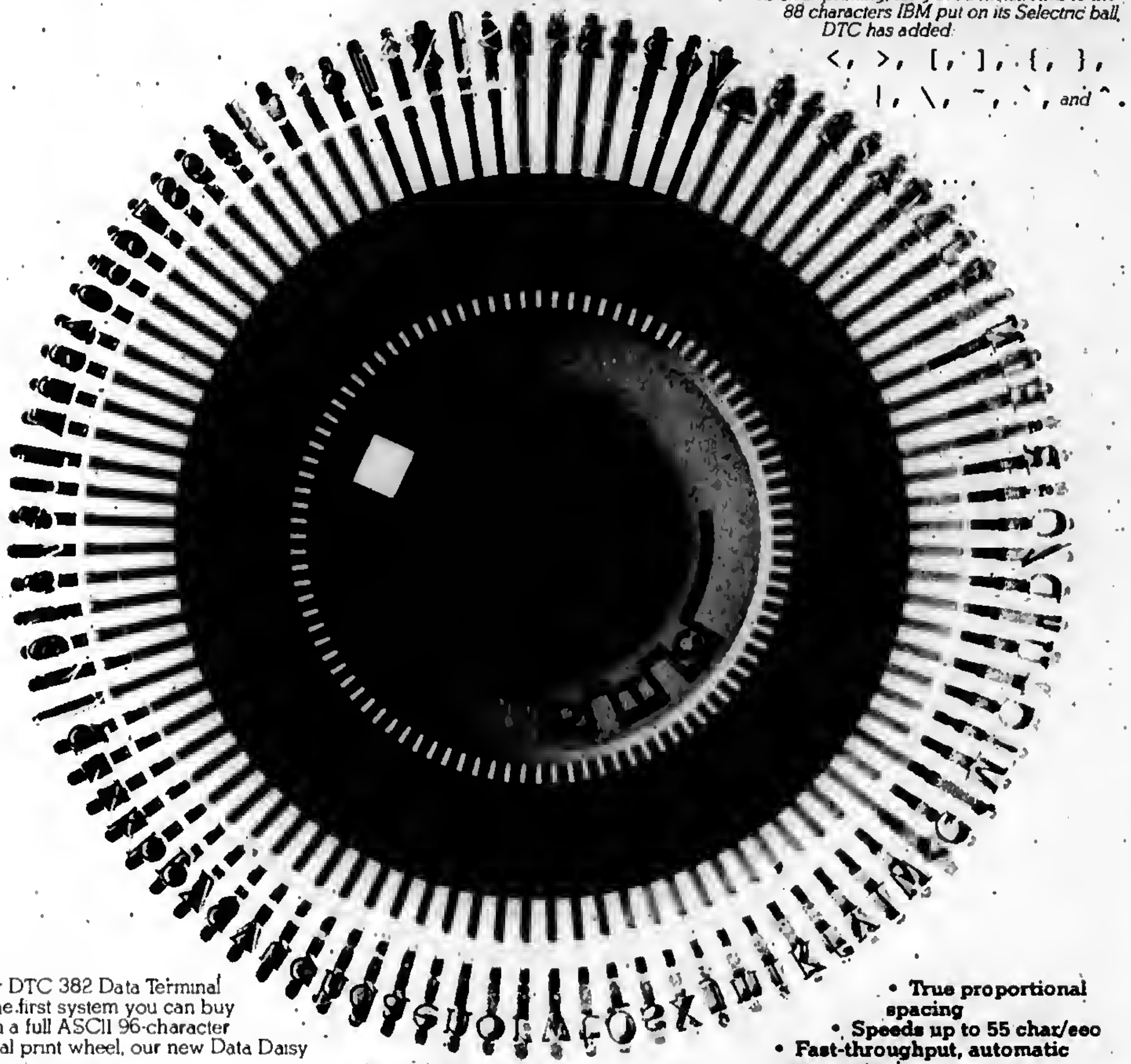

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Canadian User Examines Technology

Page Printers 'Revolutionizing' Output

By Robin Hornby
Special to CW

EDMONTON, Alberta — The high rate of technological advance that typifies the computer industry has until recently had little effect upon the visible product of DP, namely, the printed output.

Until now, batch output has been entirely produced using impact printers characterized by "hard type" printing, with performance limited by the inherent mechanical nature of the process. Although the development of print trains allowed the installation of special slugs to meet nonstandard requirements and print speed was improving (roughly doubling every six years), it is the introduction of page printers that is revolutionizing the print environment.

These new printers will offer at least 10-fold improvement in print speed as well as a high level of software flexibility ready to be exploited.

Planning Problems

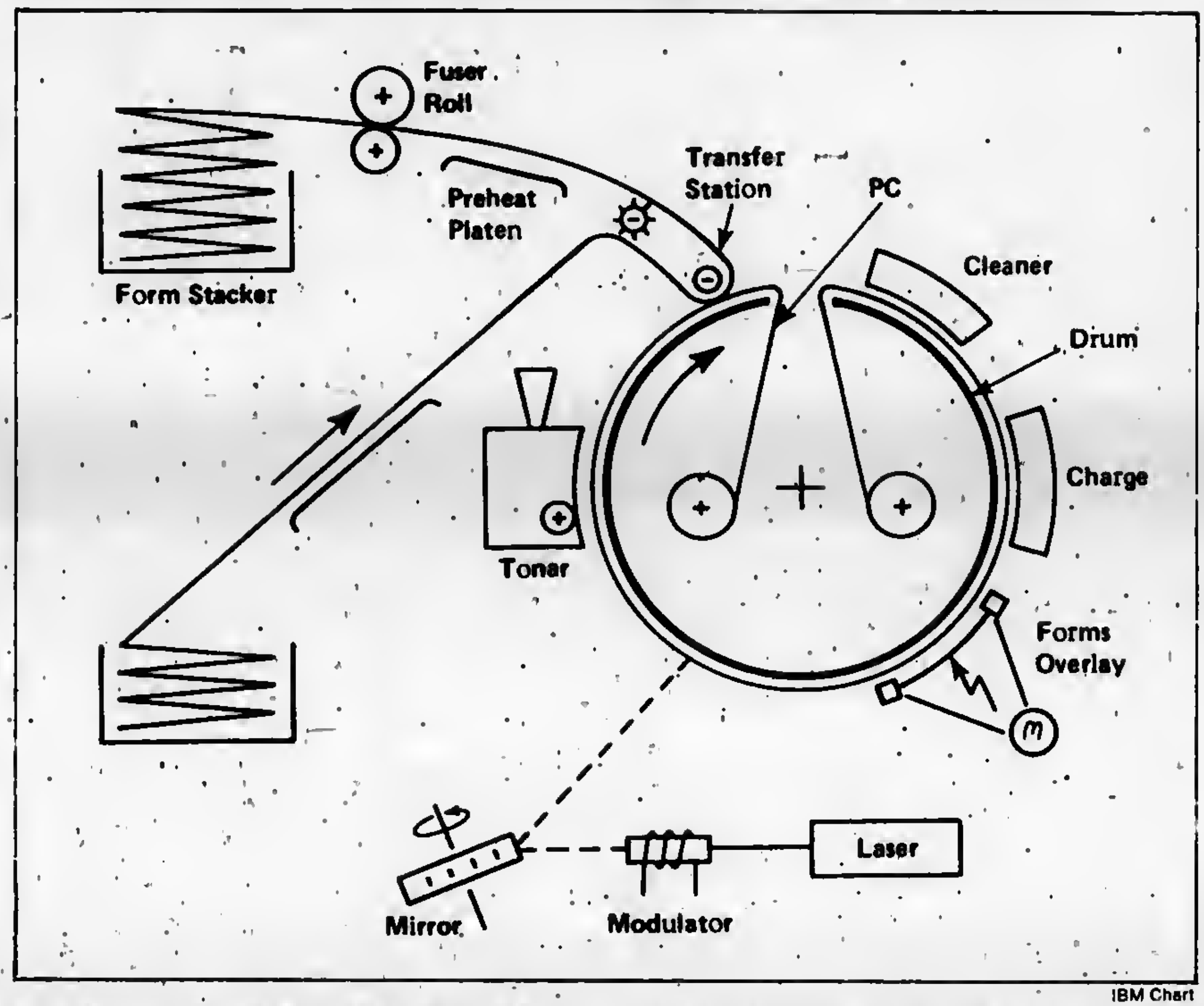
However, implementation of this new generation of output printer can cause planning problems as these capabilities come at a time when many users are learning to reduce their printed report needs by using techniques like exception and demand reporting or computer output microfilm (COM) and CRT technologies. These trends should be encouraged because they usually lead to reduced costs and greater business efficiency, leaving the facilities analyst with a greater responsibility for determining real application requirements before turning to the page printer for solutions.

Nevertheless, some cases show that high-volume printing is obviously a need, at least within the foreseeable planning horizon; an example of this would be customer billing within the telephone industry.

In implementing these new subsystems of Alberta Government Telephones (AGT), our experience has been with the IBM 3800 printing subsystem. Other machines are now available which use electrostatic principles, but a brief description of the process used by IBM should give an appreciation of machines of this type.

The machine attaches to a channel (generally a block multiplex) and appears to the application program as a conventional impact line printer. The 3800 is driven by its own miniprocessor with 52K bytes of memory, wherein print lines received from the channel are buffered prior to printing a page at a time. The printing process is "impactless" and relies on light pulses to form the character, which is printed as instructed by the digital blueprint stored in memory.

The software implementation of character sets allows the programmer to control the type style to be used; we now have a range of options from 10-, 12- to 15-pitch in upper-and lower case available.



IBM Chart

As the drum on the IBM 3800 printing subsystem turns, it passes the following points: charge, which prepares the photoconductor to receive a new image: forms overlay, which passes light through a film negative, projecting a design image on the photoconductor; laser, which creates designated characters on the photoconductor; toner station, which applies toner to the photoconductor; transfer station, where character images are transferred to paper; and the cleaner, where residue toner from a previous page image is loosened and removed.

A stack of continuous-form paper, loaded at the 3800's input station, flows through the image transfer station, over a preheat platen and past a fuse roll, which fixes characters on the paper.

The paper is then automatically refolded on a form stacker.

Furthermore, the selection is open-ended insofar as user-designed graphics can be loaded by the processor. This opens up applications using company logos and mathematical and electronic symbols as well as circuit diagrams and graphical reports.

This flexibility is possible because of the programmable 18 by 24-bit character descriptor stored in memory for each member of our character set. The matrix pattern is used by the miniprocessor to modulate pulses of coherent light from a gas laser so as to cause an exposure to light of the desired character shape. A maximum of 255 character descriptors may be stored in memory during any one print job.

A page of data is built up by exposing to laser light the selected dot elements of each character on each line under the control of scanning logic. The exposure actually occurs on a large drum coated with photoconductive material that rotates at a constant speed while printing.

The electrostatic field created by the light pulses attracts toner to the surface of the drum, which is then electrostatically transferred to the paper, forming a black character with excellent definition and contrast characteristics. The toner is then fused onto the paper to form a permanent image.

Regular fan-fold stocktab is used, although the form size and form usage can be significantly reduced by increasing the pitch and number of lines per inch of the output, consistent with the needs of the application. In our case, a 12- by 8.5-inch form is standard, immediately yielding a 20% volume saving.

In an environment where forms costs take the major share of the printing subsystem

(Continued on Page 66)

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Verification Program Cuts Dairy Record Errors

Data Entry Dimensions

By Lynn Tilton
Special to CW

PROVO, Utah — The DHI Computing Service here has developed a verification system that has helped reduce input errors and increase throughput 30% in its dairy records department.

The department has attained an average of 22,000 keystroke/hour on the company's IBM 3742 data stations, according to Dr. Bliss Crandall, founder and president of the large private dairy computing center.

The average is possible because the old method of having an experienced checker redo a new clerk's work has been replaced with the practice of having two clerks key the same material. The checker only has to determine errors when there is a difference in figures, Crandall said.

"The material is independently entered into our IBM 360/50 or our IBM 370/138 backup CPU where it is sorted. The discrepancies appear on the IBM 3270 CRT terminal. The checker then marks the correct figure, eliminating the error," Crandall explained.

Two-Level Verification

After the work has been checked, one of the 512K-byte computers edits data on one of two levels. The first, a standalone edit, rejects figures that are out of the reasonable range.

At the second level, the CPU checks each cow's milk production record against that of the previous month to ensure there has been no mistake. "If the later month's report indicates the cow doubled the previous month's production, we know we have an error," Crandall said.

He noted that anything keyed in the department is done twice and computer-checked twice. "There is no such thing as an error-free operation, but the error level is much lower than the industry average," he claimed.

The verification program was written by Lynn Crandall, vice-president of systems and programs at DHI.

Although the program was responsible for the throughput increase, another factor was incentive pay for clerks.

"We adhere to the wage and hour laws, but experienced people are paid according to production. We don't pay for errors, but we don't penalize for them either," Bliss Crandall explained.

The computers keep track of each clerk's throughput, and from this paychecks are computed, he reported.

"We don't pay by the hour, nor is a good worker kept down by a seniority system," he said, explaining that new workers are placed on a guaranteed base salary, then moved to the incentive system after the error rate is down and their production is up. "We find we have a very low error rate with the system, despite the temptation to let the error stand and have it corrected by the checker or discovered by the computer," he said.

"Our top workers get a far better wage than they would on an hourly basis," he claimed.

The system allows for flexible hours, so there is no problem with tardiness, people leaving work early or extended coffee breaks, Crandall said.

"All we want is enough manpower to get the work done. Usually it is completed by 3 p.m.," he said.

(Continued on Page 63)

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DIGITAL, APRIL, 1978.

DIGITAL SPINS THREE NEW DISKS: $900, $450, AND $300 PER MEGABYTE.

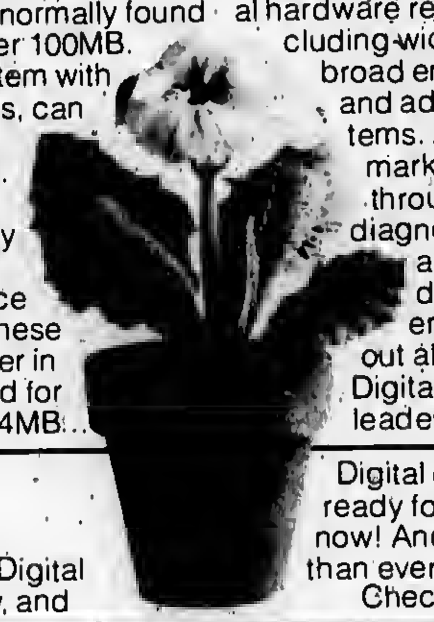
The cost of disk capacity just plunged dramatically with the introduction of three new Digital disks.

The first is the new RL01, a 5MB cartridge disk, featuring an embedded track following servomechanism, universal power supply, and extraordinary simplicity—just 5 modules and 11 subassemblies. The RL01 plus controller is the lowest priced disk subsystem available from any minicomputer manufacturer. A typical RL01 subsystem, with a controller and two drives, offers 10MB for under $9,000...that's only $900 per MB.

The new RK07 is a mid-range (28MB), high performance cartridge disk drive with features normally found on expensive drives over 100MB. And in a typical subsystem with controller and two drives, can provide 56MB for only $25,000...$450 per MB.

And the new RM02 provides 67MB capacity for UNIBUS systems at the lower-than-ever price of $18,000. Put two of these together with a controller in a typical subsystem and for just $41,000 you get 134MB... just $306 per MB.

All the new disks deliver exceptional hardware reliability features including wide design tolerances, broad environmental specs, and advanced cooling systems. And you get remarkable maintainability through sophisticated diagnostic software, modular assembly, easy-access design, and extensive error reporting. To find out all about them, and Digital's commitment to disk leadership, check the box.



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It's the second in a series of Digital catalogs of new applications programs for educators. *IDEAS: VOL. 2* gives teachers and administrators a close-up look at the 270 newest and best software packages available from publishers across the country. Subjects include administration, social science, math, CAI, and games, among many others. For your free copy, check the coupon.

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DISTRIBUTED COMPUTING: WHY THE COOKIE DOESN'T CRUMBLE.

From England comes the tastiest application story of the month. A major bakery, with a capacity of 1.25 million cookies per hour, has replaced the batch computing equipment on its factory floor in favor of a distributed computing network, hosted by a PDP-11/40. Forty-one data entry, video display, and video monitoring units, run by five microprocessor nodes, are connected to the host processor through a Digital DUP-11 synchronous interface. A PDP-11/03 acts as a front-end processor for the host in a star-loop network that monitors and controls the baking and packaging operations. Projected savings for production monitoring indicate payback on the equipment in 15 months. Ummmm.

Data Entry Set as May Seminar Topic

SAN FRANCISCO — A three-day conference on data entry will be presented here by the American Institute of Industrial Engineers (AIIE) on May 15-17.

The seminar will cover the major changes and trends in data entry and data acquisition hardware, software and management, according to a spokesman. Distributed data entry and data entry personnel will also be discussed during the course of the meeting.

Speakers will include William G. Moore Jr. of Inforex, Inc., Donald Brosnan from MSI Data Corp. and Allan Lay of Pertec Computer Corp.

The course will also present case studies of successful applications. Concurrent workshops dealing with data entry will be held.

Reference material that will be distributed includes hardware surveys; vendor experience and product lines; an overview of application areas; case studies of successful applications; and procurement checklists and guidelines.

Registration fees are $295 for members of AIIE and $330 for nonmembers. Additional information and brochures are available from Dept. PR, AIIE Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Kit Checks Air Pressure Of Self-Loading Tape Drive

ST. PAUL, Minn. — The 3M Co. has introduced a test kit that it said determines if insufficient air pressure is causing problems on self-loading tape drives.

Loading computer tape with self-threading tape drives is difficult or impossible if sufficient air pressure is not supplied by the drive to position the tape for threading, a spokesman explained.

The Loading Pressure Test Kit, which includes an air pressure gauge, a modified self-threading tape cartridge and a tape reel, will indicate the amount of air pressure present, he said.

The test reportedly takes less than a minute to perform, and one tester can be used on all of the drives in a DP center, the spokesman said.

The tester costs $100 from 3M at P.O. Box 33600, St. Paul, Minn. 55133.

The 3M Test Kit

Topaz Announces Regulator Line Now Available

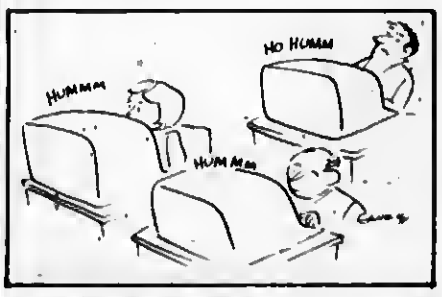
SAN DIEGO — Topaz Electronics has announced the availability of a series of ac line regulators designed to protect large DP systems from voltage fluctuations.

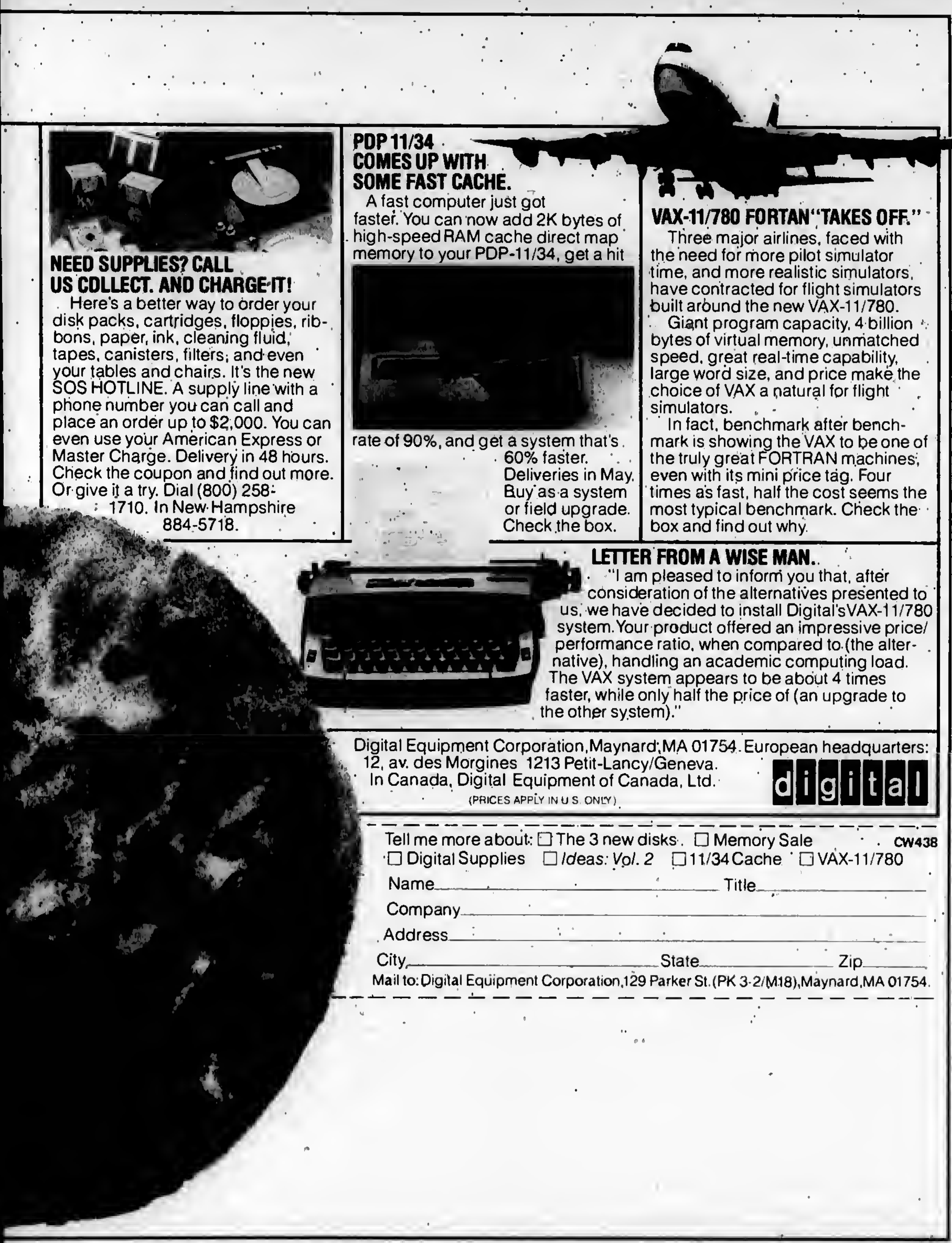
The three-phase regulators can accept input voltages varying ± 20% from nominal line voltage and regulate the voltage supplied to DP equipment to within ± 5%, the company said.

Protection against severe overvoltage is provided by an automatic shutoff within the units, a spokesman added.

The regulator, called the Model L-5, is equipped with a dual filtering system and is available in power ratings from 10 kVa to 100 kVa and 50Hz or 60 Hz operation.

Prices for the regulators start at $2,500 and range up to $18,000. Topaz is located at 3855 Ruffin Road, San Diego, Calif. 92123.

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A fast computer just got faster. You can now add 2K bytes of high-speed RAM cache direct map memory to your PDP-11/34, get a hit rate of 90%, and get a system that's 60% faster. Deliveries in May. Buy as a system or field upgrade. Check the box.

VAX-11/780 FORTAN "TAKES OFF."

Three major airlines, faced with the need for more pilot simulator time, and more realistic simulators, have contracted for flight simulators built around the new VAX-11/780.

Giant program capacity, 4 billion bytes of virtual memory, unmatched speed, great real-time capability, large word size, and price make the choice of VAX a natural for flight simulators.

In fact, benchmark after benchmark is showing the VAX to be one of the truly great FORTRAN machines, even with its mini price tag. Four times as fast, half the cost seems the most typical benchmark. Check the box and find out why.

LETTER FROM A WISE MAN.

"I am pleased to inform you that, after consideration of the alternatives presented to us, we have decided to install Digital's VAX-11/780 system. Your product offered an impressive price/performance ratio, when compared to (the alternative), handling an academic computing load. The VAX system appears to be about 4 times faster, while only half the price of (an upgrade to the other system)."

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For Enhanced Commuter Safety

Scanner Helps Railroad Handle Efficiency Tests

NEW YORK — Optical scanning is providing Long Island Rail Road (LIRR) management with an effective tool to better run the railroad, while meeting the Federal Railway Administration's (FRA) requirement for periodic testing of operating employees' performance.

When the FRA promulgated an administrative regulation early in 1975 with a provision that detailed test records be maintained, the LIRR was already doing it. An optical scanning, computer-based Transportation Efficiency Check System (Tecs) was in operation by January 1975, updating a long-established manual procedure and further enhancing safety on what is generally recognized as one of the nation's safest railroads.

"Too often, railroads are in the position of reacting to events and government regulations, but in this case we anticipated the requirement," James D. Sullivan, manager of transportation and engineering systems development, said. Sullivan, a career railroader, designed and implemented the system.

"The FRA's hearings on this regulation, which began in 1973, coincided with our own plans to modernize the manual procedures dating back many years for checking the performance of operating personnel. Tecs went into operation in January 1975," he said.

"Safety doesn't 'just happen' — you have to work at it," according to William J. Allen, assistant superintendent of train movement, whose department has primary responsibility for operating personnel checks.

Automatic Speed Controls

"In addition to the standard safety devices, all our passenger and freight trains are equipped with automatic speed controls that stop a train if the engineer fails to conform to signals on the line. But in the final analysis, safety is in the hands of our operating personnel — who are also the people with whom our customers come in contact every day — and this system is an important tool in helping run the railroad at top efficiency," Allen said.

The LIRR is the busiest passenger railroad in the U.S. and carries more than 67 million passengers annually. About 840 passenger and equipment trains are scheduled on weekdays, reportedly recording an on-time performance of more than 90%.

On the "firing line," actually moving this volume of traffic, are some 2,000 operating employees. The LIRR periodically tests these employees according to 61 efficiency checks. They range from fixed signal and speed control engineer checks through courtesy rule tests for trainmen. The checks are performed by trainmasters, road foremen and other authorized observers, with the goal of testing each operating employee at least once every six months.

"We were strict about making the checks, but the extensive clerical work involved in posting and maintaining records hampered the overall effort," Allen said. "We were not able to maintain an up-to-date historical file, and had great difficulty preparing reports that would tell us whether anyone had been missed. If effect, we had no 'product' to give a supervisor to help him in his work."

Optical Scanner on Hand

The problem was readily understood by Sullivan, who had spent 15 years in the Transportation Department before transferring to the Systems and Computer Services Department, where he became a computer specialist. The first thought was to develop a system using the optical scanner that was already on hand.

"We had installed an IBM 1287 optical character reader in 1969, and we're still using it with our IBM 360/22,"

(Continued on Page 54)

Fiche Reader Has Drop-In Lenses

HARTFORD, Wis. — A microfiche reader from Micro Design offers direct projection, a curved screen and drop-in lenses in multiple magnifications.

The Model 960 reader features a dual lens capability and modular design, according to a spokesman. The viewing screen of the unit is shaped to prevent keystoning or distortion resulting from an angled image, he added.

Available in three carrier sizes, the reader costs $229 from the company at 857 W. State St., Hartford, Wis. 53027.

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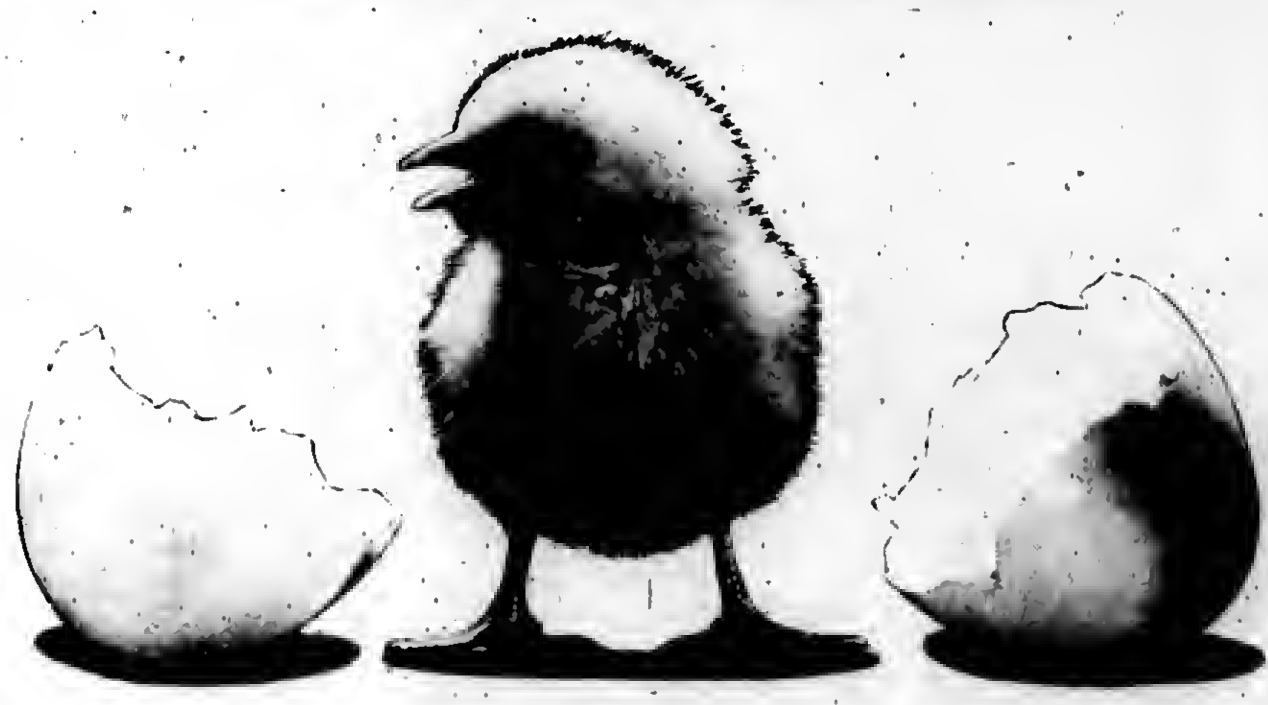

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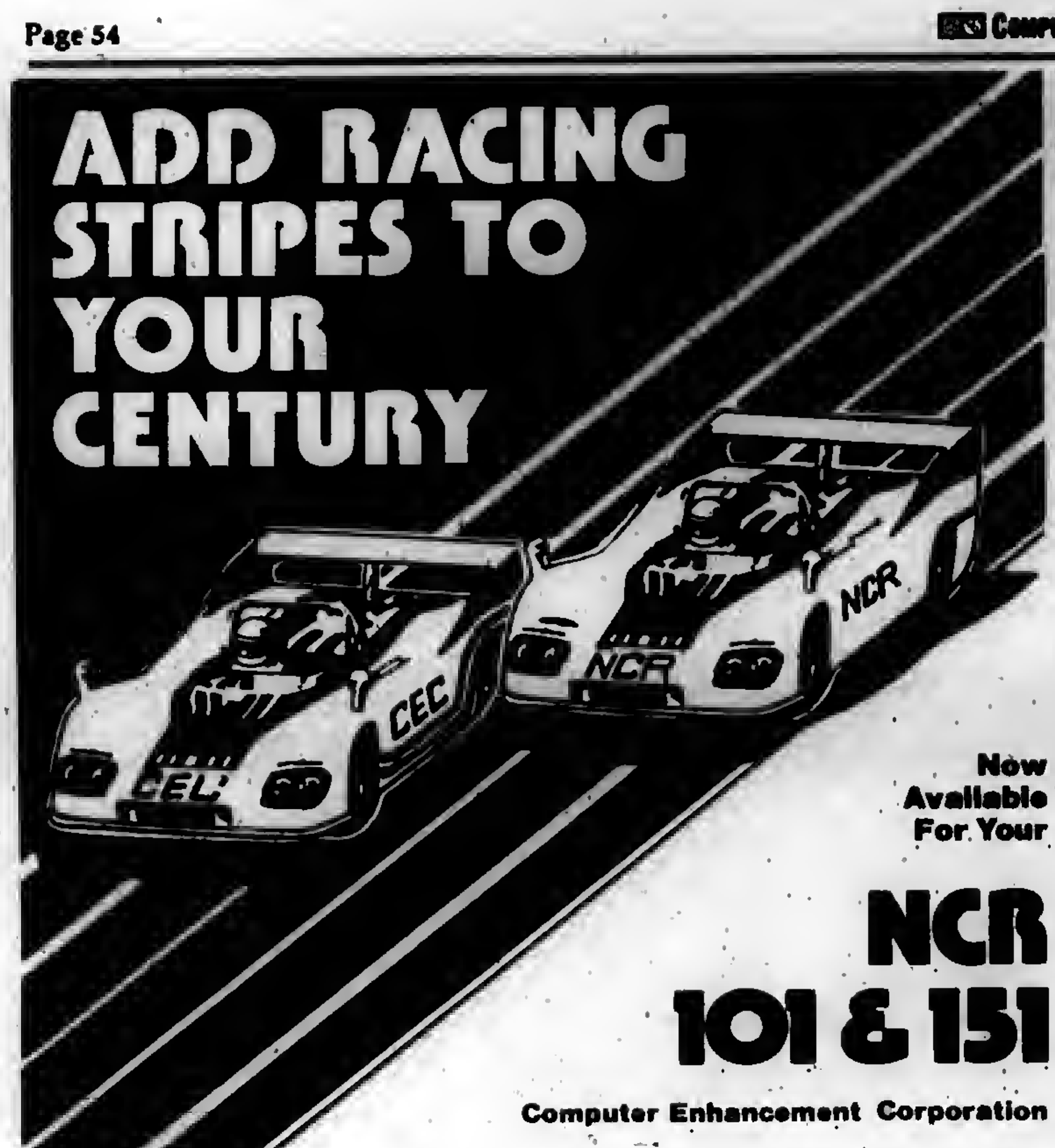

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EVENT™ business computer systems to begin with.

Railroad Operator Checks Aided by Scanning System

(Continued from 52)

Eugene V. Heissenbuttel, manager of systems and computer services, said. The scanner paid for itself in the original application, reading the holes punched by trainmen for tickets sold on trains. Some 300,000 such tickets are sold each month, and the 1287 eliminated what had been a big keypunching job.

"Since then, we have added other applications such as mail-on-ride documents sent in by commuters buying monthly tickets by mail, sick leave data and results of the annual physical inventory," he continued. "But there was still plenty of available machine time, so Tecs looked like a natural."

Most of the LIRR's DP work is performed at the Metropolitan Transportation Authority (MTA) centralized facility here. The Model 22 functions as a remote job entry system, transmitting work to the MTA's large-scale IBM 370s and receiving results for printout. An unusual feature is a control program that permits two jobs to run concurrently, so that as work moves back and forth to the MTA installation, the 1287 also performs its functions.

Converting to OCR Form

The major challenge for Sullivan and Allen, who worked in close collaboration, was to convert the check sheet for the 61 tests to an optical character recognition (OCR) form. Both agreed on the importance of maintaining the same test codes the observers were familiar with and making scoring as simple as possible since the tests are frequently performed on a moving train.

"It took some planning, and we were helped by IBM's OCR specialists, but by using both sides of the form we were able to get in all the information required," Sullivan said.

The reverse side contains a list of all tests and the score box on the front to which each relates. Scoring is done on the front portion. The observer follows nonscannable outlines in each box to record, in pencil, an "X" for failure or "0" for pass. Any number of tests covering the same individual can be entered on the same form.

In the case of a failure, the observer enters a 1 or an 8 to indicate action taken — caution, or a recommended investigation. In the latter case, the observer makes out a special report to inform management immediately.

The form also includes space for the name and employee number of the individual being checked, supervisor identification number and name and location codes. The forms are three-hole punched on the side, so they fit right into the timetable each observer carries. All operating employees are required to have their timetables with them at all times, and one of the checks performed is to ensure the timetable is up to date on all rules and regulations.

Report Production

Observers turn in their completed check forms, and every month approximately 600 accumulated forms are passed through the 1287. The pencil marks and numbers are "read" at high speed onto magnetic tape and then used to produce a series of reports.

One report lists, by department, any operating personnel not checked within the past six months. The LIRR commitment to the FRA is to check each such person at least once yearly, but for its own purposes prefers more frequent checks. This report immediately alerts supervisors to those people who must be checked.

Another report lists every test performed by an observer for the month, along with the tests themselves, pass/-fail grades, total employees tested and total tests performed. There is also a grand total for all activities. This report helps ensure that all tests are regularly performed, particularly the more important ones.

Failure Report

A third report details, by operating employee name, each failure along with the test code, date, mile-past location and any action taken. A summary shows all failures in each department and total number of failures for the month.

On demand, detailed reports can be produced by employee going back a full year, showing test dates, codes, passes and fails along with action taken. Repeated failures are highlighted and any necessary action can be taken immediately. Another report produced on demand lists every test code, and all pass/fails for a given period of time.

The error rate on test forms turned in averages about 10%, including mistakes in employee identification numbers and location codes. On the test scores themselves, the number of entries not "read" by the scanner is about 3%. The cards on which errors are made are returned to the observers for correction, and as more experience is gained in their use, the error rate is expected to drop.

"The important thing is that there's no way we can fail to know about an employee who should be checked, and we have detailed information it would have been impossible for us to develop manually," Allen said. "It would have required more than two people, full time, to even begin to met the FRA's requirements — and even then we wouldn't have had the extensive data on people and tests that we have now."

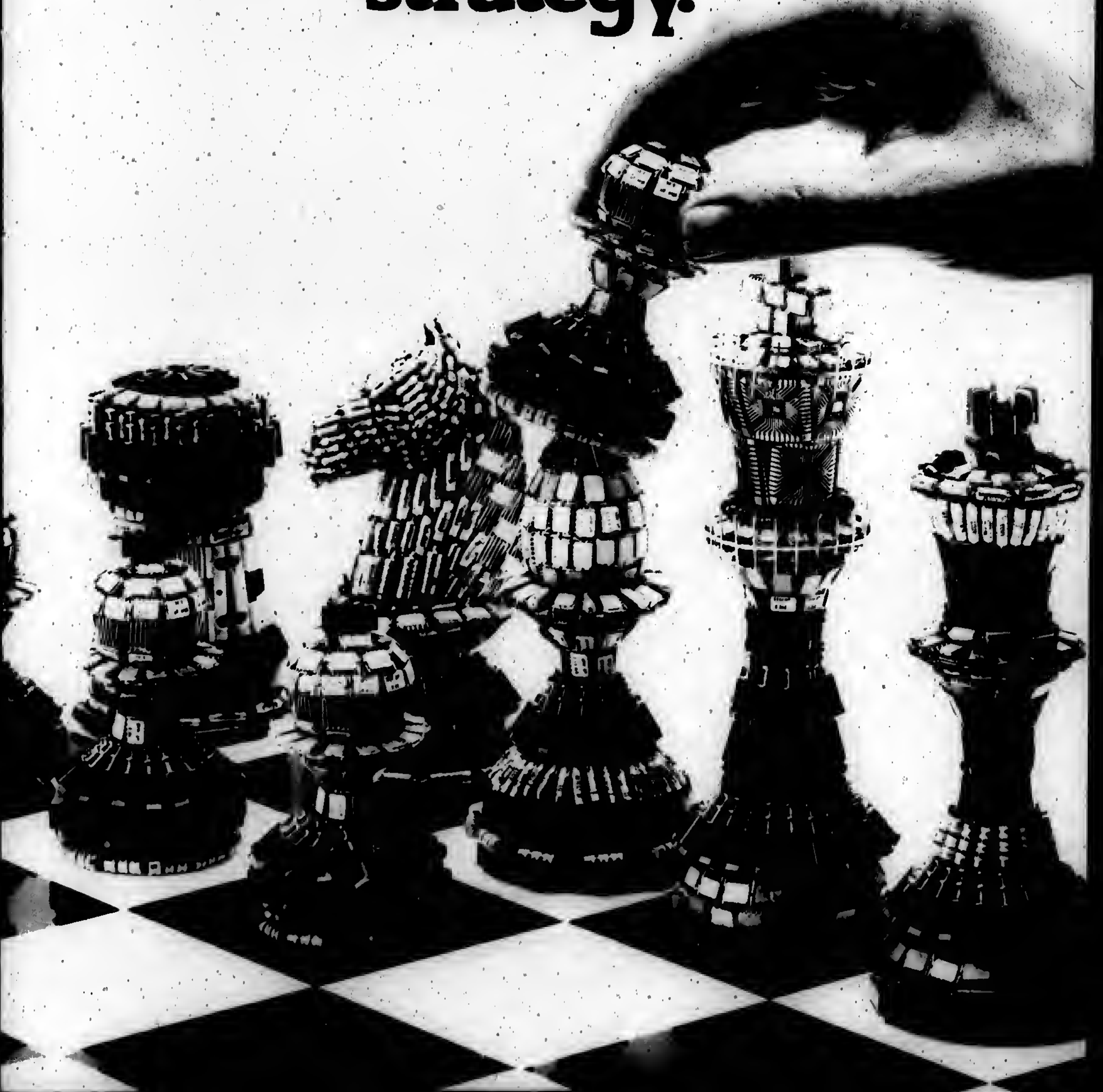
Binder Holds 1,200 Sheets

FRANKLIN PARK, Ill. — A fibreboard binder from Bankers Box/-Records Storage Systems accommodates burst or unburst 8.5-in. by 11-in. computer printout.

Using nylon posts and an adjustable compressor bar, the Datapak 604 accepts four inches or 1,200 sheets of printout, a spokesman stated. Once bound, the material is stored flat within the corrugated shell of the binder.

The binders are priced at $5.75 each in 12-unit cartons form the firm at 2607 N. 25th Ave., Franklin Park, Ill. 60131.

Honeywell Series 60: Everything you need for your long range strategy.



Honeywell Series 60: Steady advances on every front.

Series 60: A full family of computers, from minicomputers to large-scale systems. There are modular levels of hardware and software with lots of opportunity for growth within each level and easy transition from level to level.

Successive levels are linked by common Series 60 programming languages, compatible file formats and communications protocols. Levels 6 through 66 run under control of Honeywell's General Comprehensive Operating Supervisor (GCOS). Complete implementation at the upper end sets the overall standard. GCOS subsets provide large-system features and easy growth at lower levels and support interconnection of two or more Series 60 levels in communications networks. Level 68 operates under the Multics operating system.

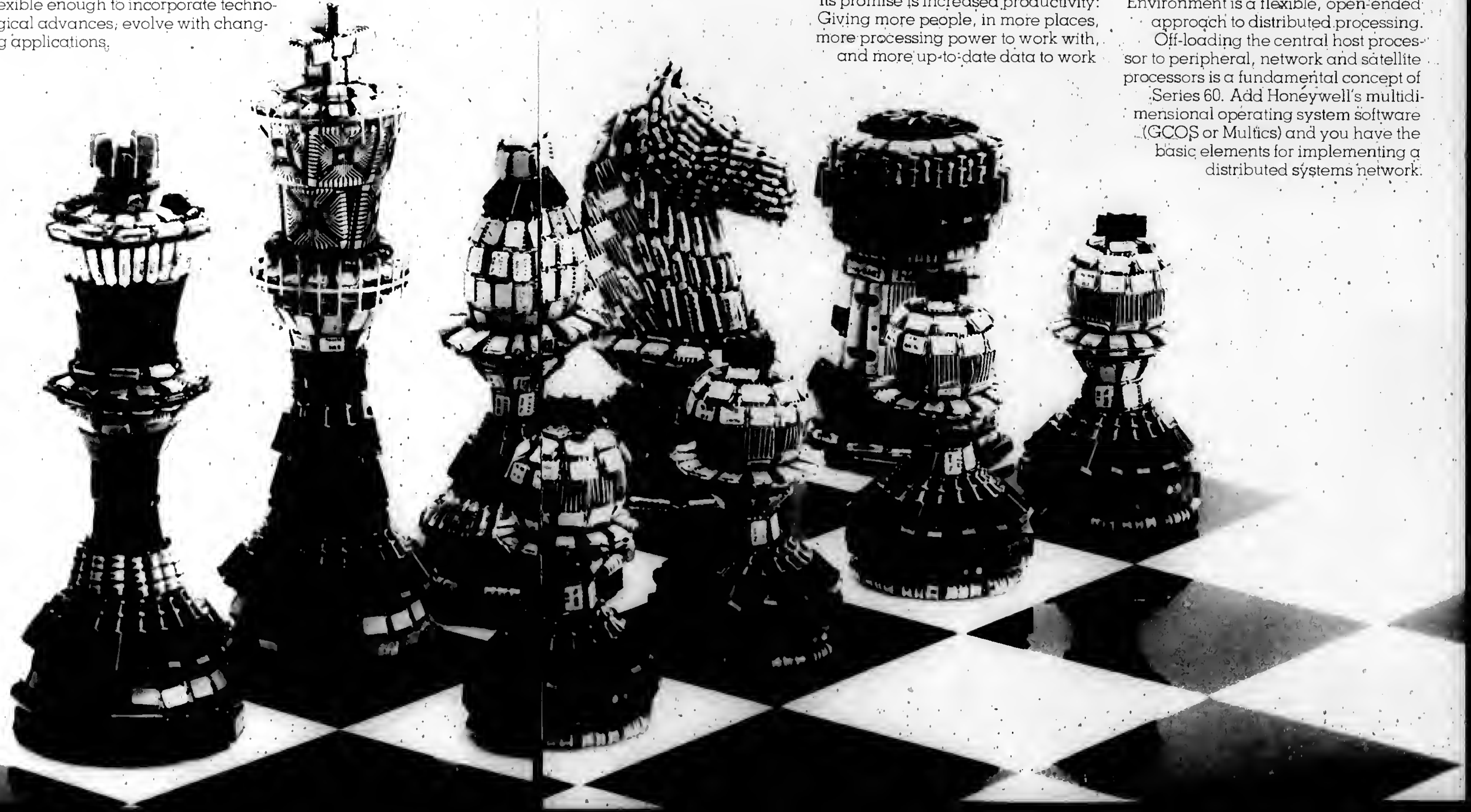
Hardware and software technology includes metal-oxide semiconductor (MOS) memory, microprogramming, dual logic circuitry, automatic error detection and correction, and self-diagnosis. All levels are communication-oriented. Mini-based network processors (for all but smaller systems) yield high communications throughput, minimize overhead.

Data base management capabilities are emphasized throughout. The basis is Honeywell's Integrated Data Store II (I-D-S II) which embodies industry-standard data base specifications. Level 68 also has Multics Data Base Manager (MDBM) which includes a fully implemented relational data base system that offers unmatched functionality and ease of use. Special end-user facilities make access easier. Security provisions guard against unauthorized or accidental access.

Series 60 – a unified family of easily expandable levels of processing power able to meet advanced requirements in online transaction processing, networking, distributed systems. Flexible enough to incorporate technological advances; evolve with changing applications.

Across-the-board power in the Distributed Systems Environment.

Decentralization of processing power and establishment of data bases on two or more separated but interacting processors. That's the essence of the Distributed Systems Environment. Its promise is increased productivity: Giving more people, in more places, more processing power to work with, and more up-to-date data to work from. But different people, different procedures, different policies, different philosophies, different organizations all require different approaches. Honeywell's Distributed Systems Environment is a flexible, open-ended approach to distributed processing. Off-loading the central host processor to peripheral, network and satellite processors is a fundamental concept of Series 60. Add Honeywell's multidimensional operating system software (GCOS or Multics) and you have the basic elements for implementing a distributed systems network.



Level 68/DPS

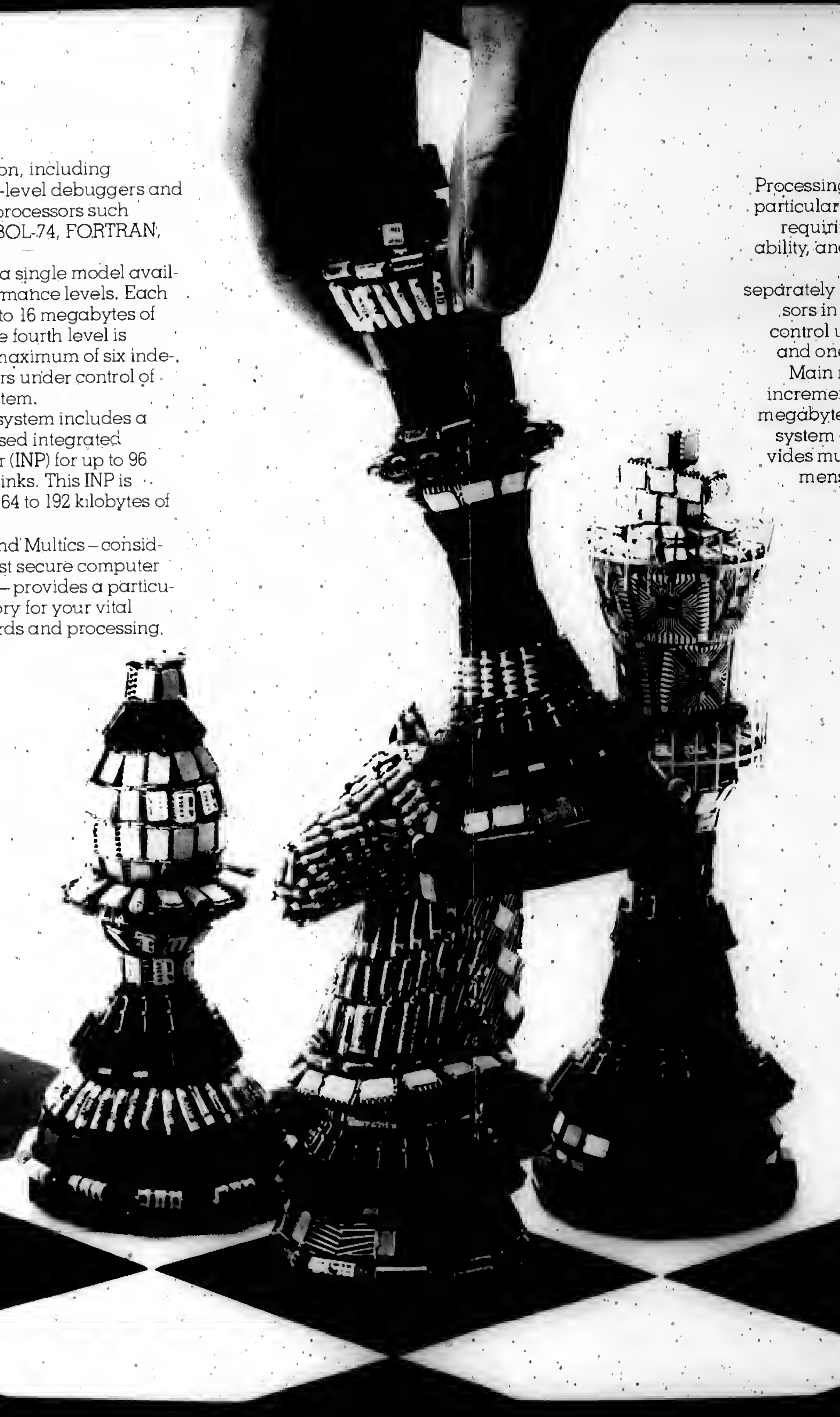
Level 68/DPS (Distributed Processing System): A combination of large-scale hardware, Multics software and firmware. Included is a powerful virtual memory capability designed specifically to answer user needs for increased productivity. The system operates simultaneously in many compatible modes – transaction processing, batch processing, time sharing, remote job entry, online inquiry, interactive graphics, and word processing – all with unrivalled system security and data integrity. Level 68/DPS provides comprehensive and easy-to-use facilities for sharing resources and coexisting in a distributed environment with computer systems of other manufacturers. The basic architecture is designed for online interactive processing and serves as an ideal vehicle for terminal driven applications.

It provides comprehensive tools for nearly everyone in a business organization. Simplified and uniform control language for all processing modes shortens the problem-solving cycle. A powerful end-user facility called Logical Inquiry and Update System (LINUS) is easy to use – by both technical and non-technical people. There are also powerful, efficient facilities for system and application software generation, including interactive source-level debuggers and online language processors such as PL/1; APL, COBOL-74, FORTRAN, RPG, and BASIC.

Level 68/DPS is a single model available in four performance levels. Each level supports up to 16 megabytes of main memory. The fourth level is expandable to a maximum of six independent processors under control of one operating system.

The base level system includes a minicomputer-based integrated network processor (INP) for up to 96 communications links. This INP is expandable from 64 to 192 kilobytes of main memory.

Level 68/DPS and Multics – considered to be the most secure computer system available – provides a particularly safe repository for your vital mainstream records and processing software.



Level 66/DPS

Level 66/DPS (Distributed Processing System): A large-scale unit particularly well-suited to applications requiring high-availability, expandability, and extensive communications. The base level includes twin separately powered information processors in one cabinet, a single system control unit, input/output multiplexer, and one megabyte of MOS memory. Main memory can be expanded in increments up to a maximum of eight megabytes. A single GCOS operating system controls both processors, provides multiprogramming and multidimensional capabilities, including simultaneous operation of transaction processing, batch processing, timesharing, remote job entry, and online inquiry modes. One or two companion processors may be added.

The base level 66/DPS system includes a minicomputer-based integrated network processor (INP) for up to 96 communications links. INP memory is expandable from 64 to 192 kilobytes. Software includes the General Remote Terminal Supervisor-II (GRTS-II) or the Network Processing Supervisor (NPS). Both support visual display keyboard and printer terminals, remote job entry devices, and satellite processors. NPS also handles message-switching applications. Honeywell's versatile data management software, Data Management-IV (DM-IV), is fully supported, including a COBOL-74 language interface and a new batch-mode FORTRAN interface. DM-IV performs all management services for large data bases – data base creation, security control, and accessing for transaction, inquiry/response, or batch activity. Level 66/DPS – versatile, expandable, reliable host processor performance for distributed system applications.

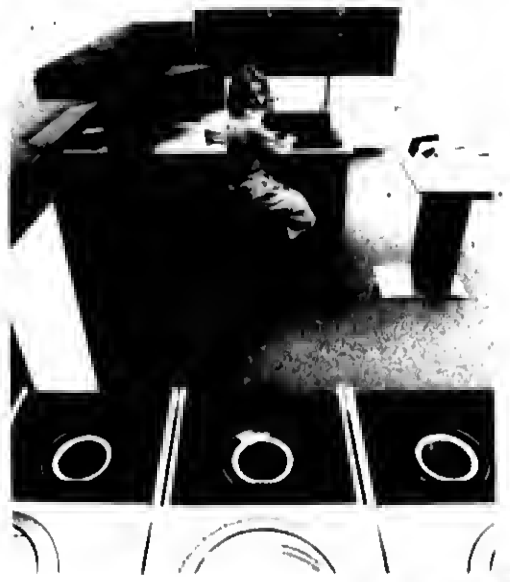
Level 64

Level 64: A medium-scale system that delivers the functionality of most large-scale systems—multidimensional growth, data communications, transaction orientation.

Integrated, microprogrammed mass storage, unit record, and magnetic tape processors off-load time-consuming peripheral control operations from the central processor. The unit record processor also handles data communications over as many as 42 links and supports a wide variety of local or remote terminals or connections to other systems.

Level 64 GCOS is a multi-programming, virtual memory operating system with automatic memory management. It includes extensive data protection, system integrity, and job accounting provisions. Key subsystems include Interactive Operations Facility (IOF), Transaction Driven System (TDS), and Integrated Data Store/II (I-D-S/II) data base system. It supports industry-standard programming languages RPG, COBOL and FORTRAN.

Versatility, ease-of-use, communications orientation, and reliability make Level 64 a sound investment for growth-oriented, distributed-systems-minded organizations.



Level 62

Level 62: The small system with a built-in future. It keeps going strong where most small systems leave off. Through field upgrades, main memory is expandable from 48K to one million bytes. Basic systems performance can be easily expanded to a level more than twice as fast. Six I/O channels support up to six independent subsystems, including integrated data communications controllers for up to 25 links.

Level 62 GCOS simplifies operation and programming. It supports industry-standard RPG, COBOL, and FORTRAN and provides data management techniques for file management, retrieval.

It allows many jobs to be run concurrently, in both batch and transactional environments. It supports online data query and remote job entry from video display or hard-copy terminals. Data communication facilities support data collection from, or distribution to, remote sites and computer-to-computer transmissions.

Program and file conversion aides, such as Liberator/3 for System/3 computers, ease transition to Level 62 from other Honeywell or competitive systems.

Level 6

Level 6: Building-block minicomputer hardware and software with modular, open-ended architecture that's equally at home in an OEM, system builder, or end-user environment.

Level 6 systems provide throughput of up to 6 million bytes per second on a bi-directional asynchronous Megabus communications path.

High performance semi-conductor memories are available in either 16K or 4K MOS chips providing up to 256K bytes per board. The newest models can accommodate up to 2 million bytes of main memory; all models can support billions of bytes of disk storage. A commercial model processes COBOL programs at high speed. Another model includes a high-performance cache memory and an integral memory management unit. A scientific instruction processor is optional.

The GCOS 6 operating system includes a wide variety of compatible modules that support applications such as forms data entry and remote batch with local processing, plus time-shared program development and terminal concentration. Other modules include compatible subsets of I-D-S/II data base management and TDS transaction systems. Level 6 provides direct support of Series 60 host processors through communications and compatible language file access and system applications subsets. High-level languages include industry standard COBOL and FORTRAN (incorporating reentrant code generation capability) as well as RPG.

Page Printing System.

The Honeywell Page Printing System utilizes an electrostatic process to set new standards for large-volume computer output printing. High-speed turnaround. Quality carbon-less impressions. Simultaneous forms printing. Conventional size pages. Printing, punching, perforating, collating—all in the same pass. A complete output production system that can save you time and money, increase output quality and productivity.

Honeywell's Page Printing System works with IBM, Burroughs, and Univac as well as Honeywell host computers. Three models deliver 8,000, 12,000 or 18,000 lines per minute. A single PPS installation can be cost effective at an output rate as low as 400,000 pages per month, can sustain a production rate as high as four million pages a month.

Applications Software

Extensive applications software is available for industries such as manufacturing, distribution, banking and health care, and for such activities as education, government, financial management, management science, mathematics, and engineering.

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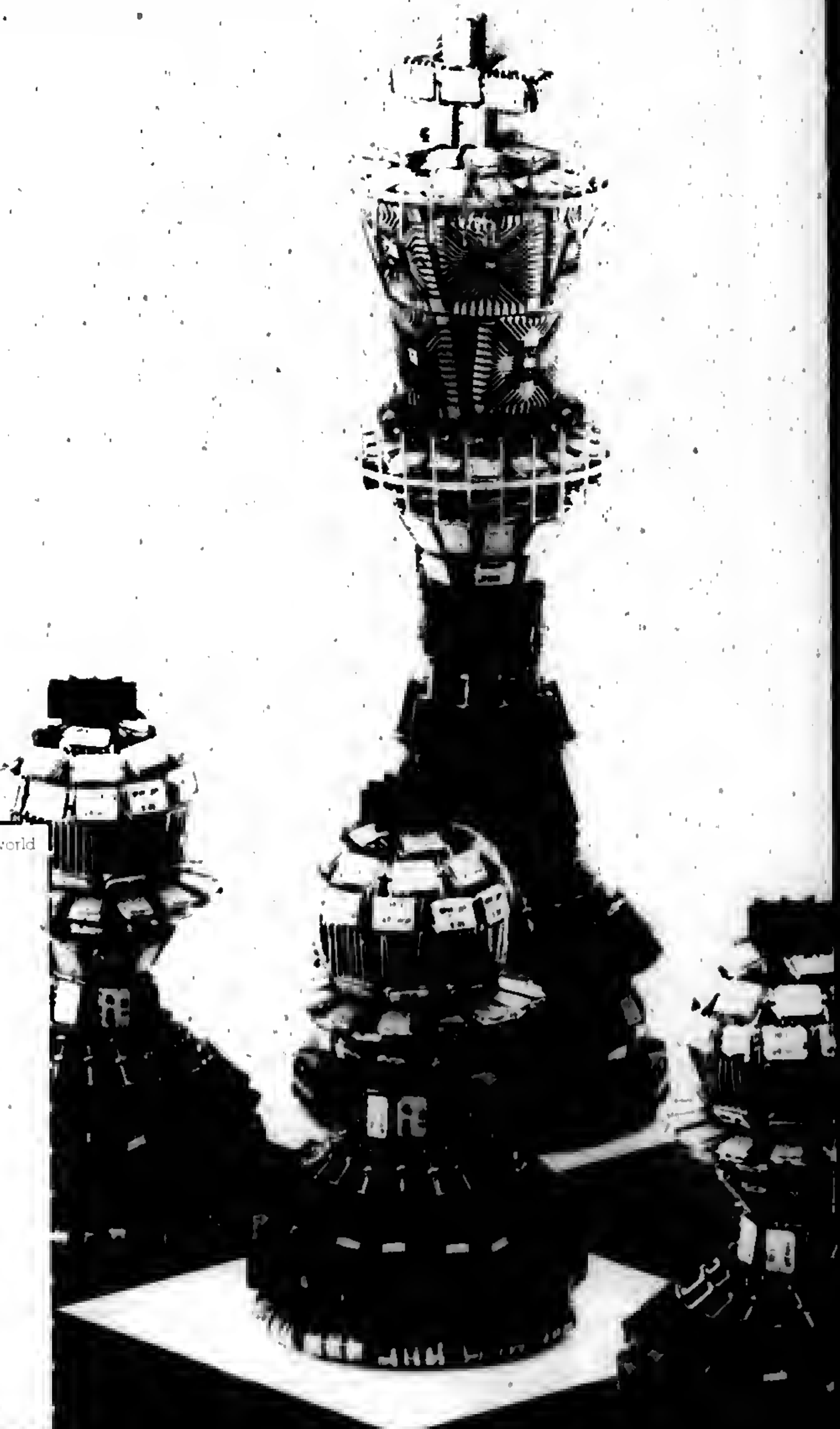

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Four-Day Seminars to Cover Auditing Basics

NEW YORK — A four-day seminar dealing with the basic fundamentals and procedures of DP auditing will be held here May 30-June 2 by the American Management Associations (AMA).

Participants of "DP Auditing: Concepts and Techniques" will be shown how to develop a framework in which to conduct an audit, identify specific tasks to be performed and select various resources for performing audit functions, according to a spokesman.

How to obtain information through questionnaires and how to use analytic flowcharts and auditing software will also be discussed during the course of the meeting, he noted.

The seminar will detail how to minimize business interruptions caused by audit activities and detect and correct problems before they develop, AMA said.

Focus on IPF Auditing

The course will also focus on auditing the information processing facility (IPF). Attention will be concentrated on selected IPF control techniques and information-gathering tools used in this particular type of audit, the spokesman said.

Registrants will receive a copy of *Computer Control and Audit* by Mair, Davis and Wood, which is developed from field experience, and a notebook containing lecture outlines, program narratives and questionnaire flowcharts.

Workshop sessions will allow individuals to utilize classroom techniques in analyzing and working out actual case studies.

The course is geared toward newly appointed auditors, managers and officials who are responsible for the standards, security and control within the DP environment. It will be repeated in Chicago on Aug. 28-31, Boston on Sept. 11-14, New York on Oct. 2-5 and San Francisco on Dec. 11-14.

Registration fees, including the cost of meeting materials, are $550 for AMA members and $630 for nonmembers. Team discounts are also available for three or more people from the same firm at $470 for AMA members and $535 for nonmembers.

AMA is located at 135 W. 50th St., New York, N.Y. 10020.

Power Node Built to Cut Need for Custom Wiring

SANTA ANA, Calif. — The Computer Power Center from Emergency Power Engineering, Inc. can help lessen the need for custom wiring done by electrical contractors, according to the company.

The unit is hard-wired to the building in which it is located and serves as a central node for power distribution to the equipment in the computer room, according to a spokesman.

No Electricians Later

Electricians or electrical contractors are not required later if additional equipment is to be added or existing equipment moved; instead, nontechnical personnel can plug power cables into the unit, he noted.

"The Computer Power Center generally pays for itself 100% the first time the computer is moved to a new location," the spokesman claimed.

Several features have been incorporated, the company said, to provide ease of use: easy accessibility to cables, lighted push-button switches, status indicators and the ability to attach up to 126 single-phase or 42 three-phase lines.

Other Advantages

Other advantages of the unit include a single-point electrical ground and the isolation of the computer equipment from spurious and potentially disruptive signals in the building's wiring, the firm added.

The Power Center, which does not incorporate a voltage regulator, can handle output voltages of 120- to 240 Vac and input voltages from 208- to 600 Vac.

Prices range from $6,000 to $14,500, the vendor said from 2919 S. Halladay, Santa Ana, Calif. 92705.

Verification Cuts Record Errors

(Continued from Page 50)

Another benefit from this system is the competitive spirit of the workers involved, "We use a dynamic allocation system here, and each morning the clerks are given their individual piles to process. Each one knows just how he rates in the department and strives even harder to increase productivity," Crandall noted.

He added that another benefit for the company is the decreased employee turnover in the dairy department.

The Provo firm handles records on nearly 640,000 cows, about 65% of the company's business, Crandall noted. The rest of its business is with savings and loan associations and medical records facilities.

Tilton is a free-lance writer based in American Fork, Utah.

NCC. Computerworld's got it covered—as only a newsweekly can.

This year's National Computer Conference promises to be the biggest ever. More than 40,000 people are expected to visit the record-breaking 1400 booths in the main show; and thousands more will be attending the newly-expanded *Personal Computing Festival* — including exhibits, speakers, and technical sessions on this fast-growing area of the computer world. And, of course, *Computerworld* will also be at NCC — to hail it, unveil it, and wrap it up — in three informative, important issues full of NCC news.

May 29th—Preview Issue: A complete rundown of the companies, products and services, keynote speakers and technical sessions you'll see at NCC. Plus — a guide of things to see and places to go in the Anaheim area. This issue will help you make the most of your time at NCC. (If you forget to bring your copy of *Computerworld* you can pick one up free at our booth — while they last.)

June 5th—Show Issue: Our Show Issue will include all the late breaking stories, program changes, intended product announcements and behind-the-scenes show details leading up to NCC. (It will also be available at our NCC booth.)

June 12th—Wrap-up Issue: Cohesive analysis and summary of the significant events of the '78 NCC. This issue will give details on product announcements and will review the content of program sessions, experts' observations and keynote speeches. The important events of NCC will be summarized here.

If you're a manufacturer or marketer in the computer field, don't miss these ad closing dates for *Computerworld's* NCC issues:

Preview Issue: (May 29th)—Color and Insert close: May 12; black & white close: May 19.

Show Issue: (June 5th)—Color close: May 19; black & white close: May 26.

Wrap-Up Issue (June 12th)—Color close: May 26; b&w close: June 2.

For all the details contact your *Computerworld* salesman. He can give you special assistance in NCC ad planning. Or call Terry Williams at (617) 965-5800 to reserve space for your ads.

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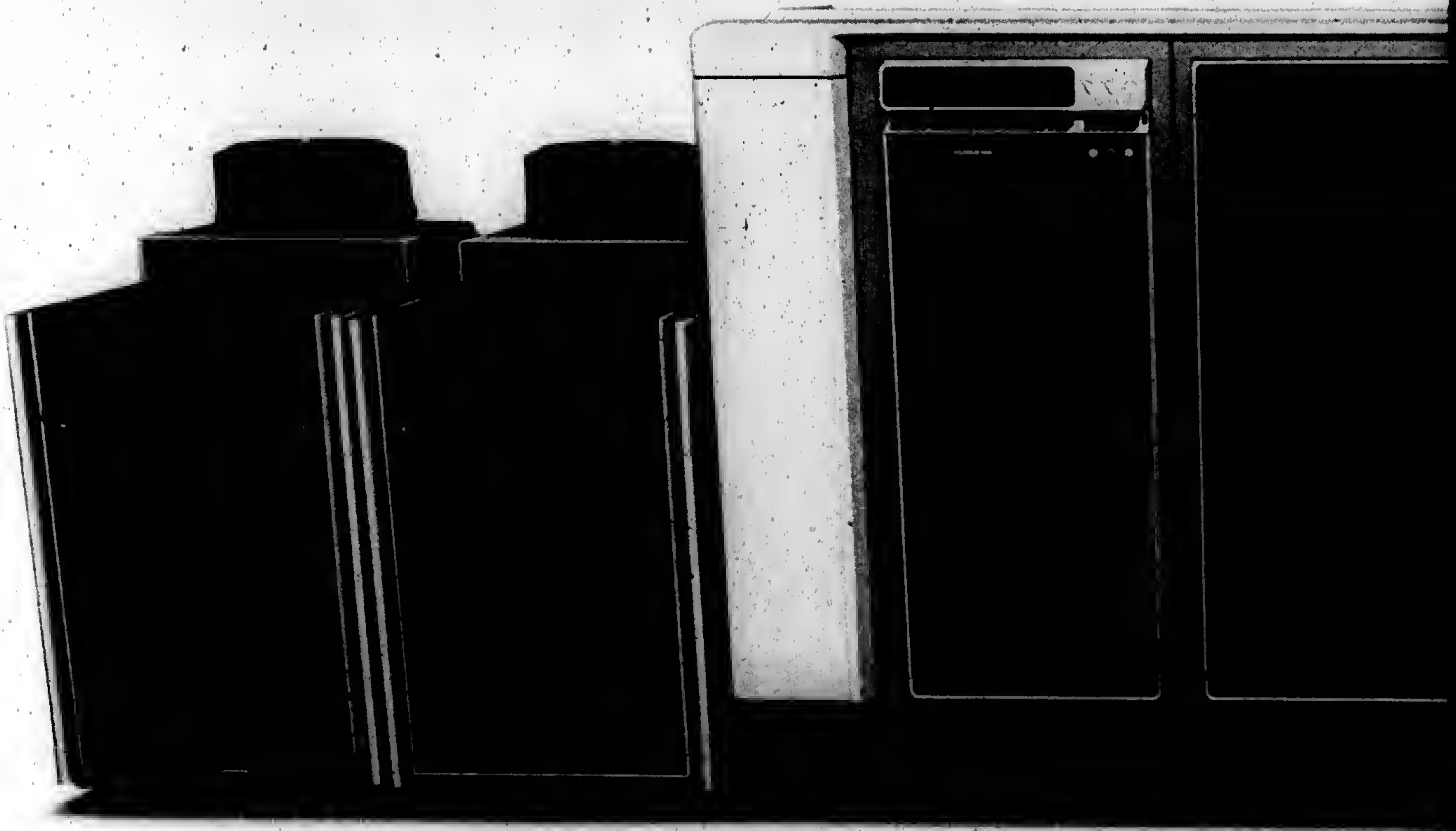

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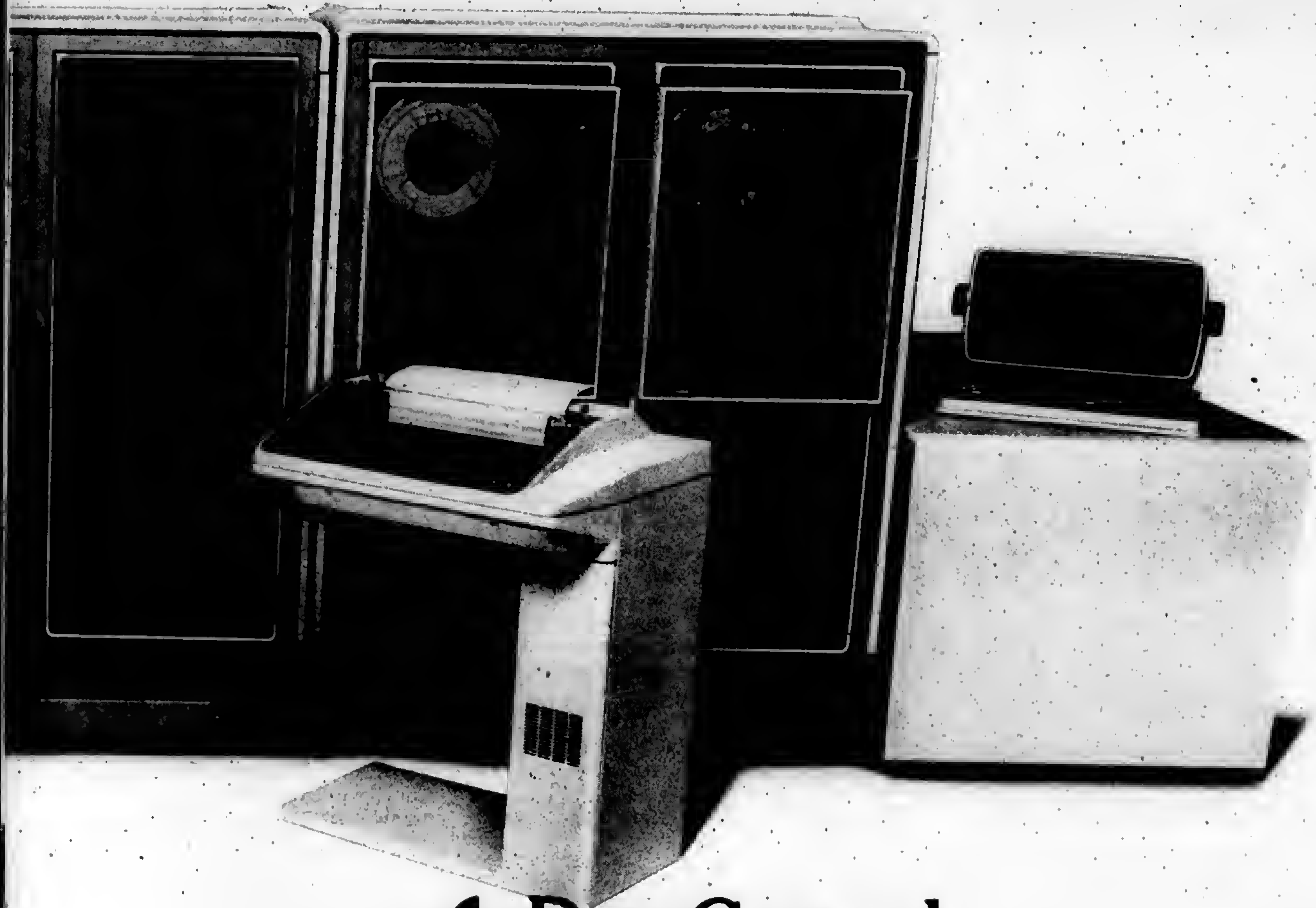

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Canadian User Cites Page Printer's Advantages

(Continuied from Page 49)

budget, this is a significant savings. The 12-inch width handles the 132-position print line when using 12-pitch characters, thus providing an automatic compatibility with AGT's impact printers.

When the burst, trim and stack function of the 3800 is selected, the form trims down to 11- by 8.5 inches, which brings computer output in line with most other business documents.

On-Line Forms Printing

Although many of our requirements for special preprinted forms can be met using the flexibility of the character set to create horizontal and vertical lines or logos, for example, there will always be a requirement for forms with some manner of preprinted design.The 3800 meets this requirement using a photographic technique known as the forms overlay feature.

Using this feature, a frame containing a photographic negative is mounted in the machine and, if activated by the job control statements, a synchronized light flash will imprint an image of the form on the photoconductive drum prior to the character-generating laser scan.

This method of "on-line" forms creation is cheap, easy to change and permits most graphical techniques such as transfer lettering, half tones and screening. A major exception is color printing.

AGT evaluated several methods of producing the negative needed when using the overlay feature for on-line forms printing. Some of our forms designs require fairly precise line placement, especially on vertical lines through adjacent 12- or 15-pitch characters, and this led us to investigate the use of a computer graphics system at a service bureau operated by Computrex.

Using a forms layout chart annotated with distances between lines and alphanumeric headings, the design is input through a Tektronix, Inc. 4014 storage tube. The system adds standard set-up markings needed for mounting the negative and outputs the form design on a California Computer Products, Inc. Model 936 plotter. The speed of plotting means that several variations can be tried in one session for evaluation by the user.

When a design is validated, the plot is rerun on a dimensionally stable Mylar medium. After manual application of any transfer lettering design that has been specified, a contact print is made from the Mylar master to produce a negative on .007-inch film.

The negative is framed and, after testing, labeled with the set-up coordinates. These are preset by the 3800 operator prior to printing the job output that needs the forms overlay feature.

The attractions of using this technique for forms overlay design, aside from gaining the precision needed to match tne 3800 printing capabilities, include good turnaround compared with manual drafting, ease of revision during the design phases and the creation of an easily amended library of forms designs.

An additional benefit resulting from the use of a computer graphics system for the design of overlays will be a degree of standardization and, therefore, further economies in the area of special forms.

System Performance

A major challenge presented by the 3800 is making good use of its throughput capability. Paper is fed at a constant rate of 32 in./sec and AGT's own measurements, which include some interruptions, show that an average rate of 1,000 forms every six minutes is possible.

The line/min rating thus depends on the line density: at 12 line/in., the average rate is equivalent to 15,000 line/-min. The theoretical maximum is over 20,000 line/min but this takes no account of interruptions.

Whatever speed is achieved, it remains obvious that we have increased our potential for adding to the weight of paper output, which is already a problem for many computer centers.

However, some applications show a very high payoff. For example, AGT spent a great deal on reducing and copying essential construction program reports. Now, they can be printed by the 3800 in the right size and quantity and with each copy individually addressed, ready for distribution.

Applications like this give a directly computable savings. Of course, a number of problems have to be solved before turning the computer room into a print shop, and one of these is rethinking the distribution system to keep the bottleneck the 3800 has resolved from moving downstream.

Incidentally, the capacity of the 3800 has allowed AGT to reduce our impact printer configuration from six units to four, and we plan a reduction to three soon. We have also absorbed growth that would have necessitated a seventh printer had we stayed with impact technology.

It is going to take AGT some time to fully exploit the capabilities of existing impactless intelligent printer technology. Systems designers are unfamiliar with the concept of "free-type" printers; this means that projects that were previously not even considered for the comptuer are now feasible.

Hornby is a planning assistant with the Systems and Methods Department of AGT, which installed one of Canada's first IBM 3800s in November 1977.

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Mini Bits

GRC Desktop System Compatible With PDP-11

HARTFORD, Wis. — General Robotics Corp. (GRC) has introduced a desktop computer system that incorporates a microprocessor compatible with the Digital Equipment Corp. PDP-11 plus a 62K-byte random access memory, extended instruction set and floating-point arithmetic, the company said.

Based on a DEC LSI-11,the 35-kilogram Model MTV/X3 system also incorporates an eight-quad slot backplane, 12-line by 40 column plasma display, keyboard with numeric pad, triple minifloppy disk unit that accommodates more than 1M byte and a 60 char./sec printer.

A standard MTV/X3 configuration also includes a DEC RT-11 operating system license and 15 minidiskettes, he noted.

An MTV/X3 costs $12,000 and discounts for $7,150 when purchased in quantities of 100 with an RT-11 monitor license.

GRC is at 57 N. Main St., Hartford, Wis. 53027.

Centronics Matrix Printers Gain Front-Feed Option

HUDSON, N.H. — A front-feed option for Centronics Data Computer Corp.'s 700 series of dot matrix printers permits automatic front insertion of cut forms and cut multipart form sets, according to company spokesmen.

Designed for invoicing, accounting, banking, stock certificate preparation and other applications requiring single or multiple-copy documents, the device operates with Centronics' 80-column Model 780 and 781 printers, which use the narrow front feed that accommodates paper 4.2 in. to 8.5 in. wide, the firm said.

The front-feed option also reportedly operates with Centronics' 132-column model 700, 701, 702 and 703 printers and with the Model 761 keyboard send/receive and receive-only teleprinters which use the wide front feed that accommodates paper 5.2 in. to 11.7 in. wide, the company added.

In end-user quantities, the stepper-motor-driven and microprocessor-controlled option costs $700 from Centronics at Hudson, N.H. 03051.

SBS Publishing Plans Seminars

SAN JOSE, Calif. — SBS Publishing, Inc. will soon begin conducting two series of seminars, one dealing with the distributed processing problems faced by DP managers and the other covering small business computer marketing.

"Distributed Processing — Today and Tommorrow," the first seminar series, will take place May 15 in Chicago, May 18 in New York City and June 8 in Anaheim, Calif.

Speakers at the one-day event will include L. Duane Kirkpatrick, vice-president of Dean Witter Reynolds; John Dodd, DP manager of Wilson Sporting Goods Co.; and Larry Woods, manager of distributed processing at Deere Co. Problems these speakers will examine will include data security, communications protocols and organizational and support consideration.

The other seminar, slated for June 7 in Anaheim, will be geared to senior marketing executives at firms that now or soon will compete in the small business computer market.

SBS Publishing is located at 4320 Stevens Creek Blvd., Suite 190, San Jose, Calif. 95129.

GA Dual-Function System Eases Generation of Forms

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Software packages that reportedly simplify forms generation and allow users of corporate distributed DP systems to enter and process data simultaneously highlight a minicomputer-based networking system introduced recently by General Automation, Inc.

Comparable in performance to the Datapoint Corp. 6600 and the Inforex, Inc. 7000, the 220 DPS distributed processing system provides an "English-like" forms generation package that allows users to create screen formats without subsequent recompilation, a spokesman claimed.

With the Easyform package, users can generate CRT-displayed data entry forms like inventory control documents and bills of lading in as little as an hour, compared with weeks or even months with rival forms generation software, he said.

The 220 DPS system also comes with a Comprehensive Data Entry Software (CDES) package that, in addition to assisting input, performs batch computations in both Cobol and Fortran, he added.

The spokesman credited the 220 DPS' ability to serve both as a processor and as a data entry system to the CDES package and to the system's 128K-byte semiconductor main memory, which accesses in 400 nsec. He also atttributed the dual-function capability to the system's operating system and to its Isam/Psam file management system, both of which are identical to those in GA's larger and more powerful 440 DS multiterminal systems.

These two common features, plus a Cobol/Fortran computing capability, make the 220 DPS upward-compatible with the 440 DS systems, he explained.

Intended primarily for Fortune 1,000 firms and OEMs that buy hardware in large quantities, the latest GA distributed processing product is said to suit applications like order entry, inventory control, reservations management, general accounting, payroll, personnel information preparation and many other standard business functions.

Typical Configuration

A typical configuration incorporates a 16-bit GA-16/220 LSI minicomputer with a 10M-byte disk drive unit and a 200 line/min printer. Each CPU/cluster processor reportedly supports up to four CRT terminals that operate as far as 2,000 feet away from the CPU in a multitasking environment.

By contrast, the 440 DS system, of which the 220 DPS is a "scaled-down version," accommodates as many as 16 concurrently operating CRT terminals, a 160M-byte disk unit and a 600 line/min printer.

An IBM 2780 emulation capability allows the 220 DPS sysems to communicate bisynchronously at 2,400 bit/sec with most common models of remote host mainframes, the spokesman noted.

A configuration with four operator stations, cluster processor and software package costs $20,000 in OEM quantities. First deliveries of the systems will begin June 1 from GA at 1055 S. East St., Anaheim, Calif. 92803.

Small Business System Propels Airline Security Firm's Reports

DALLAS — Management reports that routinely went into a holding pattern 18 months ago are now arriving safely and on schedule at an airline security services firm here, thanks in part to the company's recently installed small business system.

Guardian Services, Inc., a subsidiary of Braniff International Airways, uses the minicomputer-based system to prepare payroll, invoices, payment records and monthly financial reports for its offices here and in Kansas City, Houston, Oklahoma City and Amarillo, Texas.

Before automating its report preparation, Guardian relied on an acounting firm to manage its financial books, according to Vice-President Robert R. Kendall. Although that method of generating documents produced accurate results, it often forced the security services firm to wait a month or more for the information needed to make executive decisions.

"In an industry that moves over 500 miles per hour, that just wasn't fast enough," Kendall recalled.

Like most firms, Guardian bases its planning and management decisions on financial

(Continued on Page 68)

Jan Howe, who had never run a computer before, took the job as Guardian Service's small business system operator because "I thought it would be fun."

ACDS Packages CDC Printer For Use With PDP-11 Line

NASHVILLE, Tenn. — Advanced Computer Data Systems, Inc. (ACDS) is reportedly offering the Control Data Corp. 300 line/min printer in a package for end users and OEMs of the Digital Equipment Corp. PDP-11.

The package includes an interface/controller card and a software driver to run under DEC's RT-11 or RSX-11M operating systems, ACDS said. The printer itself features an RS-232 interface with a 1K buffer, paper basket, selectable forms length and 6- and 8 line/in. LED diagnostics, a spokesman added.

Options include 48-, 96- or 128-character sets with corresponding increases and decreases in printing speeds that are adjustable by changing print bands, ACDS said. The package also comes with an optional compressed font that permits 15 char./in instead of the usual 10-char./in. capability.

Because of this optional compressed font, the package allows the printer to generate a 132-character-wide report on 11-in.-wide paper, the company explained.

The package and the compressed font option cost $9,900 and $400, respectively, from ACDS at 210 25th Ave. North, Nashville, Tenn. 37203.

Airline Security Firm Gets Management Reports Faster

(Continued from Page 67)

reports, the vice-president noted. Without timely information, the company couldn't initiate programs or procedures until two months after a problem had arisen.

These chronic delays and the resulting search for an alternative accounting system eventually led Kendall to consider equipping his firm with an in-house small business system.

"It was the only logical choice," he explained. "If we wanted full control over our financial reports and documents, we had to have the ability to process them ourselves — without adding staff. We had seen minicomputers in operation at other companies and were impressed at how much was available for such a small cost."

After determining that a minicomputer would solve his company's problem, Kendall began searching for the right combination of hardware and software that would meet Guardian's requirements.

The search for a suitable system took the firm six months. First, company officials defined parameters that included an on-line general ledger system with accounts payable, receivables, payroll, financial reports and management reports, Kendall said. They also specified electronic storage of all employee files for quick reference whenever needed.

System Selected

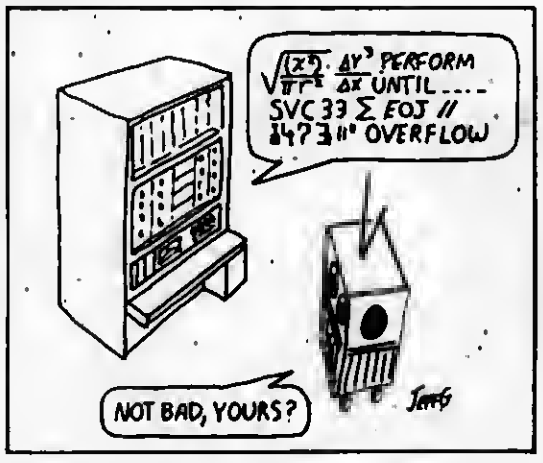
By the end of 1976, Guardian Services selected a Wang Laboratories WCS-30 with 10M bytes of hard disk storage, 16K bytes of internal memory and a high-speed printer. A program to meet the firm's exact requirements was developed by Fiestel and Fiestel here, Kendall said.

Because programs had to be developed and many years of financial and personnel information converted, the Guardian Services computer didn't become fully operable until last March. In the meantime, Jan Howe was hired as a computer operator.

"I had run a word processor before, but never a computer," Howe said. "I thought it would be fun and it's one of the reasons I took the job. The programmers showed me what to do, and I ran our March statements."

Careful and a little nervous, Howe admitted she took two days to do what should have taken only a few hours. "But we got it right the first time, and we got out our March statements two weeks before our accountants had finished with February," she added.

In the near future, Guardian plans to expand the existing configuration to accommodate additional applications and capabilities such as budget comparisons, programs to ease contract bidding and a telecommunications link to remote terminals.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At Six Australian Hospitals

Patient Report System Relieves Clerical Burden

VICTORIA, Australia — Clerical workloads and the volume of paper records have declined noticeably at six area hospitals since officials at the institutions jointly developed what they claim is the first patient identification and report system of its type in the world.

Designed for both in-patient and out-patient care, the minicomputer-based system has allowed the laboratory staffs at the participating hospitals to concentrate on their primary jobs — doing lab work — instead of wasting their time on relatively trivial chores like manually transcribing experimental results. As a result, the system has yielded improved quality control procedures at the six hospitals, spokesmen for the institutions said.

"The system has enabled us to cope with a worklaod during an expansion period, and this would not have been possible using the old manual system," one official said.

Updated Patient Reports

Based on a program written by the Hospitals Computer Service of nearby Monash University, the system's Data General Corp. Nova 3 processor receives raw data from six CRT terminals in the hospitals' laboratory or patient reception areas. After storing, updating and processing the results of laboratory tests, the 64K-byte minicomputer generates cumulative patient reports as well as ward reports that show the latest test results for patients in each ward at any time of the day or night, spokesmen explained.

For example, at Dandenong and District Hospital, one of the latest institutions to subscribe to the system, the processor produces cumulative reports that cover the biochemical and hematological history of each patient. Using a paper tape reader, the system also reads measurements from many test instruments directly into the minicomputer, hospital officials said.

Eventually, officials at the participating hospitals hope to expand the existing configuration into a "total laboratory system," capable of supplying microbiological and histopathological data as well as the other forms of clinical data already available from the system, they added.

Copes With Expansion

The six cooperating hospitals developed the system, which also incorporates a 2M-byte disk subsystem and a magnetic tape subsystem, partly to increase control over expanded treatment facilities and to keep pace with growing public demand for improved service.

One of the hospitals, for example, boosted its bed capacity this year from 205 to 340 beds, with the opening of a new wing, and a recent survey showed the institution provides services to 203,000 persons in five suburbs southeast of Melbourne. By 1982, the hospital expects to serve 300,000 patients, officials reported.

To keep pace with this increased demand, the hospital plans to install two additional terminals during the next 18 months — one in its medical records department and the other in the intensive care ward. The hospital has already linked its pathology department to the patient identification and reporting system, spokesmen said.

Other hospitals that have also connected their pathology departments to the system include Royal Melbourne, Prince Henry's, Alfred, Geelong and St. Vincent's.

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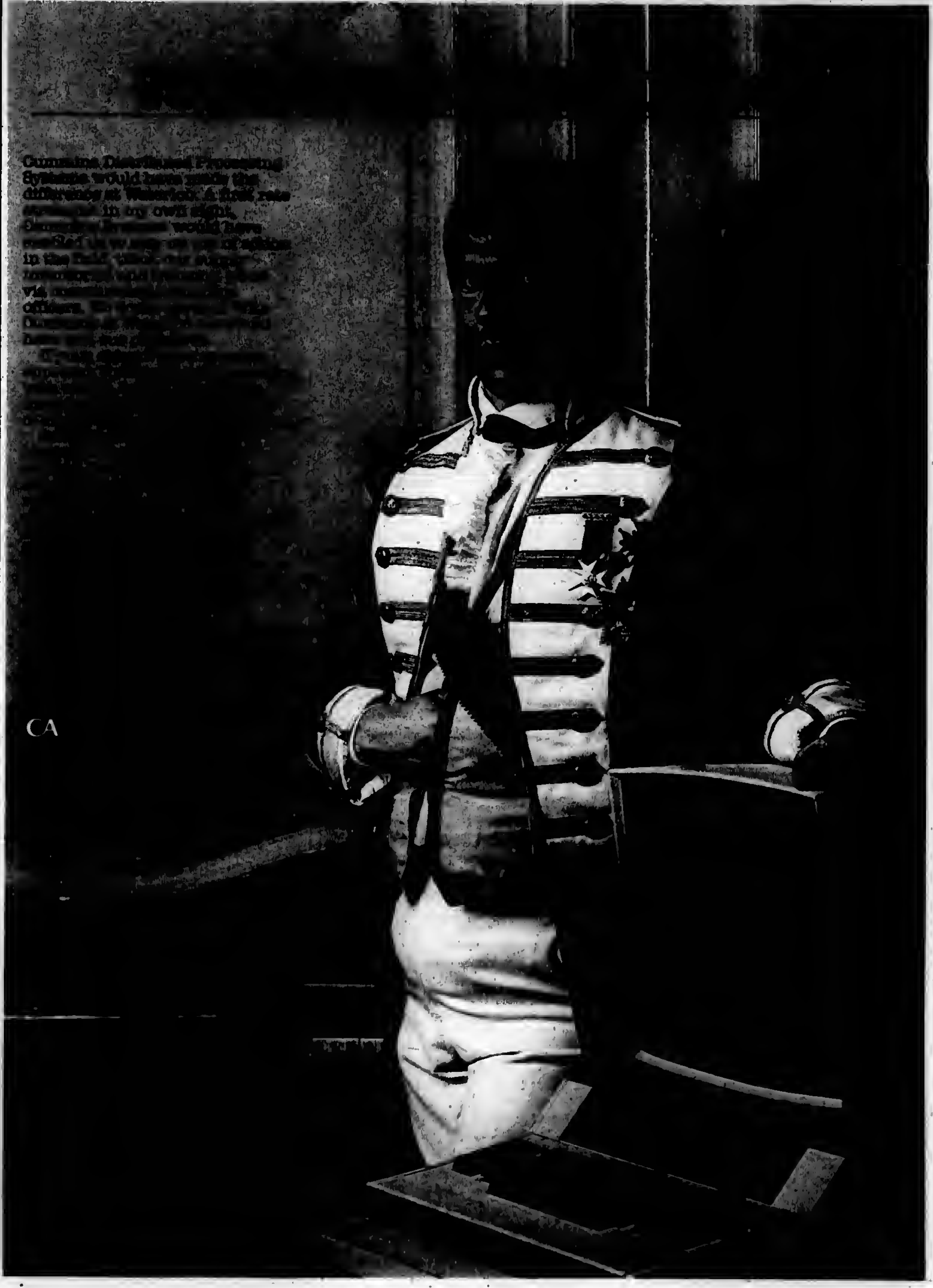

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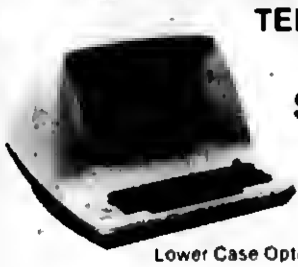

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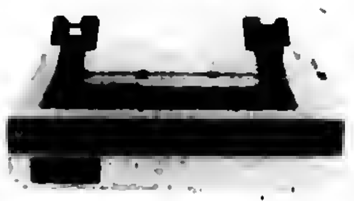

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In-House CPU Cures Hospital's Cash Flow

TWO RIVERS, Wis. — The 73-bed general hospital here has been using an Industry Application Program (IAP) and a System/32 from IBM since 1975 in order to speed its cash flow and increase the accuracy of its patient charge recording.

"It became clear in 1975, after Two Rivers Hospital separated from municipal control and became a nonprofit community corporation, that we needed something better to replace what had become a fragmented business system," according to controller A.T. McKinney.

"We had an ancient accounting machine for patient billings, we used one outside firm for general ledger posting and we used another for payroll processing. As a result, our procedures were slow, cumbersome and costly," McKinney said.

Patients on the Increase

"At the same time, we faced growing patient loads both in the general hospital and in our associated 86-bed extended care facility, Hamilton Memorial Home," he continued.

"The System/32, together with IBM's Hospital Financial Management System IAP, offered a ready solution to our problem," McKinney said. "The small computer is simple enough to be operated by our regular staff people and economical enough to be well within our means.

"Yet it also offers the computing power to enable us to pull together all of our business functions in a single system and the data storage capability to support a central information source.

"The financial management IAP designed to run on the System/32 gives us ready-to-use programs for patient billing, accounts receivable, payroll, accounts payable and general ledger so that we need not bring in our own programmers," McKinney reported.

First Application

Patient billing was the first application program implemented on the system. "This is where the inefficiency of the old system had been most painful," McKinney noted. "We were having trouble tracking patient charges, especially those emanating in the laboratory, pharmacy or X-ray departments. Billings were delayed, slowing down our vital cash flow, and bill statements often confused the recipients.

"Even more troublesome was our inability to put our hands on needed patient information — individually or collectively, in detail or summary form," the controller said.

With the System/32, patient transaction data is captured at its source, from admittance to discharge, and the individual patient records are updated daily.

Cash Flow Speeded

Room charges are generated automatically, and any ancillary charges accruing to the patient are automatically priced and posted. Patient bills are triggered on a cycle basis. Two Rivers Hospital has modified the basic program here so the computer provides a bill itemizing the patient charges and summarizing the charges by type of service.

"The dynamic and overall efficiency of patient billing has speeded our cash flow from receivables by an average of one week, which represents some $70,000 in available funds," McKinney reported.

"The ability of the system to accurately track and record all charges against a patient account has resulted in a 6% annual increase in our ancillary service billing total, and this represents an extra $240,000 in annual revenue," he said.

Important By-Product

"As a by-product of the patient billing routine, the computer delivers detail and summary reports showing service frequency and revenue amounts by service type and department for inpatients and outpatients. In addition, we can quickly retrieve meaningful information on patient mix and services performed and on trends and rates, giving us much better control over our present and future financial positions," McKinney said.

Officials said training employees on the computer has presented no problem, and six employees are now capable of taking over the computer operation if the need arises.

Currently, two additional applications — inventory and utilization review — are being considered for the system, which is readily expandable, the officials said.

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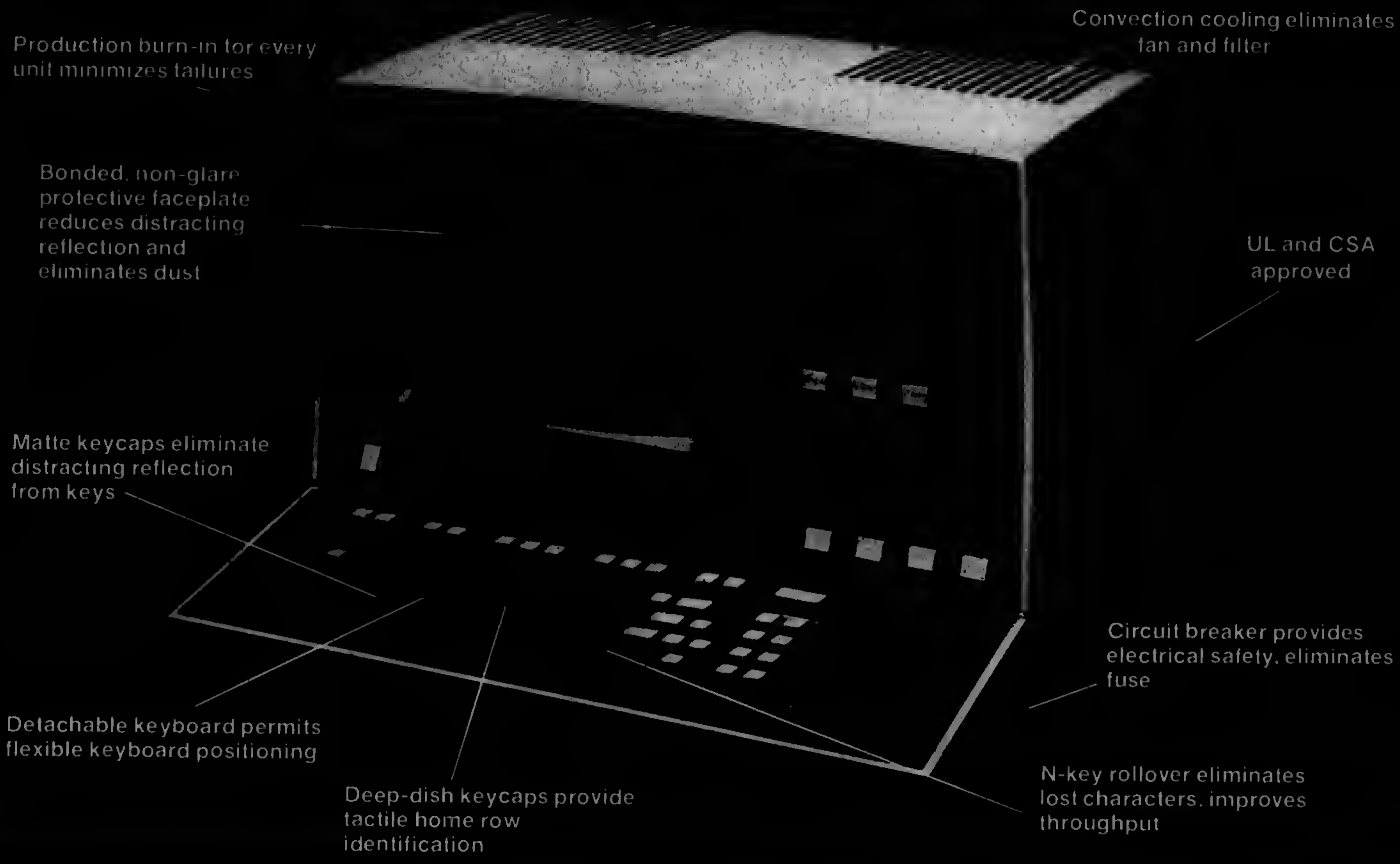
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Expandable Mini Series Handles POS, Standard Business Tasks

MOUNTAIN VIEW, Calif. — A series of expandable minicomputer systems from Extensys Corp. performs retail store and supermarket point-of-sale applications as well as standard business functions such as general ledger accounting, inventory and product control and sales order entry, according to the firm.

Equipped with a distributed processing capability and multitasking software, the modular EX3000 incorporates a host processor and as many as 16 subsidiary processors that control one or more floppy disk, hard disk or remote terminal subsystems, an Extensys spokesman said. Each of these subsystems reportedly accommodates up to eight 9,600 bit/sec serial lines to permit communications with as many as 64 remote terminals.

Four Subsystems

A basic EX3000 series incorporates four subsystems, a spokesman said.

- A floppy diskette unit with a 1M- to 4M-byte mass storage capacity.
- A 96M-byte hard disk subsystem.
- A multiple terminal subsystem with eight RS-232C serial interfaces.
- A terminal/operator processor subsystem with keyboard, CRT and RS-232C serial interface.

Other boards in the family include a memory board with a 16K- to 64K-byte random-access memory (RAM); a memory management board that controls a RAM as large as 1M byte and has a priority direct memory access (DMA) mechanism; and an 8085-based CPU with a 16K-byte onboard programmable read-only memory, eight-level vectored interrupt and combination interval/event counters, the spokesman noted.

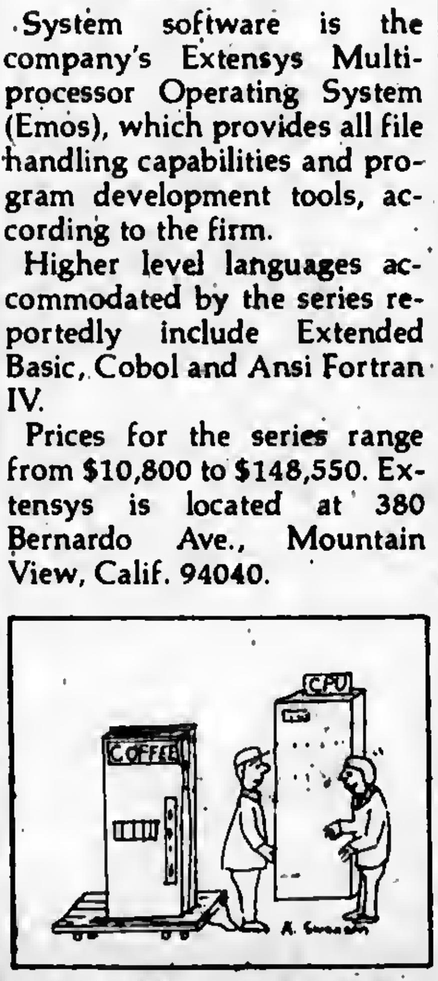
A typical EX3000/System 30, for example, is said to consist of a combination system console/terminal, three remote terminals, 24M-byte hard disk unit, 200 char./sec matrix printer, operating and higher level software and 192K-byte system and user RAM with DMA memory management module. Processing is distributed throughout 19 microprocessors, Extensys added.

System Software

System software is the company's Extensys Multiprocessor Operating System (Emos), which provides all file handling capabilities and program development tools, according to the firm.

Higher level languages accommodated by the series reportedly include Extended Basic, Cobol and Ansi Fortran IV.

Prices for the series range from $10,800 to $148,550. Extensys is located at 380 Bernardo Ave., Mountain View, Calif. 94040.



'You Mean, CPU Doesn't Stand for Coffee Processing Unit?'

IBM Series/1 Users Get Interface Option

ORANGE, Calif. — A serial interface from MDB Systems, Inc. reportedly allows users to attach a teletypewriter or similar peripheral to the IBM Series/1 and to use an input unit RS-232 capability.

The MBI-49-TTY/ RS-232 interface also transmits and receives data serially by using TTL Levels, MDB spokesmen said.

In RS-232 or TTL operation, the interface offers clear-to-send and request-to-send protocol, the spokesmen added. It also provides an 8-bit character buffer that allows an attached processor a complete character time to fetch an assembled character before data overrun occurs, they said.

The MDB IBM Series/1 TTY-board reportedly has switch-selectable data transmission rates ranging from 110 bit/sec to 9,600 bit/sec and operates under direct program control. Standard units also come with switch-selectable parity, number of stop bits and word length, MDB said.

Deliveries of the $560 board will begin in June from MDB at 1995 N. Batavia St., Orange, Calif. 92665.

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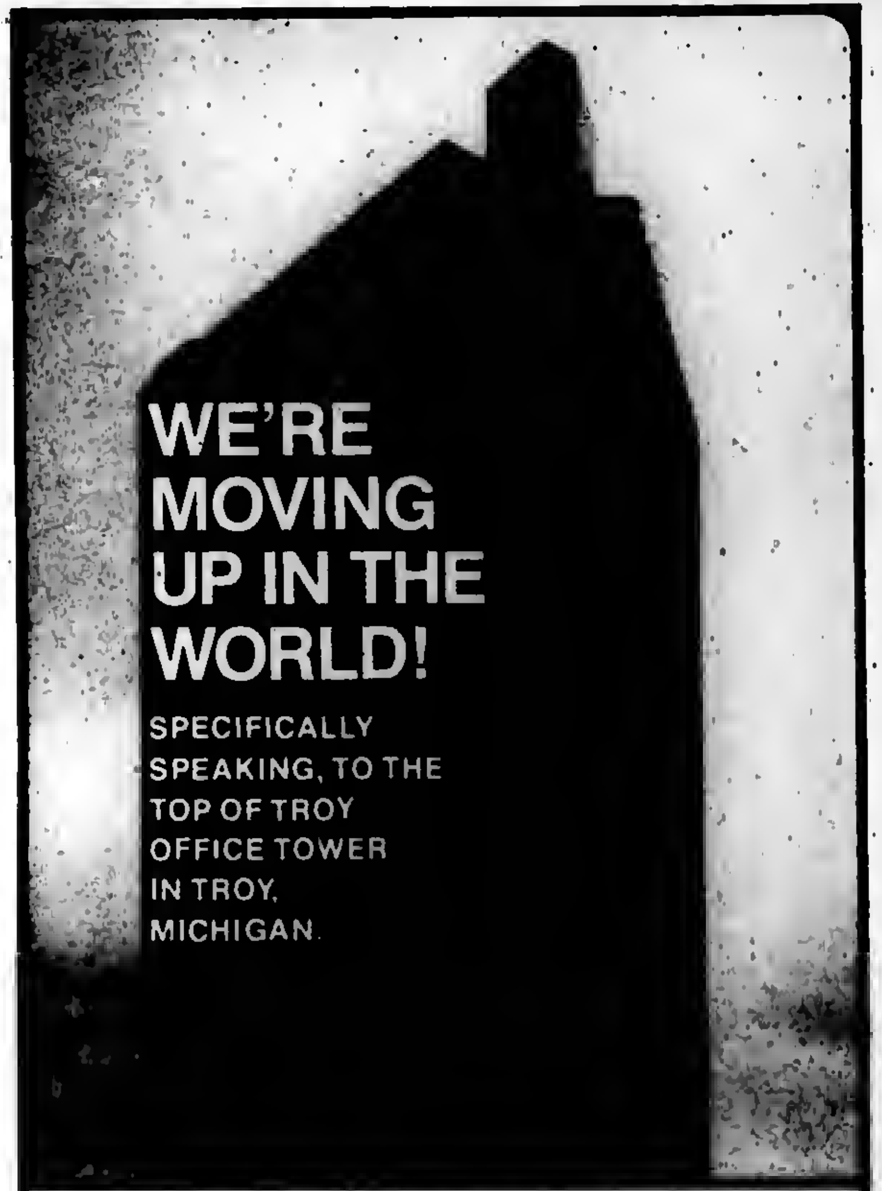
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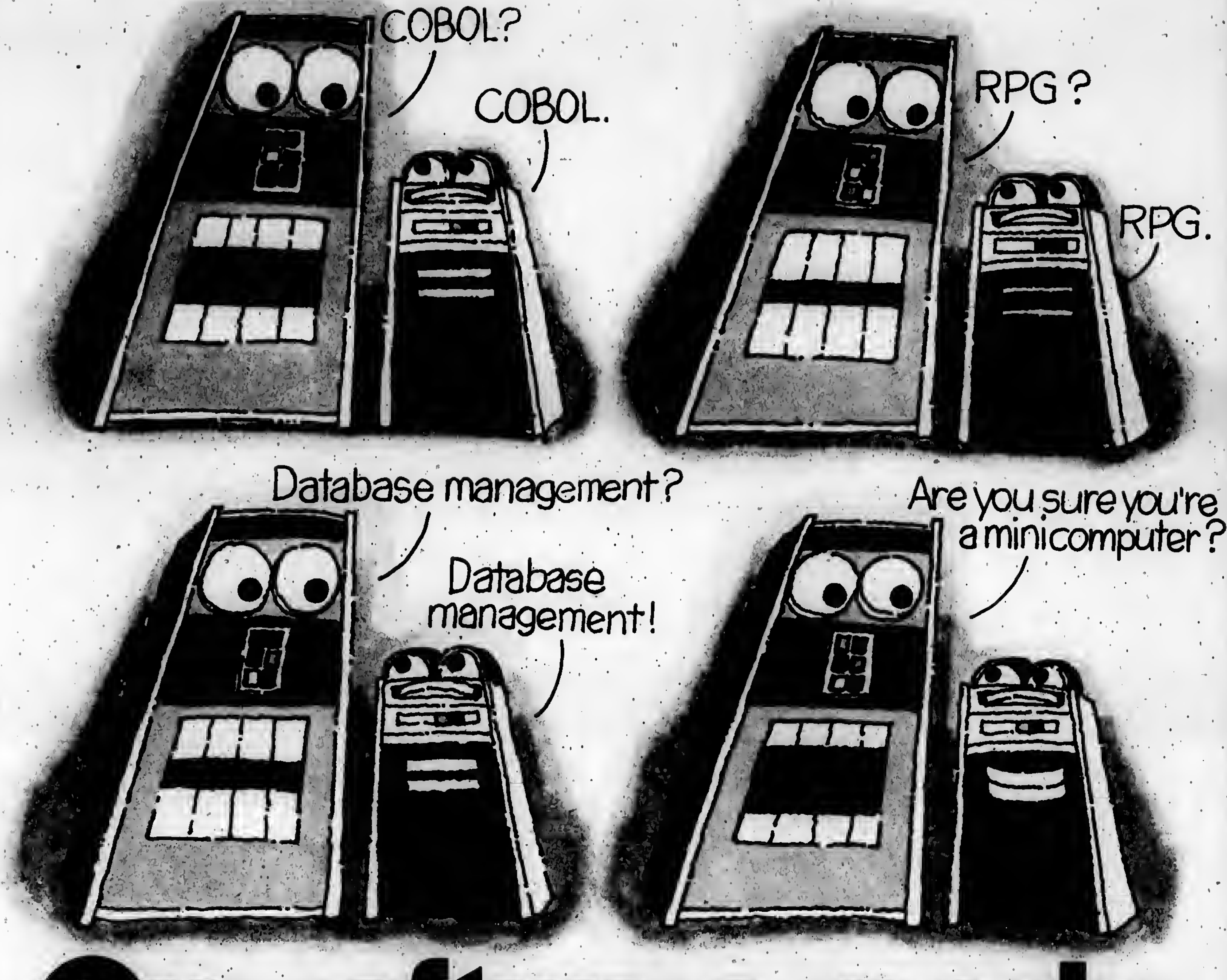
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digital

Diva Disk Fits PDP-11/70

EATONTOWN, N.J. — Diva, Inc. has introduced a disk system compatible with the Digital Equipment Corp. PDP-11/70 that communicates with the PDP-11/70's cache bus controller, a spokesman for the disk manufacturer said.

Functionally equivalent to DEC's RP04 and RP06 disk drives, the DD 70 series uses its cache bus interface to transfer 32-bit words into CPU memory without Unibus intervention, Diva said.

The DD 70 series reportedly consists of the Computroller V, which is a microprocessor-based disk controller; a four-board PDP-11/70 interface that plugs into the DEC CPU and replaces DEC's RH70 massbus controller; and various disk drives ranging in capacity from 80M- to 300M byte/spindle.

Some systems in the series transfer data 50% faster than the DEC counterparts, the Diva spokesman claimed.

A microprocessor based emulation package makes the DD 70 software transparent to all standard DEC operating systems and thus eliminates foreign I/O drivers and software or hardware modifications of a user's PDP-11/70, the spokesman added.

Depending on storage capacity, prices for single-drive systems range from $22,000 to $30,000. Add-on drives range in cost from $10,000 to $21,000.

Diva is at 607 Industrial Way West, Eatontown, N.J. 07724.

Odell Desktop Unit Operates Alone or in a Network

MOUNTAIN VIEW, Calif. — Odell Industries Corp. has begun production shipments of a desktop computer system that the company claimed performs assorted commercial, industrial and engineering applications either as a stand-alone unit or as part of a larger network.

Equipped to serve word processing and DP applications, the System 85 incorporates a programmable keyboard, built-in 1,920-char. display, dual floppy disk drives, communications interface and random-access memory as large as 64K bytes in a self-contained package, Odell said.

Odell System 85

The system's CPU reportedly incorporates an Intel Corp. 8085 microprocessor and a compatible multibus structure that allows users to upgrade to a 16-bit processor with minimal modification.

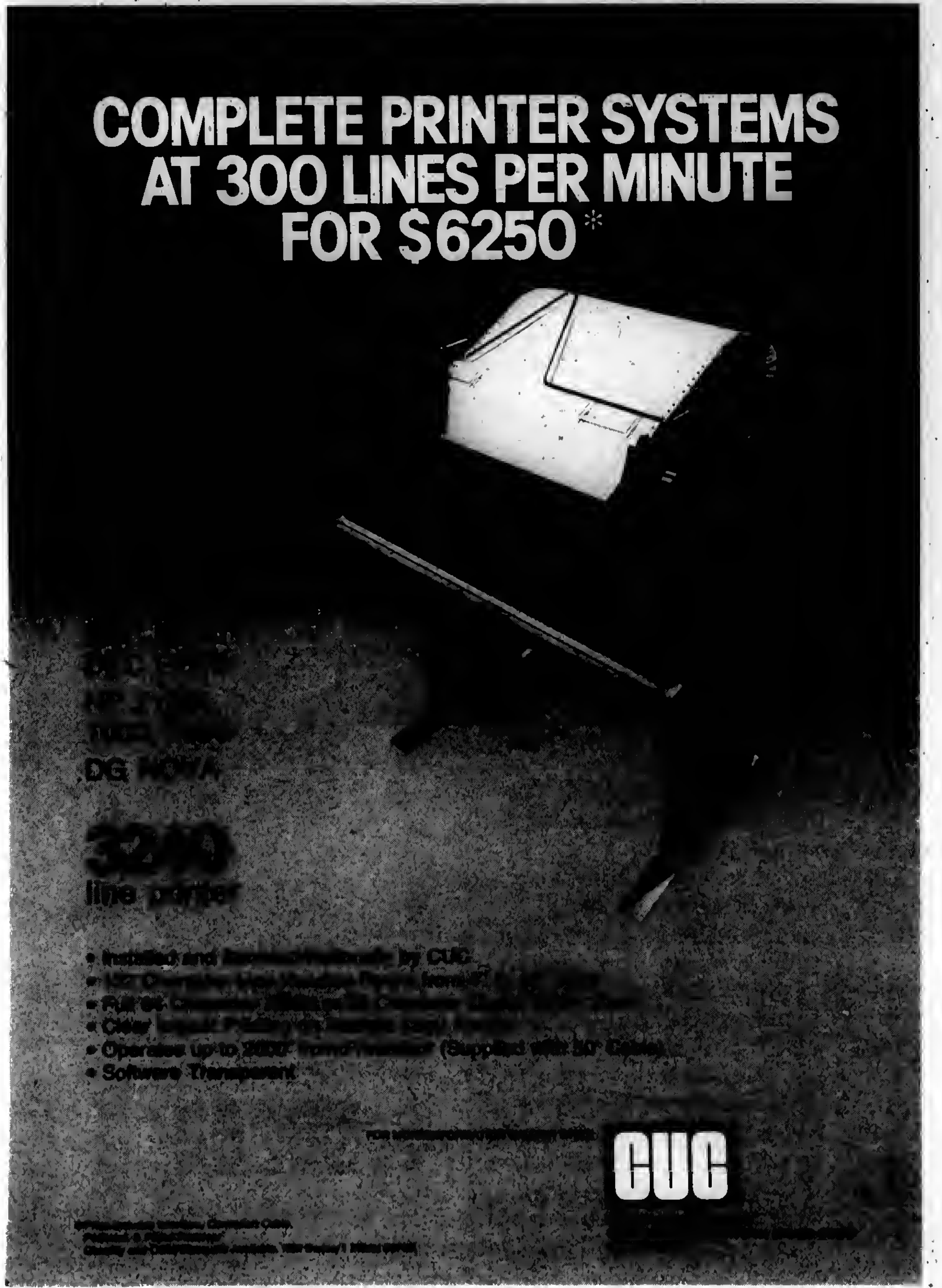
The System 85 accommodates the Shugart Associates line of floppy disk storage units and can be specified by users to incorporate either an 80,000-char. mini diskette or a 200,000-char. standard-sized diskette, according to a spokesman.

The system can accept two to four single- or dual-headed diskette units, he added.

The System 85 communicates in asynchronous, bisynchronous or synchronous modes at programmable rates ranging from 50 bit/sec to 19.2 kbit/sec in a polled, interrupt, dial-up or on-line environment, the firm said.

Intel PL/M-compatible, the system comes with assorted software packages including an advanced Commercial Basic, Ansi Standard Fortran, assembler, text editor, general ledger and letter writer, the spokesman noted.

Prices for the System 85 start at $8,350 with OEM discounts available. Odell Industries is at 2351 Charleston Road, Mountain View, Calif. 94043.



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Four Elements Make Up Minimal System

MANUFACTURER AND TYPE	PRICE	CPU TYPE	TOTAL MEMORY (ROM/RAM)	POWER SUPPLY (AMPS)	FRONT PANEL SWITCHES	INTERFACES				VIDEO DISPLAY KEYBOARD	SOFTWARE INCLUDED	GRAPHICS OR PLOTTING?	KIT
						VIDEO	TAPE	PARITY	OTHER				
Commodore PET *	$595	6502	14K/4K	?	No	Yes	Yes	No	IEEE 488	Yes Yes	Basic, Monitor, Diagnostic	Yes	No
Cromeco Z-2	$595	Z80	0/0	30	No	No	No	No		No No	None	No	Yes
Digital Group Z80	$1,095	Z80	256/10K	12	No	Yes	Yes	Yes		No No	Monitor, Diagnostic, Demonstration	No	Yes
Heath H-8	$375	8080	?/0	?	Yes	No	No	No		No No	Basic, Assembler, Editor	No	Yes
Heath H-11	$1,295	DEC LSI-11	4K (18-bit word) RAM	?	No	No	No	No		No No	Basic, Focal, Assm. Ed.	No	Yes
Imsai 8080	$699	8080	0/0	28	Yes	No	No	No		No No	None	No	Yes
OSI Challenger II-P	$598	6502	8K/4K	?	No	Yes	Yes	No		No Yes	Basic	Yes	No
Polymorphic Poly-88	$575	8080	3K/512	6	No	Yes	No	Yes		No No	Monitor	Yes	Yes
Radio Shack TRS-80*	$599.95	Z80	4K/4K	?	No	Yes	Yes	No		Yes Yes	Basic	Yes	No
SWTPC 6800	$395	6800	?/4K	?	No	No	No	No	RS-232	No No	None	No	Yes

* Complete system — plug it in and run
** Requires a video monitor or a modulator and TV set only

Figure 1

By William L. Colsher
Special to CW

One of the greatest effects of microprocessor technology and large-scale integration (LSI) technology has been the enormous price reductions of products that make use of those technologies.

Since vendors of microcomputing equipment have chosen to package their respective microprocessor and LSI components in different arrangements, there is quite a bit of difference between "minimal" systems and their costs. Some of the primary interest areas for users considering a "minimal" system should include the basic system, buses, output devices, storage devices and input devices.

A hobbyist in the market for a system must decide, first of all, around which microcomputer he wants to build that system. This is perhaps the most difficult part of the whole process, given the large number of different systems currently available.

After this decision is made, however, the rest of the system can usually be built simply by looking for the best prices for a given type of component. In some cases, the decision is even simpler. For example, the most commonly used tape cassette interface, the Tarbell Interface, is available only from Tarbell Electronics.

Bus structure is a rather emotional topic. I will only say, therefore, that the "problem" is not nearly as large as many would make it seem. All the important peripherals are rapidly becoming available for all the major systems and interfaces are also being marketed to enable two different bus structures to communicate with each other.

Figure 1 shows some of the major micros currently available, their list prices and the accessories included in the price. The type of microprocessor chip and other information are also included for comparison purposes.

Users should note that, in many cases, the basic micro does not provide a complete system by any means. In the case, for example, of most of the Altair bus systems (also known as the S-100 bus), only a microprocessor unit (MPU) and front panel are pro-

(Continued on Page 76)

MANUFACTURER	MEMORY SIZE				
	8K (Static)	16K (Static)	16K (Dynamic)	32K (Static)	32K (Dynamic)
* Cybercom	199.95	525.00	—	—	—
*** Digital Group	225.00	445.00	375.00	845.00	695.00
* Dynabyte	—	555.00	399.00	995.00	—
* Extensys	—	—	595.00	—	895.00
* Godbout	139.00	—	—	—	—
* Seals Electric	229.00	579.00	395.00	—	750.00
** Smoke Signal	—	529.00	—	—	—

* Altair/Imsai bus only
** SWTPC 6800 bus only
*** Digital Group bus only

Figure 2

MANUFACTURER	CASSETTE TAPE INTERFACE	PARALLEL I/O INTERFACE	Serial I/O***			VIDEO INT.	INTEGRATED SERIAL AND PARALLEL INTERFACE
			Cost	Ports***	Type		
Cybercom	—	—	—	—	—	149.95	$149.95
Digital Group	$145.00* **	4 port ($65.00)*	$95.00	1	Either	* **	—
Imsai	—	4 port ($299.00)	$156.00	2	Either	—	—
Mits	$138.00	1 port ($105.00)	$148.00	1	?	—	—
Processor Tech	$110.00	—	—	—	—	$199.00	$149.00
SWTPC	$79.50	1 port ($35.00)	$35.00*	1	Either	$175.00	—

* Included with system MPU price
** Integrated cassette tape and TV interface (one board)
*** Serial interfaces are either RS-232 (many video terminals, Decwriter, etc.) or 20mA current loop (Teletype)

Figure 3

'Minimal' System Varies According to Vendor

(Continued from Page 75)

vided. This is also true of several other micros.

In virtually all cases, some additional purchases will be needed to obtain a microcomputer system capable of being programmed in some high-level language. It is this last capability that we will use as the major factor in determining the additional circuitry and peripheral devices needed to build a minimal system.

Main Memory

Main memory enjoys perhaps the greatest range of prices and the most rapid price decreases of any component in a microcomputer system. For this reason, the prices in Figure 2 should be considered as guidelines only.

The amount of main memory required depends upon the type of programming a given user plans to do. Most of the Basic interpreters available today require 4K to 12K bytes of memory, so about 8K to 16K bytes of memory in total are required for a user who wants to use a higher level language.

The word "total" is used because in several cases the Basic interpreter or other system software is supplied in read-only memory (ROM) of one type or other. Thus, in addition to space for the interpreter, at least 4K bytes of memory are needed for user programs.

In many cases, user programs are stored in only slightly compressed form. The more memory available, therefore, the more lengthy the programs that can be written. At the present time, the average amount of memory in use among hobbyists seems to be about 16K bytes.

All of the prices listed in this article were accurate at the beginning of the year. Some fluctuations may have occurred since then.

Terminal Trauma

Few microcomputer hobbyists own hard-copy printers or terminals. The reason is simple: cost. Even a Teletype costs as much as all the rest of an average system combined and high-quality devices such as the IBM 2741 and similar terminals are far beyond the average person's price range.

There are a few surplus units available, but these are sometimes difficult to interface and maintain.

The way around this cost problem has been solved rather ingeniously: a low-cost keyboard (ranging in price from about $65 to $250) is interfaced to the system as the primary input device and a video interface card provides a video signal that can be directly input to a video monitor or through a low-cost ($7 to $25) modulator to an ordinary television set.

Figure 3 shows what these interfaces cost from some of the major manufacturers. Generally, a parallel interface card for the keyboard and a video interface are the minimum I/O configuration for personal use.

In addition, some means for loading and saving programs and data is also required. As in the case of replacing traditional output devices, the mass storage devices commonly used in traditional DP have been replaced with low-cost alternatives.

The most common device is an ordinary cassette tape recorder connected to the microcomputer system by means of a special interface. These interfaces operate rather slowly, in the range of 300- to 1,500 bit/sec, but this is quite adequate for low-volume applications.

These interfaces record the data on tape in a large number of different formats; at the present time, there is no standard format and there appears to be little hope for one in the near future. Even in the case where the identical standard is used for recording, say, a Basic program, that program may be unreadable by any other version of Basic. Figure 3 contains some representative prices for these interfaces.

Disk Storage

Lately, the minifloppy disk has begun to gain considerable favor in the hobbyist market. Disk technology of any kind has obvious advantages over tape but, even though prices are rapidly dropping, these devices are rather costly in comparison with the cost of the rest of a system.

One of the seldom mentioned advantages of disk storage is that the recording techniques and formats are already fairly standard. Thus, only software changes may be needed to read disks written by a different mainframe, as is the case with magnetic tape on large-scale systems today.

Another interesting device that is becoming rather popular is high-speed tape. These tape drives are somewhat less expensive than floppy disks and are comparable to the minifloppy with well-designed software.

Figure 4 shows some typical prices for both mini- and standard floppies as well as high-speed tape drives.

Total Cost

What is the total cost of a typical hobby or personal computer system? Figure 5 summarizes the various parts of such a system and their cost from a number of manufacturers. In all cases, the criteria for the selection of the various accessories is the ability to execute programs in some high-level language such as Basic.

Thus, an MPU 8K to 16K bytes of memory, some sort of terminal consisting of a keyboard and display and an external storage device to save programs and data are the minimum system that is acceptable.

This discussion of a minimal system is not to be taken as definitive of the personal computer market in any way. It merely serves to provide a starting point for understanding exactly what a personal computer is and what it costs.

The best possible course for anyone who wants to know more is to visit local computer stores, read the many magazines which cover the field and actually use some of the systems. This — not mere academic knowledge — will lead to a reasonable choice for a personal computer.

MANUFACTURER	HIGH-SPEED DUAL-CASETTE DRIVE	MINI FLOPPY		FULL-SIZE FLOPPY		Notes
		Single	Dual	Single	Dual	
Cromemco	—	$495.00	—	—	—	3,4
Digital Group	$545.00	$795.00	$1,195.00	$995.00	$1,575.00	3
Info 2000	—	—	—	—	$2,650.00	
Micropolis	—	$795.00	—	—	—	3
North Star	—	$699.00	$1,099.00	—	—	2,3
Peripheral Vision	$585.00	—	—	$750.00	—	1,2,3
Smoke Signal	—	$795.00	$1,139.00	—	—	
Vista	—	$649.00	$1,048.00	—	—	1,2,3

1 — Cabinet extra
2 — Power supply extra
3 — Kit form
4 — Controller extra

Figure 4

MANUFACTURER AND MAINFRAME (PRICE)	MEMORY (PRICE)	CASSETTE INTERFACE COST	VIDEO INTERFACE COST	I/O INTERFACE KEYBOARD	KEYBOARD*	MONITOR (TV) *	TAPE UNIT *	TOTAL ****
Digital Group Z80 ($1,295.00)	18K (Included)	Included	Included	Included	$100.00	$150.00	$50.00	$1,595.00
Imsal 8080 ($699.00)	16K ($278.00)	$110.00	$149.00	$105.00	$100.00	$150.00	$50.00	$1,641.00
SWTPC 6800 ($395.00)	20K Total ($529.00)	$79.50	$175.00	Included	$100.00	$150.00	$50.00	$1,478.00
Radio Shack ** TRS-80 ($595.95)	16K total ($290.00)	Included	Included	Included	Included	Included	Included	$889.95 ***

* Estimate — prices and quality depend on user needs
** Assembled system
*** Software included
**** Users should expect to spend $50 to $100 more for software.

Figure 5

Micro Bytes

4K, 8K RAMs Work With 80/10 Offerings

SAN DIEGO — Electronic Solutions, Inc. is offering 4K and 8K random-access memory (RAM) boards that it said are compatible with Intel Corp.'s SBC 80/10 and National Semiconductor Corp.'s BLC 80/10 microcomputers.

Memory cycle time is 630 nsec and typical power consumption on an 8K board is 9.5W, the firm said. Address selection is performed by jumpers.

The 4K RAM board costs $295 and the 8K is priced at $395. Electronic Solutions is at 7969 Engineer Road, San Diego, Calif. 92111.

University Plans Workshop

PITTSBURGH — The Carnegie-Mellon University here will sponsor a five-day microcomputer workshop beginning June 5 on the university campus.

The course will include more than 12 hours of "hands-on" problem-solving experience, a spokesman noted. The format will emphasize opportunities to review and discuss sample problems and their alternative solutions with the faculty and other class members.

Additional information on the workshop is available from Gerry Cohen at Post College Professional Education, Carnegie Institute of Technology, Carnegie-Mellon University, Schenley Park, Pittsburgh, Pa. 15213.

IEEE Announces Schedule

NEW YORK — The Electrical Activities Board of the Institute of Electrical and Electronics Engineers, Inc. (IEEE) has announced a group of courses and seminars for its spring/summer sessions.

Three-day microprocessor courses will be held April 20-22 in Birmingham, Ala.; May 18-20 in Princeton, N.J.; May 25-27, Burlington, Vt.; June 8-10, Princeton (spillover); June 15-17, Chicago; June 22-24, Washington, D.C.; and June 28-30, Montgomery, W.Va.

Two-day microprocessor seminars will be held May 5-6 in Kansas City; May 19-20 in Dallas; and July 20-21, Nashville, Tenn.

A one-day introduction to microprocessors will be held in Milwaukee May 12, followed the next day by a course in minicomputers and microcomputers in the same city.

Additional information on the courses can be obtained by contacting V.J. Giardina, 445 Hoes Lane, Piscataway, N.J. 08854.

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Q

QUEUE — Refers to waiting lines resulting from temporary delays in providing service.

R

RACK — Refers generally to the metal or other type of frame or chassis on which panels of electrical, electronic or other equipment may be mounted, such as power supply units, amplifiers, etc.

RAM (RANDOM-ACCESS MEMORY). — This type of memory is random because it provides access to any store location point in the memory immediately by means of vertical and horizontal coordinates. Information may be "written" or "read" out in the same very fast procedure.

READER — Refers to a device capable of sensing information stored in an off-line memory media (cards, paper tape, magnetic tape) and generating equivalent information in an on-line memory device (register, memory locations)

REAL-TIME CLOCK — Refers to a device that provides interrupts at twice the alternating current line frequency. For example, it allows maintenance of an accurate time of day clock and measurement of elapsed time.

REGISTER — 1. A digital computer device capable of retaining information, often that contained in a small subset (e.g., one word) of the aggregate information. 2. A temporary storage device used for one or more words to facilitate arithmetical, logical or transferral operation. Examples are the accumulator, index, instruction and other registers. The accessibility to the CPU is basic to registers. The number of registers in a microprocessor is one of the prime criteria for judging its worth. 3. A memory device capable of containing one or more computer bits or words. A register has zero memory latency time and negligible memory access time.

RESET — 1. To restore a storage device to a prescribed state. 2. To place a binary cell in the initial, or zero state. 3. To return a register or storage location to zero or to specified initial condition.

RESTORE — 1. Refers to return of cycle index, a variable address or other computer word to its initial value. See also "reset." 2. Periodic regeneration of charge, especially in volatile, condenser-action storage systems.

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Charting Different Courses

Service Firms Launch Mini Offerings . . .

By E. Drake Lundell Jr.
CW Staff

Even though Automatic Data Processing, Inc. (ADP), Keydata Corp. and National CSS, Inc. (NCSS) are reacting to the same threat with the development of their new systems over the past month, each has taken a different path.

While the ADP Onsite systems, the Keydata Unity series and the NCSS 3200 line all share some characteristics, the vendors are pursuing considerably different marketing paths.

Each of the service firms is offering a minicomputer, but that is just about the only major point they have in common except that the offerings were all aimed at combating the traditional minicomputer and small business systems manufacturers who have been making inroads into the traditional service areas of the business.

The ADP offering, for example, most closely resembles a traditional service offering and will be marketed as such, while the Keydata Unity series makes a break with the traditional methods of serving its market. The NCSS 3200 series departs most radically from tradition.

ADP's Onsite is truly a service offering. The hardware will not be sold for stand-alone applications, but rather as part of an overall service including communications with and processing on the ADP central sites.

Users will only be able to buy a complete package from ADP, and that package includes the mini as only one part of the service. All software for the system runs on the host network, which is necessary for the system to function.

Because Onsite is a service offering, ADP indicated it would continue to market the service in the traditional way — to the ultimate end user of the service rather than to the DP department. However, the firm admitted the DP department would probably be more involved in the decision making on the Onsite service than has traditionally been the case when end users contracted directly for computer service time.

But while ADP's approach involves a complete service package, the other two firms have branched out more.

Keydata and NCSS will both offer stand-alone minisystems that can be optionally hooked to their networks and central computer sites.

But there is a different emphasis by the two firms, with Keydata stressing applications for the first-time user, while NCSS offers a slightly more experienced system that should appeal more to technically sophisticated users.

Like a service offering in many ways, the Keydata Unity system will provide tailoring of applications packages to the individual user's needs and will provide a lot of "hand-holding" support for the user in order to get him up and running.

Also in both the case of ADP and Keydata, the firms have opted for hardware that has been proven from well-known mini makers — Data General Corp. Novas in the case of Keydata and slightly modified Digital Equipment Corp. Decsystem 2020s in the case of ADP.

The NCSS difference in approach begins here. The firm contracted with a little-known manufacturer — Two Pi Corp. — to build a processor specifically designed to run a subset of the firm's VPCSS operating system that has been in use on the NCSS network for a decade.

The system provides a complete IBM compatibility and can run programs developed for IBM 360s or 370s. In fact, the systems may be used as 360/370 replacements or supplements, although the firm played down that part of the marketplace for its initial thrust.

But NCSS is not stressing applications so much as Keydata and instead is emphasizing the capabilities of its sophisticated operating system, a feature that is sure to appeal to the more technically sophisticated.

. . . In Reaction to Incursions By Minis and Small Systems

By E. Drake Lundell Jr.
CW Staff

In the past four weeks, major service firms in the computer industry have launched a counteroffensive against the growing encroachments of small business computer makers into the traditional service areas of the business.

Automatic Data Processing, Inc. (ADP) started the movement with the announcement of its Onsite computer systems [CW, March 27], but was quickly followed by Keydata Corp. with its Unity series of processors [CW, April 10] and this week by National CSS, Inc. (NCSS) with its 3200 series of processors.

The firms don't chose to call the moves "defensive" of their traditional markets, however. For example, Josh Weston, ADP president, said he had "never played defense" in his life, but admitted that the best defense was a good offense.

An NCSS spokesman admitted that the announcement was a "bit of offense and a bit of defense," while the people at Keydata emphasized they felt they were filling a market need not presently filled by the mini makers.

Minicomputer firms have been installing systems at first-time users' locations and in departments of larger corporations that needed extra power over and above what would be supplied by the central DP site. Both of these markets had been the preserve of the service firms.

Industry sources said that while it is difficult to measure the amount of business the mini makers have been able to gain at the expense of the service firms, the impact has been relatively slight so far.

However, the threat has been building because the price of producing hardware has consistently been coming down. And while mini makers gained extra resources to devote to software, they were also driven to offer more software in order to keep their growth rates up.

But the declining price of hardware also worked to the advantage of the service firms. It is relatively easy and inexpensive today to purchase minicomputer hardware, all three firms stressed when entering the business.

The availability of inexpensive hardware allows each of the service firms to add a great deal of value — in the form of software and support — to each system they ship.

This makes the entire operation profitable from the service firms' viewpoint while at the same time allowing them to combat the mini makers' encroachment into the traditional service segments of the business.

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ADL Predicts

Telecommunications Sales to Double by 1987

AMSTERDAM, The Netherlands — The world market for telecommunications equipment will more than double by 1987, resulting in total sales of $65 billion (in 1977 dollars) as compared with 1977 sales of $30 billion, according to forecasts made by Arthur D. Little, Inc. (ADL) recently at the firm's international telecommunications forum.

The private systems market, mostly in the U.S., Japan and Europe, will grow the fastest, predicted at 10.1% annually, the research firm said.

However, the switching, transmitting and local distribution segments, although growing at a slower annual rate, will each account for about a third of the total dollar sales.

ADL predicted the transmission and local distribution segments — comprising radio, cable and satelllite sytsems — will achieve an 8.1% annual growth as developing regions expand international and intercity trunks and major cities extend their local distribution systems.

Market Potential

Developing nations represent the greatest market potential with an expected annual growth rate of nearly 10% annually over the next decade, compared with the 6.2% growth rate for North America, the firm said.

Because of expanding world markets, the North American share of the telecommunications equipment market is predicted to drop from the present 47% to 40% by 1987.

Digital switching technology, largely a result of computer development, will allow less sophisticated countries to bypass old-fashioned technologies in building communications capabilities.

But economic conditions and teledensity (the ratio of telecommunications equipment per unit of population) will be the major constraints on growth in the less developed nations.

Prospects for Financing

Prospects for financing, while continuing to be rosy in the U.S., will require emerging nations to seek the assistance of international lending agencies, ADL added.

Developed areas where equipment is already installed also offer large revenue opportunities as more sophisticated users transform their current telephone networks and increase usage of facsimile and other special-purpose terminals.

In addition, ADL expects increased equipment sales to boost the market for related services such as research and development, installation and maintenance.

Prospects for new entrants into the telecommunications equipment market are encouraging because of regulatory changes and the growth of new technology. However, the industry is highly concentrated. ADL noted that 13 companies had sales in excess of $500 million each in 1976.

Major firms have been able to improve margins along with sales growth while keeping price increases below those for other consumer expenditures.

Other topics covered at the conference included future applications in the areas of teleconferencing and telediagnosing, expected to be available by the turn of the century.

In light of the growing world wide exchange of data, privacy matters are also of great concern as individual privacy standards and national security practices vary from country to country.

Expansions

Chicago Data Systems, Inc. has moved into expanded facilties at Suite 150, 2805 Butterfield Road, Oak Brook, Ill. 60521.

CMI Corp. has begun operations from its new international headquarters at Top of Troy at W. Big Beaver and I-75, Troy, Mich. The company markets, trades, sells and leases IBM computers and peripherals.

Wango Division of Perkin-Elmer Corp.'s Data Systems Group plans to consolidate company operations. Groundbreaking ceremonies for a new 168,000 sq-ft facility have taken place on a 44-acre site in Garden Grove, Calif.

The Kennedy Co. of Altadena, Calif. has leased a 33,000 sq ft manufacturing facility in Azusa, Calif., located at 717 N. Coney Ave., the building will house the newly formed Disk Division and the Engineering Department, which will move from Atlanta.

Computer Automation, Inc. of Irvine, Calif., is proceeding with plans to establish a manufacturing operation in the European Economic Community in Dublin, Ireland. Computer Automation Ireland, Ltd. will be established as the resident operating company with headquarters at Coolock.

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Commerce Reports

DP Boosts '77 Business Machines Trade Balance

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The U.S. computer industry's "strong competitive position in world markets" was wholly responsible for the 29% rise the U.S. balance of trade in business machines experienced in 1977, according to the Department of Commerce.

A new trade balance record of $2.3 billion was set in business machines trade in favor of the U.S. The balance was a positive $1.8 billion in 1976, Commerce said.

Exports for 1977 were 23% above those for 1976, and imports increased by 16%. Both exports and imports of the calculating and accounting machines subgroup declined for the third year in a row.

The largest U.S. customer continued to be the European Economic Community (EEC), whose members took 46% of the export total. Canada, the leading individual country purchaser, bought 16% and Japan, 8%.

The Far East remained the largest U.S. supplier, providing 48% of total U.S. imports in 1977, Commerce stated. Japan, which sent $501 million in business machines to the U.S., continued to be the largst single U.S. supplier, holding 35% of the total business machines imports to this country.

Exports of computers and related euipment rose 26% from $2.6 billion in 1976 to nearly $3.3 billion in 1977. Imports rose 8% from $234.7 million in 1976 to $252.9 million in 1977, the Commerce Department reported.

In 1977, the EEC bought approximately $1.5 billion in computer equipment from the U.S. Canada purchased $475.4 million, and the Far East bought $413.6 million.

Commerce stated that the EEC sold $102.5 million in computers and related equipment to the U.S. in 1977. Canada sent $77.3 million worth of computers across our northern border last year, and the U.S. purchased $63.1 million in computers from the Far East.

More detailed data can be obtained from the U.S. Census Bureau publications "FT-410 U.S. exports, Schedule B Commodity by Country" and "FT-246 U.S. Imports for Consumption and General Imports."

Foreign Orders & Installations

International Commodities Clearing House Ltd. of London has ordered more than $280,000 in data communications equipment from Racal-Milgo, Inc.

Regie Nationale Des Usines Renault, a French automobile manufacturer, has ordered three SEL 32/75 superminicomputers from Systems Engineering Laboratories SA. The firm will use the systems for design applications and the control of machine tools in three of its Paris area plants.

The Swedish National Communicatons Administration has ordered a Univac 1100/80 from Saab Univac. It will be used to link another 2,500,000 telephone customers to a planned nationwide system.

Spigadoro, a food products company headquartered in Bastia Umbra, Italy, has ordered a Univac 90/30 to be used for order entry and inventory control.

The Dutch government has ordered Phillips PTS6000 terminal systems for a project at the Land Ownership Registry and for an automated fine-payment system at the Public Prosecutor's Offices.

Timpsons, a shoe manufacturing company of Manchester, UK, has ordered a Univac 90/30 to upgrade its merchandising, stock control and fashion selection functions.

The Norwegian Telephone and Telegraph Co. has ordered a Univac 1100/82 system valued at more than $4 million from Saab Univac Norge A/S to improve customer service.

Barclays Bank International Ltd. of London has ordered a Nonstop 16 Computing System from Tandem Computers, Inc.

A distributed network of 14 Micos computer systems has been installed at group oil terminals of Shell Oil UK by Mini-Computer Systems, UK, Ltd., a subsidiary of Mini-Computer Systems, Inc., Elmsford, N.Y.

The Societe Generale Bank of Nigeria has installed two NCR Corp. I-8250 systems, six NCR 299 accounting systems and four NCR 7200 data entry subsystems.

Ross Foods Ltd., a UK Imperial Foods Group company, has ordered a Honeywell Information Systems, Inc. Level 6 minicomputer, valued at about $250,000, for use as an automatic weight-checking system.

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Company Secures Mountains of Data in Iron

By Tim Scannell
CW Staff

HUDSON, N.Y. — Users can find literally ironclad security for their data at the Iron Mountain Security Storage Corp. here and at its sister facility, the Iron Mountain at Rosendale Records Center, Inc. (Imar).

Data security and integrity are two major concerns of the DP professional, particularly in the light of the recent increase in the number of bombings, embezzlements, human errors and incidents of civil unrest, according to Paul Catalano, marketing vice-president for the firm.

Iron Mountain, established in 1951, is actually an 80,000 sq-ft building that occupies about two-thirds of an abandoned iron ore mine. The building has about 13 stories, 10 of them below ground, and at some points is covered by more than 200 feet of solid rock, a spokesman said.

Upon entering the building and identifying himself, a prospective client must pass through two steel doors and an iron gate to enter a series of offices. The security precuations, up to this point, are similar to those of most manufacturing or industrial companies. This, however, is where the similarities end.

The actual storage area, a series of underground corridors that follow the contours of the mountain, is protected by a 28-ton time-lock vault door described as being the largest in the U.S. Beyond that is a door protected by a "curtain of air" that acts as a shield between the air within the vaulted corridors and that in the exterior offices, the spokesman continued.

Lining each corridor on both sides are randomly numbered, 400-lb steel doors that open into private vaults, varying in size from 400 cu ft to 45,000 cu ft. It is within these temperature- and humidity-controlled vaults that clients store their backup tapes, microfiche and related documents, the spokesman noted.

Various other items stored by clients include television pilot and series tapes, movie film master prints, unreleased recordings of numerous singers and assorted objets d'art.

Active Center

Although most corporations think of the Iron Mountain facility strictly in terms of storage, it is very much an "active" center, according to Richard Ruck, assistant vice-president. Files are maintained in accordance with a prearranged system used at the facility or in accordance with the customer's own particular specifications, Ruck stated. Clients can access information at Iron Mountain and update records as often as required, he added.

A great deal of the misunderstanding and confusion concerning the present purpose and capabilities of the Iron Mountain complex has evolved from its historical background, according to Ira Temchin, assistant sales vice-president. The structure was originally conceived to protect the data and information of major corporations in the event of an atomic attack. In fact, the installation's former name was the Iron Mountain Atomic Storage Corp.

Since the mine itself contains magnetic iron ore, the heat from an atomic blast would serve to fuse the elements in the mountain, making it considerably more secure, Temchin stated. The complex also has a backup diesel power supply as well as reserve food stocks for use by personnel in the event of an emergency.

The second facility, at Rosendale, was founded in 1966 and is contained within a 15-acre cavern formed as a result of mining limestone for a nearby cement factory. Presently, only four acres of the cavern are being used, and the area being used consists of paved access streets lined with two-story buildings. Each climate-controlled building along the streets houses the records and data of a specific company.

When the Imar facility was first put into operation, people from the surrounding communities were quick to form their own opinions concerning its purpose. Neighbors suspected the center of being everything from a Central Intelligence Agency headquarters to a secret government missile base, Temchin said. They were finally given a special tour to relieve their suspicions, and many of them are now employed by the facility.

Two buildings in the center are of special interst. One is the Retrieval and Information Security Center (Risc) and the other is a hotel-like structure maintained by a major oil corporation.

The Risc center is actually an alternate computer site complete with raised flooring, telecommunications and environmental controls — everything except DP equipment. In the event a corporate member of the Imar family should suffer a disaster at its own data center, that company would be fully recovered and operational in the Risc Center not more than five days after the destruction occurred, Catalano said.

The center also helps corporations develop, test and implement realistic disaster recovery programs to prevent extensive destruction in the future, Catalano added.

Magnetic tape rehabilitation and preservation is another function of the Risc facility, Catalano noted. Tapes are processed through a scheduled quality control and maintenance program that includes cleaning, retensioning and testing each reel.

Catalano said the benefits of using the data security and protection programs at both Iron Mountain and Imar would best be summed up as security, integrity and confidentiality.

Because of the confidentiality, Catalano refused to be specific about the various manufacturing, chemical, industrial and securities firms that use the services at Iron Mountain.

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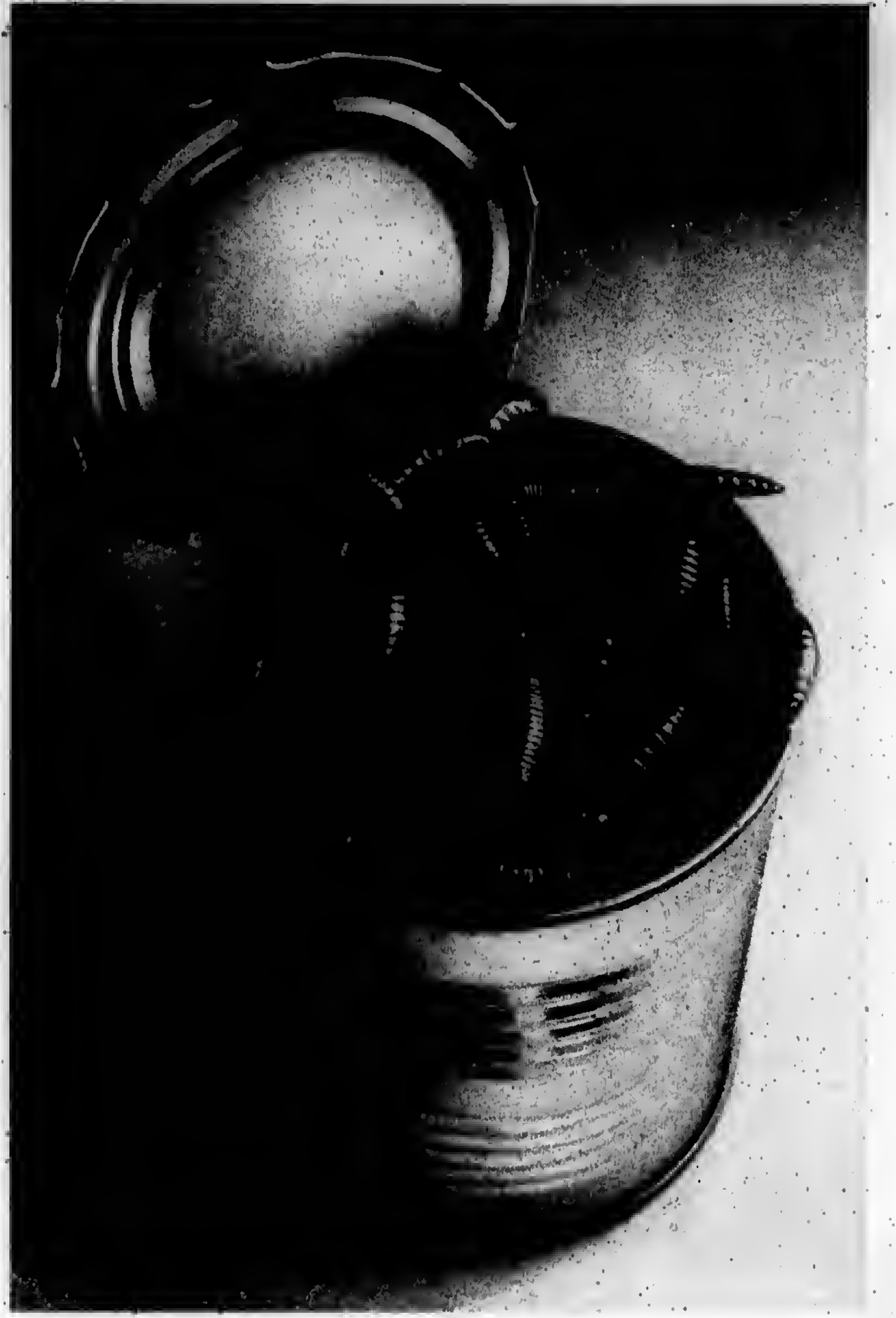

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Claim Antitrust Violations

SPC, Transportation Microwave Suing AT&T

SAN FRANCISCO — Southern Pacific Communications Co. (SPC), a subsidiary of Southern Pacific Co., and Transportation Microwave Corp. have filed a civil antitrust suit against AT&T in the Washington, D.C., federal district court.

The 24 regional Bell telephone operating companies were also named as defendants. They include Pacific Telephone and Telegraph Co., Southwestern Bell Telephone Co., New York Telephone Co. and Illinois Bell Telephone Co.

The suit alleges that AT&T has violated the federal antitrust laws, since SPC's appearance as a competitor in 1973, by restraining trade and by attempting to monopolize telecommunications service. SPC seeks treble damages and orders preventing AT&T from continuing its alleged anticompetitive conduct.

SPC's damages to date may be as much as $200 million, according to a company spokesman.

SPC began operations as a specialized common carrier of voice, data and facsimile communications services to industrial, commercial and government customers in 1973, following Federal Communications Commission (FCC) decisions that encouraged competition with Bell in this field.

SPC's complaint charges that AT&T and subsidiaries illegally combined and conspired to:

- Propose and establish unreasonably low and unjustified rates for Bell's services competing with SPC.
- Refuse interconnections between SPC and Bell companies.
- Delay SPC from competing in the intercity communications market.
- Impose upon SPC arbitrary and discriminatory restrictions to hinder SPC's ability to compete.
- Interfere with SPC's relationship with its customers.
- Engage in a variety of other anticompetitive activities to prevent SPC from competing.

An SPC spokesman noted that many of the activities alleged in SPC's complaint are also involved in a civil antitrust suit filed against AT&T by the Department of Justice in 1974. That suit is also pending in federal district court in Washington, D.C.

Contracts

The Satellite Communications Division of Harris Corp., Melbourne, Fla., has been awarded two contracts for the development of time-division multiple access (TDMA) burst modems by Satellite Business Systems (SBS).

The Computer Research Company of Chicago has been awarded a $1.2 million contract to supply Argonne National Laboratory with computer services in connection with energy research.

Datacrown Ltd. has been awarded a five-year contract with Canada Permanent Trust Co. to provide an expanded DP service.

Scan-Data Corp. of Norristown, Pa., and NCR Corp. have signed an agreement under which Scan-Data will supply optical character recognition equipment to NCR.

Sweda International, a division of Litton Industries, has been awarded a five-year contract for the purchase by Handy Dan Home Improvement Centers, Inc. of Sweda 800/80 Home Center Systems to implement a nationwide point-of-sale merchandising network. The contract has a potential of $10 million.

Honeywell Information Systems, Inc. has begun work on a $998,000 contract by the Minnesota Department of Transportation for installation of a minicomputer-based traffic surveillance and ramp-metering system on Interstate 694 in Minneapolis.

Vermont Research Corp. has signed an OEM contract to supply its Model 4016 head-per-track memories to Taylor Instrument Co. of Rochester, N.Y. Taylor will use the memories in conjunction with its range of process control systems supplied to the textile and petrochemical industries.

Computer Analysts and Programmers (London) Ltd. has been awarded a contract by House of Fraser to assist their computer staff in the analysis, design and implementation of a warehousing system for Wylie and Co. Ltd.

Medical Information Technology, Inc. of Cambridge, Mass., has signed a $190,000 software contract with Strong Memorial Hospital, University of Rochester Medical School, Rochester, N.Y. It will use dual Data General Corp. Eclipse C/330's with more than 70 on-line CRTs and character printers.

Chubb Integrated Systems Ltd. and Philips Data Systems have reached an agreement for Chubb to supply versions of its series of customer-operated terminals for integration with the Philips PTS 6000 terminal system. The terminals provide the bank customer with automatic and secure transactions for cash withdrawals, transfers, deposits and routine inquiries.

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Executive Corner

- James E. Heaton has been appointed marketing director at Process Computer Systems, Inc.
- Joseph J. Sacco Jr. has been appointed vice-president and general manager at the Pulsecom Division of Harvey Hubbell, Inc.
- Jack Gammon has been appointed vice-president of engineering and development at Applied Digital Data Systems, Inc.
- Fred B. Cox has assumed the position of vice-president and general manager for Dynus, Inc.
- Curtis D. Neumann has been named to the position of vice-president of customer services at Dataproducts Corp.
- William Goodale has been appointed vice-president of engineering at Western Peripherals, Inc.
- Sanford Pitch has been appointed vice-president for finance at Durango Systems, Inc.
- Robert A. Camero has been named vice-president for sales at Computer Results, Inc. of Houston.
- Charles D. Daley has been appointed vice-president of finance and treasurer of On-Line Systems, Inc.
- Raymond B. Sepe has been elected to the position of executive vice-president at International Data Sciences, Inc.
- Neville Baynes has been appointed managing director of Inforex Ltd. in the UK.
- Ronald E. Hagan has been named vice-president of the Management Services Division for National Sharedata Corp.
- Werner Simon has been named vice-president of Univac's General Systems Division.
- Douglas C. Altenbern has been named chairman of the board and chief executive officer of NLT Computer Services Corp.
- Patrick L. Shannon has been appointed vice-president for software marketing at International Corp. of Andover, Ma.
- A realignment of the Univac Worldwide Development and Manufacturing organization has resulted in the creation of two new divisions. The realignment provides for a Major Systems Division, headed by vice-president R.C. Phillips, and a General Systems Division reporting to vice-president W. Simon.
- Richard F. Hespos has been named president of Insco Systems of Neptune, N.J.
- J.A. Bertch has joined the Microdata Corp. as vice-president of marketing.
- John J. Chluski and Douglas Stevenson, currently group executives and vice-presidents of ITT Europe, Inc., were elected to the additional posts of vice-presidents of the parent company.
- Art Carroll has joined Petrodata as vice-president of operations.
- Samuel T. Byars has been appointed senior vice-president of marketing at MRI Systems Corp.
- Arthur W. Fonda has been appointed vice-president of operations at Logical Machine Corp.
- Donald L. Courtois has been elected vice-president of manufacturing at International Data Sciences, Inc.
- Kim O. Jones who assumed the presidency of Genasys Systems, Inc. He succeeds C. David Key Jr. who has moved to London as vice-president and director of international operations.
- Donald S. Bates has been promoted to vice-president and general manager of General Electric Co.'s Information Services Division.
- Erik T. Ringkjob has been appointed corporate vice-president and general manager of Storage Technology Corp.'s systems division.
- Sal Intagliata has been named general manager of Perkin-Elmer Corp.'s Wangco division and a vice-president of the corporation's Data Systems Group.
- H. Frederick Koehler has joined SCI Systems, Inc. as corporate vice-president of the computer division.
- James R. Dunathan has been appointed vice-president of marketing at American Information Development, Inc. of San Francisco.
- David F. Sweeney has been appointed vice-president of engineering by Data-Printer Corp.
- H.K. White has been named vice-president of sales/marketing at Ven-Tel, Inc. Peter J. Szeremeta has been named vice-president of engineering and Fran Willes has been appointed national sales manager.
- Terry Wellman has been elected president of GHC, Inc. and Dr. David C. Cordes has been appointed chairman of the board.
- G. Wesley Mayland has been elected vice-president and controller of Datapoint Corp.
- James D. Simonsen has been elected vice-president of industrial relations at Datapoint Corp. John L. Hale has joined Datapoint's Customer Service Division as vice-president for field operations.
- Dennis E. Puckett has been named group vice-president of communications and center operations by National Data Corp.
- George Toor has been appointed vice-president of marketing at Persci, Inc.
- Robert A. Boyle has been named executive vice-president and chief operating officer at Computer Transmission Corp.
- James R. Carreker and Stephen O. James have been promoted to vice-presidents in Datapoint Corp.'s Communications Management Products Division.
- F.L. Harvey has been selected president of Inforex, Inc.
- W. Donald Shaw has been appointed vice-president of personnel at Durango Systems, Inc.
- Stephen J. DeMetrick, Thomas F. Foley and Michael P. Rocchio have been appointed vice-presidents at Information Sciences, Inc.

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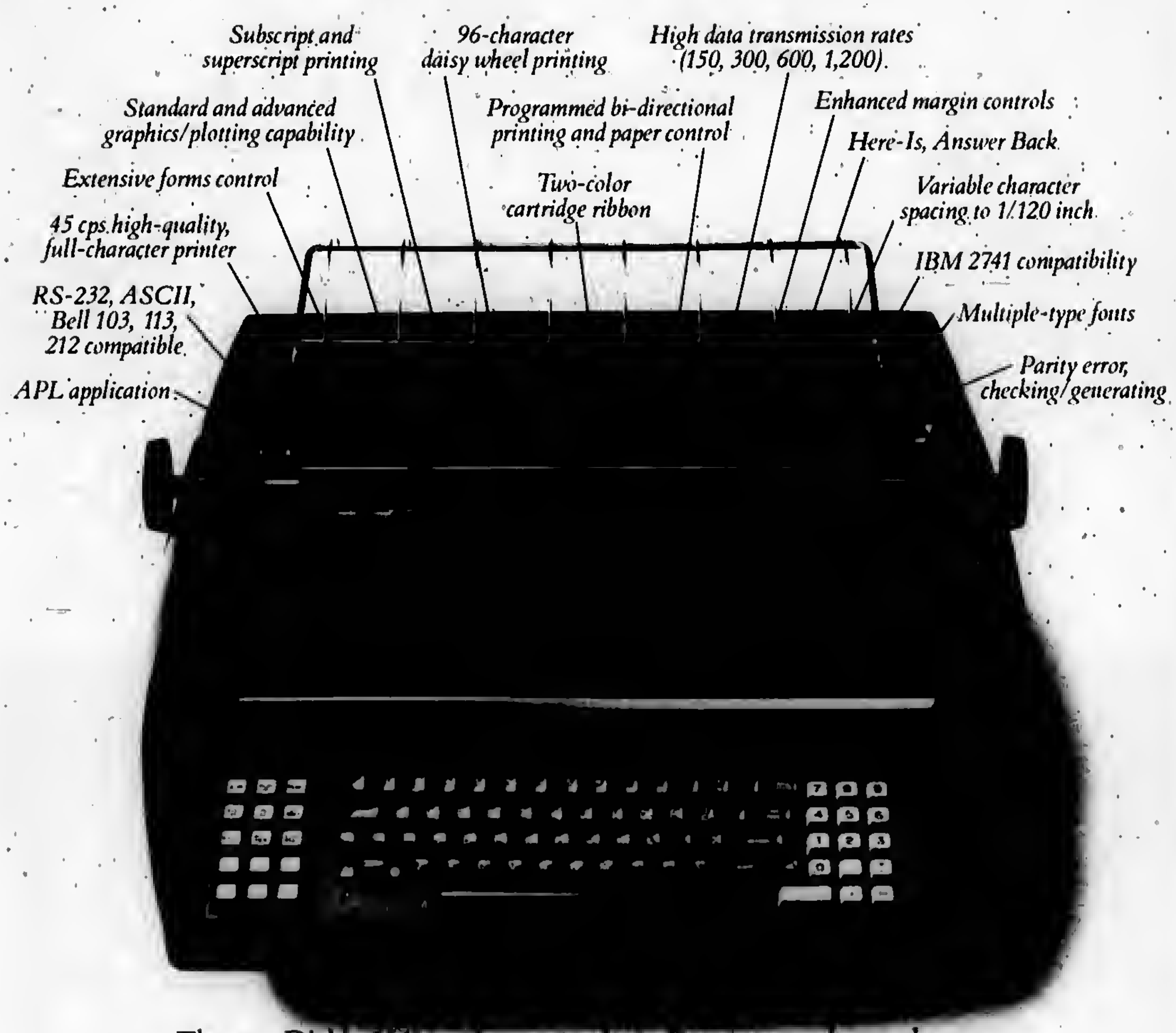
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Belden Brings Out Data Bus Cables

GENEVA, Ill. — Belden Corp. has introduced a line of data bus cable assemblies that the company said meets the requirements of IEEE Standard 488.

Designed for interfacing computer power supplies with programmable test and measurement instrumentation, the 24-conductor general-purpose interface bus (GPIB) reportedly provides molded-on, 24-contact male/female connectors. Functions performed by GPIB include general interface management, data byte transfer control, input/output and logic and earth grounds, the company said.

As many as 15 programmable devices including counters, signal generators, calculators and digital voltmeters may be interconnected simultaneously, company spokesmen said. Maximum transmission path is 66 ft, Belden added.

Standard GPIB cables are available in 1-, 2-, 4-, 8- and 16-meter lengths and in bulk without connectors. Price for the 2-meter GPIB in quantities of 50 and up is $36 from the firm at 2000 S. Batavia Ave., Geneva, Ill. 60134.

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Zilog Adds 16K by 1-Bit RAM

CUPERTINO, Calif. — Zilog, Inc.has announced a 16K by 1-bit dynamic random-access memory (RAM) that is pin-compatible with Mostek Corp.'s MK 4116 and Intel Corp.'s 2117 dynamic memories.

The Z-6116 MOS RAM also interfaces with Zilog's Z80A CPU circuit and is available in three speed models.

The Z-6116-2 and Z-6116-3 models have cycle times of 375 nsec and access times of 150 and 200 nsec, respectively; the Z-6116-4 has cycle and access times of 410 and 250 nsec.

The Z-6116 can execute delayed write cycles and do page-mode operation and RAM storage-only refresh as well as standard read, write and modify-write cycles.

The Z-6116-2, -3 and -4 are priced at $60, $45 and $39 per unit, respectively, in quantities of 100 to 999.

Zilog, Inc. is located at 10460 Bubb Road, Cupertino, Calif. 95014.

OEM Products

Datel Unveils Acquisition System

CANTON, Mass. — Datel Systems, Inc. has announced a 32-channel analog-to-digital, digital-to-analog (A/D-D/A) data acquisition system that reportedly fits inside the card guides of Motorola, Inc. microcomputers.

The ST-6800 Master A/D-D/A Board for Motorola M6800 and Exorciser micros features paper tape diagnostic/prototyping software and interface hardware.

The ST-6800 accepts 32 single-ended or 16 differential analog input channels and digitzes them to 12-bit binary data words, Datel said, adding that Assembly language program instructions arrange data samples on the 6800 bus in byte pairs.

Additional A/D or D/A expansion boards are available for channel capacity up to 128 A/D and/or D/A channels; 48 A/D or up to 8 D/A channels can be added per board.

The ST-6800 uses memory-mapped I/O architecture, appearing to the CPU as any consecutive block of 512 memory locations, and has a jumper-selected address, the firm said.

The basic ST-6800 board with 16 A/D channels, program and manual only sells for $419 per unit. Datel is at 1020 Turnpike St., Canton, Mass.02021.

Micro Accepts 768 RAM Words

SAN DIEGO — Electronic Product Associates, Inc. has announced an OEM microcomputer system featuring up to 768 words of random-access memory (RAM), optional 2.5K words of programmable read-only memory (Prom) and a teletypewriter/CRT/cassette interface.

The M68-MBC microcomputer system includes a monitor program, keyboard, 6-digit display and mounting frame.

The monitor program allows program loading and execution, system diagnostics and debugging.

The mounting frame accepts three peripheral boards and permits front, back, side or 19-in. rack panel mounting.

The M68-MBC microcomputer system sells for $695 per unit from Electronic Product Associates, Inc., 1157 Vega St., San Diego, Calif. 92110.

Orders & Installations

Weber Marking Systems, Inc. of Arlington Heights, Ill., has ordered an IBM 370/148 with Memorex 3674 disk subsystem, Storage Technology Corp. 3650 tape subsysterm and 3270-equivalent CRTs and control units for the development of on-line oriented marketing, financial and manufacturing applications.

South Coast Data, Inc. of Houston has installed a Burroughs Corp. B1860 system valued at $285,000.

Hoeganaes Corp. has ordered a Univac 90/30 system for installation at the firm's facilities in Riverton, N.J.

First Federal Savings and Loan Association of Waterbury, Conn., has ordered a Burroughs Corp. B1860 valued at $340,000.

The Ira A. Watson Co., a junior department store chain, has ordered a Honeywell Information Level 64 to run an on-line inventory control system.

The College of Business Administration at Georgia State University has ordered minicomputer equipment from Wang Laboratories, Inc. valued at $250,000. The equipment will be used to support teaching and research in the use of small computers by industry and government.

Cincinnati Technical College has ordered a Honeywell Information Systems, Inc. Level 62 system to teach computer operation and programming career fields. The system is valued at $85,000.

Giant Eagle chain stores of Pittsburg, Pa., has installed two Datachecker power management systems from National Semiconductor in an effort to decrease utility charges.

Southeast Contractors Co., Inc. has installed a Honeywell Information Systems, Inc. Level 62 system to run job-cost accounting and a variety of financial-management applications. The system is valued at $144,000.

Bio-Lab, a chemical manufacturing concern headquartered in Decatur, Ga., has ordered a Univac 90/30.

Edgewater Data Processing, Inc. has installed a Honeywell Information Systems, Inc. Level 62 to run a variety of financial management applications. The system is valued at $194,000.

The town of Shaler, Pa., has ordered a Univac 90/25 to expedite its local government operations.

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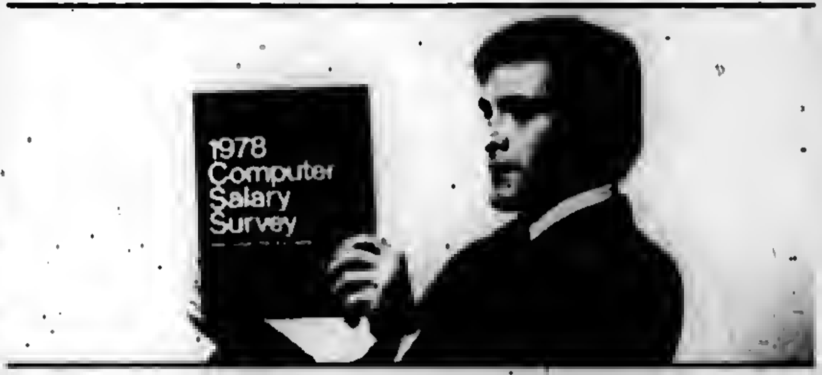

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This depertment is engeged in the development of software for on-line interectiva data processing systems. Software product arees currently under development or planned for the near future includa both development of support systems and real-time operating systems. We seek people with design, implementation, and support of compilers, assemblers, link editors, object processors, automated software distribution and control libraries. Openings also exist for individuals with design implementation of real-time communications-oriented multitasking operating software for microcomputers or equivalent.

ADVANCED SYSTEMS DEVELOPMENT

This area provides early definition and design of future microcomputers in communications products along with initiation, early program management, and startup development of new programs. This group offars opportunities for individual contributions in a systems level scopa of design from the conceptual stage to finished product. We require senior analysts with a minimum of 5 years in software plus knowledge of hardware in any one of the following areas: • Microcomputer Design • Communications Product Design • Communications Network Architecture • Systems Modeling Performance Measurement and Analysis.

MICROPROCESSOR SYSTEMS DEVELOPMENT

This department is primarily responsibla for designing, implemanting general purpose microcomputer systams. Key decisions are made here regarding processor design, memory design, and overall systems architecture. We seek software professionals to help make the decisions for our next generation microcomputer systems. These people must have extensive experience in both systems and applications software. Other opportunities exist for personnel with experience in the following areas: • Diagnostic Systems • Diagnostic Programs • Startup Firmware • I/O Handlers • Microcode.

COMMUNICATIONS SYSTEMS DEVELOPMENT

This group is charged with the responsibility of proposing, designing, and providing hardware and software modules for future communications products. Concentrating both hardware and software development in one group of professionals allows the application of top-down system design techniques developed only recently within the industry. Current challenges include the successful application of small, inexpensive microprocassors in communications systems, such as controllers and front ends in place of minicomputers often used today. Opportunities exist for personnel with experience in any of the following: • Design and Development of Communications Protocol Drivers • SDLC • Communications Diagnostics • Intelligent Communications Controller General Software.

COMMUNICATIONS SOFTWARE

Get in on the ground floor of advanced communication design and participate in NCR's entry to Distributive Network Architecture, consisting of a series of microprocessor-based terminals and nodes connected by communications linas. We seek individuals who have in-depth software background with solid communications experience. Qualified applicants must provide definition, design, and implementation leadership in any one of the following areas: • Microprocessor Software • Communications Links Disciplines (SDLC, Bisynch, ISO, etc.) • Front End Processor Software • Network Node Software • Network Definition Language (Systam Generators) • Constructors for Nodes, Cluster Controllers and Front Ends • VTAM NCP (for interface to SNA Network).

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SYSTEM PROGRAMMERS are needed to participate in our conversion from MVT/HASP to MVS/JES2, to help us establish an effective measurement and evaluation program, to install and support enhanced interactive services, and to develop other subsystems.

APPLICANTS must have a degree in Computer Science or related field and must have demonstrated fluency in S/370 assembler language and a sound knowledge of operating system organization and principles. Also desirable are experience with HASP or JES2 internals, experience with interactive systems, and advanced degree. Salary and responsibilities will be commensurate with education and experience. Send resumé, including education, professional experience, and salary history, to Dr. Donald T. Laird, Director, Computation Center, 229 Computer Bldg., University Park, PA 16802.

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- Data Management/Job Management
- Supervisor Services

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- VS1
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- Structured Programming
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STATE OF WISCONSIN

Management Information Supervisor 5 (Two Positions), Management Information Supervisor 6 - Area Manager, Division of Economic Assistance.

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Candidate must have a minimum of a Bachelor's Degree in Computer Science and (4) years experience as systems analyst with emphasis on program and design, or an appropriate combination of training and experience.

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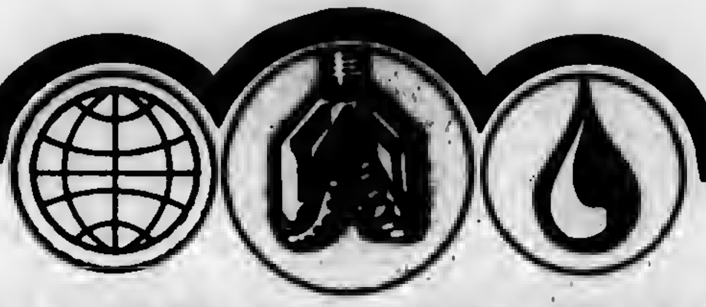

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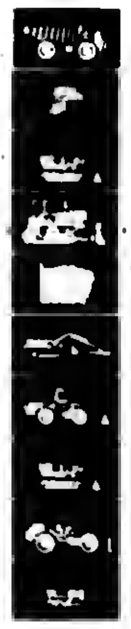

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ISA is a rapidly growing professional firm in e dynemic and vital industry — Insurance oriented D.P. Software and Sarvices. Professional people are the reason for our success end the foundation for our continued growth. And our growth is calling for additional insurance end data processing prolessionels at almost all levels.

PROGRAMMERS/ANALYSTS/ SALESMEN/MANAGERS/ACTUARIES

ISA needs your energy, talent, and ideas. We olfer, in turn, exceptional career growth potential in a warm and exciting organizetion. Either in our suburban Atlanta headquarters or our Cedar Rapids operation, you will be olfered professional challenge, state of the art industry exposure, and the rewards deserved by successful professionals.

THE INDUSTRY - THE COMPANY - THE LOCATIONS

At ISA we believe we have it all. To explore the many opportunities for you within our firm, send your resume in confidence to: FORREST EDWARDS, Director of Recruiting.

P.O. Box 47975
Atlanta, GA 30362

ISA
INSURANCE SYSTEMS OF AMERICA INC.

SYSTEMS PROGRAMMER

Looking for recognition?

You'll get it with the Data Processing Center of ITT World Communications if your background includes heavy exposure to IBM Assembly language and you have the determination and drive to succeed. Our system is a 370/145 DOS/145 DOS/VS with CICS on-line 3270 operation - with planned conversion to OS-VS1/VM.

Please send resume including current compensation to: E. Asmus, ITT World Communications, 67 Broad St., New York, N.Y. 10004.

ITT World Communications

An Equal Opportunity Employer M/F

DATA PROCESSING ADMINISTRATOR

Provides overall direction for the Dete Processing Administretion in systems development, management engineering, and related administrative operations. Supervises the automated systems anelysis and development staff end menages all management-oriented programs associated with the administrative operetions. Coordinetes deta processing services. Graduetion from an accredited college or university with major study in information or computer sciance, business administration, mathametics, or related lield end five years of menageriel experience involving information systams. Either graduate study may be substituted for experience or edditional experience may be substituted for education, on an equivalent time basis. Good salary, benefits and promotional opportunity.

If interested contact Personnel Dept. before May 1, 1978.

DIVISION OF MOTOR VEHICLES
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Our Client, a Major International Air Carrier, seeks several Key Data Processing Professionals to Manage and implement a Large, On-Line, State-of-the-Art Airline Reservation System. All Positions will be based in Athens, Greece, and will provide outstanding opportunity for Career Growth and Advancement. Specific Positions currently available are as follows:

Project Manager

Extensive knowledge and experience of both IBM System Software (e.g., OS, OS/VS1) and User Application Programs are required together with an appreciation of user problems, requirements and motivations. Should have taken part in the Development of a Major Application Package. Airline Data Processing experience highly desirable.

Senior Application Programmer

Should have worked on the Functional Specifications of User Requirements together with their analysis in the form of Program and Data Specifications. ASSEMBLER LANGUAGE.

Senior Communications Engineer

Should have detailed knowledge of the latest Communications Equipment and Techniques and have experience in liaising with PTT Authorities.

Senior Software Programmer (Systems Programmer)

Implementation and Using IBM System Software (e.g., OS, OS/VS1). Should have worked with IBM in the Generating, Debugging and Maintaining of System Software and have a good overall knowledge of Control Program Techniques and Problems. ASSEMBLER LANGUAGE.

Programmers/ Programmer Analysts COBOL, FORTRAN or ASSEMBLER

Compensation is open based upon experience. Speaking knowledge of the Greek Language helpful but not essential. Client Company assumes complete interview, Relocation and Fee Expenses, and is an Equal Opportunity Employer.

Qualified applicants are invited to call Mr. Robert Klavan at (617) 861-1020 for detailed discussion of opportunities, and to submit recent resume and salary history to him, in confidence, at Dept. C, 3 Fletcher Avenue, Lexington, Massachusetts 02173 (USA).

nkc Norton, Kleven and Co., Inc.
INDUSTRIAL RELATIONS MANAGEMENT CONSULTANTS
Three Fletcher Avenue, Lexington, Massachusetts 02173
Telephone (617) 861-1020

Member Massachusetts Professional Placement Consultants
Representing Equal Opportunity Employers M/F

DIRECTOR

BANKING AUTOMATION & COMMUNICATIONS SYSTEMS

A large West Coast based mini computer company is looking for a highly motivated, creative individual with a proven track record in developing large communication/based Software projects to head-up its communications/banking and finance group. In this position, you will take on the challenge of developing very large mini-computer based communication software systems from specification through implementation.

A strong customer orientation is essential and the candidate should have the necessary business acumen to participate in corporate strategy. Growth in this position will be rapid. Growth will be both internal and through acquisition of software companies and products.

Requires an individual with proven leadership and coordination skills. Previous experience with large mainframe manufacturers, large software companies and commercial projects is vital. Actual banking and finance experience is highly desirable.

In addition to the personal satisfaction and challenging career potential available, we offer a substantial salary commensurate with background and experience.

For consideration in confidence, submit resume including salary history and requirements.

CW Box 1543
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Newton, MA 02160

Equal Opportunity Employer M/F

Mini/Micro 78

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(617) 861-6250 — Management Consultants

City Of Little Rock, Arkansas
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Systems Programmer
SALARY RANGE:
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Be responsible for System Software under the guidance of Sam Trotter, in one of the Most Advanced Commercial Mini Computer Installations.

College Degree and extensive Assembly Language Programming on Mini Computers is required.

Knowledge of Operating System design and data base management systems is desirable.

Submit Resume To:

Director of Personnel
City Hall - Room 101
Markham and Broadway Streets
Little Rock, Arkansas 72201
(501) 371-4590

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DATA PROCESSING MANAGER

We are seeking a Data Processing Manager because of an internal promotion. The successful candidate will have a B.S. in Business Administration or Computer Science, seven years in Data Processing including two years in a managerial capacity plus demonstrated communications and technical skills. The candidate will be responsible for all aspects of an expanding 370 DOS/VS TP environment while reporting to the Associate Administrator for Information Services. Salary commensurate with ability. Exceptional benefits with liberal retirement plan. University town, convenient cultural, recreational activities. Resumes to: Personnel Dept.

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(203) 347-9471

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Lge. mfg. co. needs solid analyst to join team designing & implementing both acctg. & marketing systems. Bkgrd. must include major project resp. Dynamic peer group + high visibility. Degree. $23,000. (Fee Paid.)

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716-842-0801

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Consulting division of major regional CPA firm seeks EDP and systems consultants for fast growing practice. Three Years EDP systems experience and college degree required. Accounting degree, MBA or consulting experience a plus. Limited travel. Send resume in confidence to

CW Box 1539
797 Washington St.
Newton, Ma. 02160

ANALYST/ PROGRAMMER

M.I.S. International, Inc., an international computer systems, integration company, needs specialized professionals for Michigan, Ohio and Indiana branches.

- Business system analyst/programmers with experience in COBOL, PL/1, IMS, DMSII, IDS.
- Real time analyst/programmers with experience on micro/mini computers.
- Engineering analyst/programmers with time sharing experience.

Experienced men and women interested in furthering their career should consider M.I.S.'s top salary structure, stable employment environment, fully paid fringe benefits, educational opportunity and relocation allowances. You are invited to call or send your resume to Mr. Gene Bryant.

M.I.S. INTERNATIONAL, INC.
31350 Smith Road
Romulus, Michigan 48174
(313) 326-7010

PROGRAMMER/ANALYSTS PROGRAMMERS

We offer suburban living in Southeast Pennsylvania with ready access to major metropolitan areas as well as convenience to Atlantic shore and mountains for year round recreational activities.

National retailing organization, headquartered in York, Pennsylvania, seeks several EDP Professionals to help us develop new information systems supporting the solid profitable growth of our company.

We are now operating on a MULTIMEG IBM 370/158 supporting a heavy teleprocessing network using OS/VSI, CICS/VS, COBOL, DELTAK TRAINING COURSES, TOTAL DATA-BASE, DATA ANALYZER, ON-Line PROGRAMMING, OPTICAL SCANNING, COM, HIPO AND OTHER NEW TECHNOLOGIES.

If you have a minimum of 2 years solid experience and seek further growth potential, please send us a resume stating salary requirements to:

McCRORY STORES
DIVISION McCRORY CORPORATION
2955 EAST MARKET STREET
YORK, PA 17402

Equal Opportunity Employer M/F

Programmers & Analysts

San Francisco Peninsula.

Our Business Systems Department needs responsible people to assist in the development of financial, engineering, manufacturing, product assurance, and material systems. These openings are in a data base environment and processing is being changed from batch to on-time.

Education requirements include a BS in Business, Mathematics, Computer Science or work experience equivalent.

PROGRAMMERS - one to three years' experience.

PROGRAMMER ANALYSTS - two to five years' experience.

Salaries are commensurate with experience. Send resume with salary history/requirements to Professional Employment, Dept. BAR-8.

Ford Aerospace & Communications Corporation

Western Development Laboratories Division
3939 Fabian Way, Palo Alto, California 94303

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SYSTEMS PROGRAMMER

If you're more than a beginner . . .
. . . You're ready for us

Foremost Insurance Company, an industry leader, is currently staffing its corporate DP center and is seeking a Systems Programmer with 2 years Assembler language experience. Candidate must have a good understanding of Data Base management, preferably with ADABAS, and a working knowledge of OS/JCL.

We offer a competitive starting salary and complete company benefits in a pleasant recreational community in suburban Grand Rapids, Michigan. If you would like the opportunity to further develop your skills in this challenging growth position, forward your resume with salary requirements to the attention of B. Jourdan, in our corporate Human Resources Division.

Foremost® INSURANCE COMPANY

P.O. Box 2450
Grand Rapids, MI 49501
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UTILITY ENGINEER/PROGRAMMER

Consulting engineer firm has immediate opening for graduate Electrical Engineer having a strong computer background and familiarity with electric utility operations. The selected individual will debug and make revisions to a number of programs, such as billing, payroll, inventory, continuing property records and transformer load management. The engineer must be able to understand computer related problems as outlined by a utility's staff and must be thoroughly familiar with computer software and hardware so that he can resolve difficulties to the client's satisfaction. This is a permanent professional level position, reporting to the General Manager. It is Anchorage based and requires moderate travel.

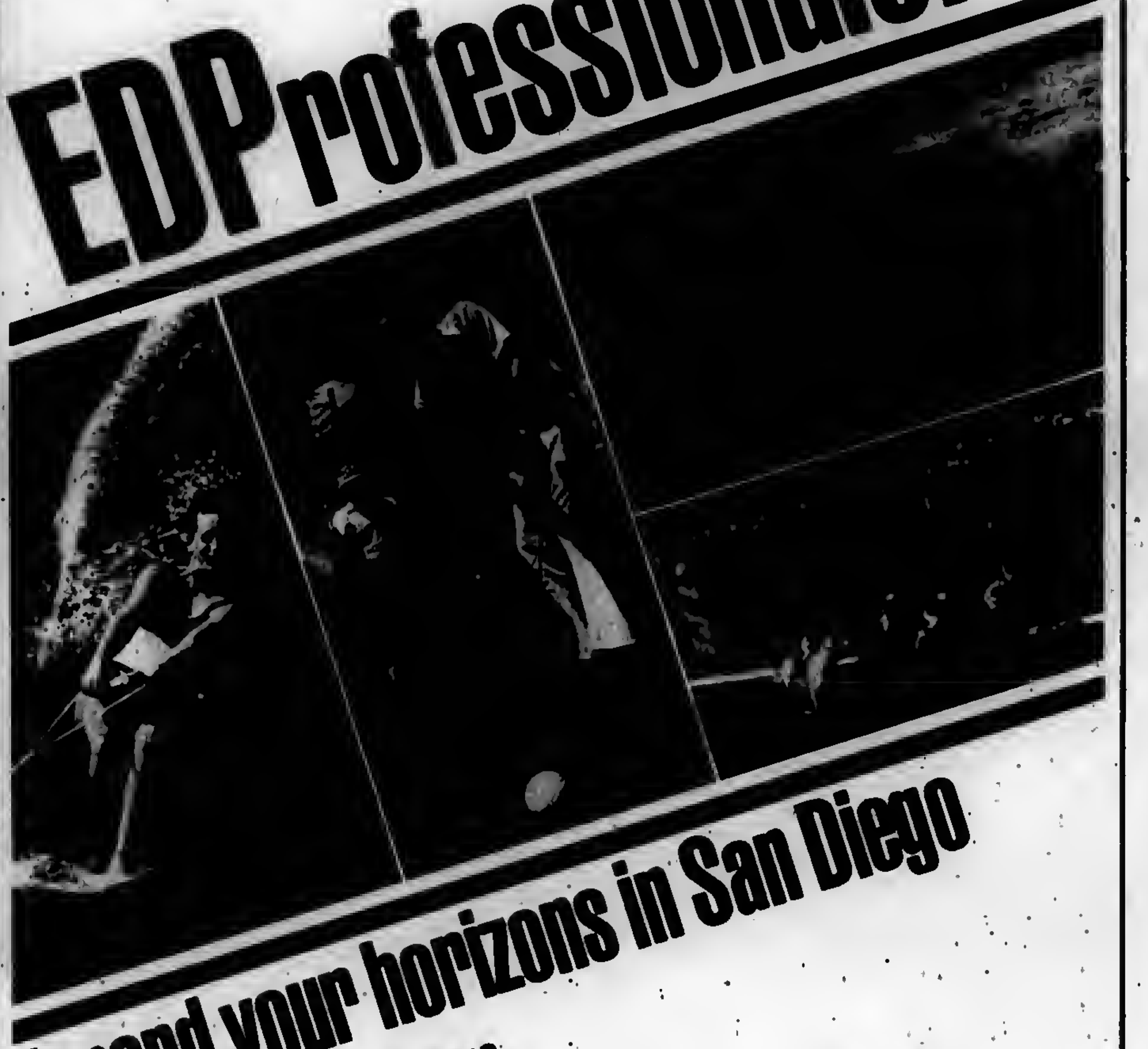
Write or call collect to Owane L. Legg at:

ROBERT W. RETHERFORD ASSOC.
P.O. Box 8401
Anchorage, Alaska 99502
(907) 344-2585

COMPUTER CENTER DIRECTOR

Plans and directs all activities of university computer center. Represents the center in discussions with other campus units and systemwide Chancellor's Office. Required qualifications: five years progressively responsible experience in data processing, including three years managing all phases of a DP installation (experience with large data bases and large-scale timesharing systems desirable); equivalent to graduation from a four-year college or university (advanced degree preferred). Salary $25,644 - $30,984. Send letter, resume, names of three references to Phillip Waslay, Dean, Educational Resources, California State University Dominguez Hills, Carson, CA 90747. Applications must be received by May 15, 1978. Approximate appointment date: June 1, 1978. Equal Opportunity/Affirmative Action Employer.

EDP professionals!



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With experience in one or more of the following areas: teleprocessing, system architecture, network processing, transaction processing. Participate in design and application of an advanced communications network architecture to meet distributive processing needs of the 1980s.
- **TEST SYSTEMS DEVELOPMENT**
Specify, design or evaluate and recommend test systems to support manufacturing digital and analog test requirements. Evaluate current test philosophies, review testability of new product designs and propose product test plans. Requires Electrical Engineering or Computer Science education, thorough knowledge of computer architecture, logic design experience and demonstrated firmware proficiency.
- **FIRMWARE**
- **DIAGNOSTIC PROGRAMMING**
Design, develop programs to support software testing, release and repair.
- **SOFTWARE DEVELOPMENT**
Design/implementation of multi-program O/S in a high-level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time-sharing compilers.
- **MIS APPLICATIONS**
- **SOFTWARE QUALITY ASSURANCE**
- **OPERATING SYSTEMS (HIGH-LEVEL LANGUAGES)**
—File management Project Lead
—Data communications
- **DATA BASE**
—Project Lead
—COBOL
- **TRANSACTION PROCESSING**
—Project Lead
- **SYSTEMS MEASUREMENT**

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employee and dependents. Please send resume, including salary history and experience, to the Professional Placement Office at the address below:

NCR ENGINEERING AND MANUFACTURING

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Prestige PHILA. based INSURANCE firm reqs 3+ yrs PUBLIC or INDUSTRY. Respon on-going review of all EDP activity to evaluate interna controls in existing & proposed new systems. Prior INSURANCE exp. pfd. Degree essential. Depending upon exp salary to $25,000.

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PERSONNEL AGENCIES
2 Penn Center, Suite 708
Philadelphia, PA 19102
(215) 588-4580

SYSTEMS ANALYST $30K

A conglomerate with Corporate headquarters in North Jersey and affiliates throughout the U.S. seeks Analyst(s) with exp in manufacturing and financial systems design.

Qualified candidates will possess substantial on-line exp, to be utilized in the Hewlett-Packard distributed processing project for manufacturing applications or in the area of new system development acting as an "In House" Consultant for financial applications in an IBM 370/158 OS/VS CICS environment.

Both areas are staffing autonomous project teams in highly visible situations demanding technical professionalism and excell communication abilities. An extensive benefits package including 2 profit sharing plans complements an outstanding starting salary. No obligation. Our client companies pay all expenses and fees. Confidentiality is assured.

DICK MATTHEWS (201) 540-0850
CORPORATE SEARCH, INC.
EDP Professional Recruitment Division
25 Airport Road, Morristown, N.J. 07960

SYSTEMS PROGRAMMERS: PROGRAMMER ANALYSTS:

Michigan State University

Computer Laboratory is looking for a lead systems programmer, systems programmers, and programmer analysts.

The Computer Laboratory is responsible for developing a multi-mainframe interactive distributed network and providing associated user services. Current hardware includes CDC 6500-6400 with Interdata 7/32 front ends.

Qualifications on CDC CYBER computers for these positions include:

Programmer Analysts-

a good working knowledge of a high level general purpose language. Experience with user documentation writing, course instruction, and user consulting is highly desirable. Salary: $12,950 to $18,130.

Systems Programmer-

experience in PP programming, assembly language, and a good working knowledge of one high level language. Salary: $14,050 to $19,670 per year.

Lead Systems Programmers-

B.S. in related field or equivalent education and experience. Considerable experience as a systems programmer. The ability to design, implement, and document complex new software systems or extensive modifications of existing software. Salary: $16,610 to $23,260 per year.

Send your resume and salary history to the Personnel Office, Michigan State University, 110 Nisbet Building, East Lansing, Michigan 48824, no later than May 19, 1978.

Michigan State University is an equal opportunity employer and eagerly seeks all qualified people.

DATA TERMINALS

SYSTEMS ENGINEERS

We are offering new career opportunities in our marketing department located in northern New Jersey. For consideration you should have 4 to 10 years of experience in communications computer systems with knowledge of facilities, modems, systems design, computer operation, applications systems design, programming and field sales experience dealing with end users. A degree in math or computer science is desired.

SALARIES $19-$25,000

This is an exciting opportunity to join a leading supplier of intelligent and non-intelligent data terminals nationally. Excellent benefits, compensation, incentives and personal growth potential available. For details send resume or call Personnel TOLL FREE 800 631-7050, N.J. residents call collect (201) 529-1170.

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PROGRAMMER-COBOL APPLICATIONS

Looking For A Real Opportunity?

Our Systems Development Department offers a challenging job to the highly motivated Applications Programmer. We have a 370/168 with MVS, IMS/VS installed and plans to expand the Distributed Processing.

We Require:

- 2 years' minimum COBOL applications programming experience in manufacturing, finance, or sales/marketing.
- A Degree in Business Administration, Accounting or Computer Science is desirable, IMS experience a plus.

We are the Consumer Products Division of the Fortune 500, NYSE-listed Schering-Plough Corporation. Our location is Memphis, Tennessee, one of the fastest growing cities in the nation offering a broad selection of cultural and recreational diversions in a mild mid-Southern climate. Additionally, we offer a comprehensive benefits package including relocation assistance and competitive salaries.

If you are interested in associating yourself with a dynamic organization in which EDP is a key organizational element — we want to hear from you!

Please send detailed resume, including salary history, in strictest confidence to:

Raymond L. Smith, Professional Employment Manager

Plough, Inc.
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Personnel Department
P. O. Box 377C
Memphis, Tenn. 38151

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For Washoe Medical Center in Reno, Nevada. 2-4 years' analyst work experience in a hospital or health care facility required. NCR background helpful. Competitive salary, generous benefit package including State retirement plan and excellent working conditions. Call weekdays (702) 785-4156 or apply Personnel Office. WASHOE MEDICAL CENTER, 77 Pringle Way, Reno, Nevada 89520. An equal opportunity employer.

PROGRAMMERS

Major internat. consulting firm seeks hvy. COBOL programmers that are ready for design work. Min. 2 yrs. exp. IBM 370/138 OS/VS7 environment, financial systems desirable. Prefer BS. Salary $13,500 -$17,000 (Fee Paid). Contact Gerry Battista.

ROBERT HALF
PERSONNEL AGENCIES
140 Federal St.
Boston, Mass. 02210
(617) 423-6440

COBOL PROGRAMMERS

Sargent & Lundy, a prestigious engineering consulting firm founded in 1891 and presently employing 4,000, seeks additions to its programming staff. To qualify, you should have a sound background in creative programming, testing, debugging, and documentation of management information systems. Familiarity with third generation operating systems will enhance your qualifications. You will be a part of a first-rate team of data processing professionals and work in close alliance with other programmers and systems analysts on a project basis.

Qualified candidates will be offered the opportunity for career growth and advancement within a technically dynamic EDP environment, as well as excellent compensation, benefits, and modern working conditions at our new Chicago Loop headquarters building. For prompt, confidential consideration, submit resume or write letter, outlining your background and salary history, to:

K. Chadwick

SARGENT & LUNDY
ENGINEERS
55 E. Monroe St.
Chicago, Illinois 60603
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SYSTEM DESIGNERS/ IMPLEMENTORS/SALES SUPPORT

The Minicomputer Division of Data Communications Corporation has openings for systems designers, implementors, and support personnel. Applicants must have experience in designing and coding systems level software in any third-generation assembly language. Desirable backgrounds include operating systems development, communications subsystems implementation, data capture and processing/data management applications.

DCC offers involvement in state-of-the-art implementation of software products for communications, data management, and distributed processing in a minicomputer environment. Excellent working conditions and employee benefits package. Salary commensurate with experience.

To arrange an interview, please call Don Rogers, Director of Personnel, collect at (901) 345-3544.

DATA COMMUNICATIONS CORPORATION
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Openings exist for Assistant or Associate Professors with a knowledge of at least two of the following areas: business systems analysis, COBOL, FORTRAN, DBMS, MIS, data communication, and information systems for management. Applicants are expected to present a doctorate in a computer related field; however, full consideration will be given to ABD's and master's degree holders with an impressive record of achievement in business, industry or government.

This position becomes effective July through September, 1978. Faculty salaries have perennially been in the top ranges of compensation scales compiled and published by the AAUP.

Applicants are urged to send a current resume, evidences of effective teaching (if available), and the names and addresses, and telephone numbers of three references prior to June 15, 1978, to Vice President for Academic Affairs.

Bentley College
Beaver & Forest Sts
Waltham, Ma 02154
(617) 891-2000

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Programmer/Analyst RSX-11M

Diano, a growing company and a world leader in the development and manufacture of instrumentation and automated systems for measurement analysis and quality control of materials has an exceptional career opportunity in our Programming Department.

Individual is responsible for the design, implementation and documentation of a system of programs to run under the RSX-11M operating system. This system will include both MACRO and FORTRAN IV Components. Individual must have strong MACRO assembly language experience, FORTRAN IV experience and RSX-11M operating system experience. Must be familiar with the development of I/O drivers for RSX-11.

We offer competitive pay rates and a liberal fringe benefit package. If your background coincides with our needs, please forward your resume, salary history and requirements to John Bartlett.

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IRAN

Applications programmer, Systems Engineer, H-6000 or L/66, GCOS/COBOL/GMAP IDS TPE/MULTICS, US firm has 18-24 mo tours w/fam. Ex financial pkg in Tehran. Ski 1 hr fm office. Rush resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101. (703) 356-1997. Other positions avail.

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Advancement opportunities for System 3 programmers with experience in all aspects of RPGII, especially table and array processing and exception output. Must be knowledgeable of indexed, random and sequential file organization, and be familiar with computer procedures and operations. Background in business applications such as: AR, AP, GL, Payroll, Inventory Control, plus a knowledge of the auto insurance business desired. Central New Jersey location. Good Company, good working environment, good benefits. For interview, send your particulars to:

CW Box 1538
797 Washington St.
Newton, MA 02160

Equal Opportunity Employer M/F

Computer Science

Assistant Instructor; anticipated appointment to teach freshman/sophomore level courses in Computer Science and Data Processing. A knowledge of FORTRAN and COBOL is necessary with BAL desirable. Applicant must have at least a B.S. in Computer Science or Data Processing. Additional duties will consist of lab recitations and tutorial sessions. Send all resumes and inquiries to: Dr. August Freda, Chairman, Division of Engineering and Computer Science, University of Pittsburgh at Bradford, PA 16701. Deadline for applications is May 30, 1978.

Systems Planner Distributed Processing $26,000-$30,000

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Executive Recruiters

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P.O. Box 823
Computer Park
Hampton, N.H. 03842
(603) 926-8712

"%$@#ing COBOL!"

You've seen enough users fighting their COBOL systems to want to give them something better. And you've been around compilers long enough to know how. Here's your chance to

RUN YOUR OWN SHOW AND BUILD A COBOL SYSTEM THEY'LL LOVE.

At Data General's Advanced Systems group in Research Triangle Park, North Carolina, we're building systems that will set new standards for capability, reliability, and ease of use. It's a place where innovative people get the chance to put innovative ideas into practice. Using high level languages, software tools, and structured design throughout.

As Project Manager for COBOL, you'll be building a development group to deal with all aspects of a COBOL product. Data bases, screen management, transaction processing and interactive debugging, to name a few. It's a ground-floor opportunity involving product-line decisions, high visibility, and heavy interaction with all other areas of system software. With outstanding growth potential.

So if you'd like to manage your own COBOL project that will leave your users smiling and the rest of the industry with egg on its face, contact us. Call collect and speak directly with our Language Group Manager on Tuesday or Thursday, April 18 or 20, between 5 pm and 9 pm at (919) 549-8421. Or if you prefer, send your resume, with salary history, in complete confidence to Allen Sabourin, Data General Corp., P.O. Box 12358, Research Triangle Park, NC 27709.

Data General
You can get there quicker from here.

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PHILADELPHIA RPG II PROGRAMMER/ANALYST

Hi-visability position w/leading PHILA. area mfgr. Bkgd SYS 3/RPG II essential. CCP exp highly desirable. Respon for design, development & modification of all commercial sys. Excel oppty for aggressive, self-starter to assume top spot in growing dept. Depending upon exp; salary to $23,000.

For immediate confidential attention, please call or forward resume to:

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center, Suite 708
Philadelphia, PA 19102
(215) 568-4580

IMS SENIOR TECHNICAL ANALYST

Experienced IMS professionals needed for large progressive company with state-of-the-art environment. Must be able to interact with IMS at external and internal levels. Minimum two years IMS DB/DC experience in a large S/370 environment. Minimum six years experience in technical software area. Degree preferred.

All inquiries held in strictest confidence.

Fee paid by the employer.

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If you already have a successful track record in the mini-computer industry, and are not earning $47,000+ for achieving your annual quota - then we should definitely be talking to each other.

For further information, write or call in confidence: Mr. Daniel Dougherty (301) 792-0257 or (202) 924-4170.

basic / four corporation
an MAI company
10025 Governor Warfield Parkway
Columbia, MD 21044

equal opportunity employer m/f

Software Systems Specialists

San Diego

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This Circulation System is to be the focal point of an integrated library management information system which is to have the capacity to acquire, describe, locate, and circulate all types of library materials, and to provide inventory, financial and usage reports, and statistics. The system is to perform all transactions quietly on a library department-wide basis. The Proposal shall include all computer hardware and software to operate such a system and provisions for training.

The Montgomery County Department of Public Libraries currently consists of 19 branch libraries serving a population of 600,000 in an area of 506 square miles; 2 bookmobile routes; 4 uniquely identified collections; and a film department; and materials are centrally purchased, catalogued, and processed; annual circulation is 5,500,000. The book collection is 1,313,000 copies of 135,000 titles; phonorecord collection is 50,000 copies, or 6,250 titles; periodicals collection (current year only) is 30,000 issues of 1,500 titles; and approximately 200 framed prints; 200 8 mm film; and 100 videocassettes.

"Expression of Interest" may be addressed to: Mrs. M. Weaver, Purchasing Director, Room 114, COB, 100 Maryland Ave., Rockville, Md. 20850. **NO LATER THAN 3:00 PM, ON FRIDAY, APRIL 28, 1978. IMPORTANT: OUTSIDE OF ENVELOPES MUST BE MARKED: PD#783-78.**

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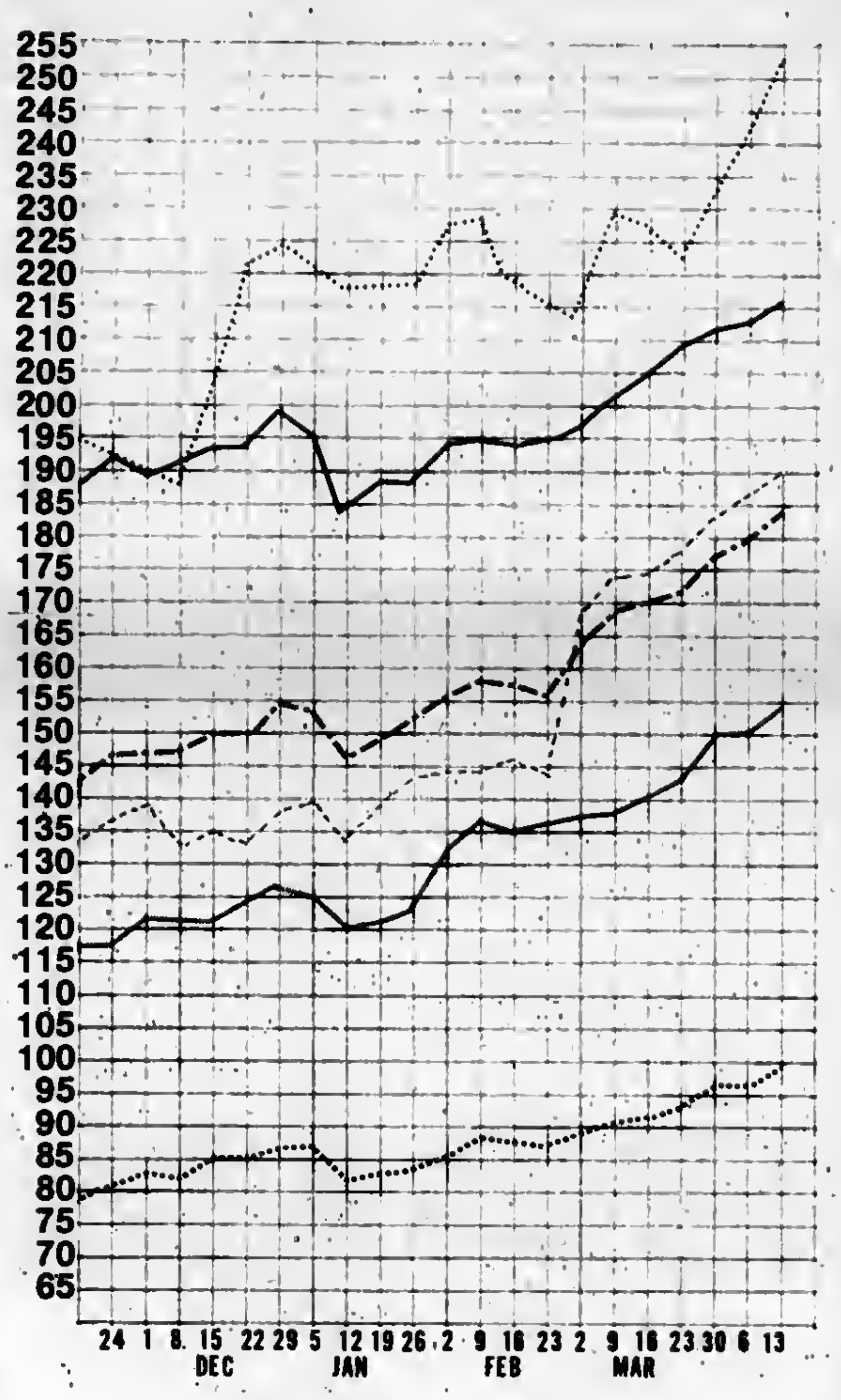

Earnings Reports

DATA 100
Year Ended Dec. 31

	1977	1676
Shr Ernd	$1.19	$1.43
Revenue	136,129,000	121,936,000
Tax Cred	517,000	1,750,000
Earnings	6,094,000	6,435,000
3 Mo Shr	.40	.55
Revenue	41,159,000	34,042,000
Tax Cred	36,000	862,000
Earnings	2,537,000	2,910,000

AT&T
Three Months Ended Feb. 28

	1978 (000)	s1977 (000)
Shr Ernd	$1.60	$1.52
Revenus	6,674,729	6,558,167
Earnings	1,216,066	981,467
12 Mo Shr	7.15	6.24
Revenue	37,228,711	33,416,363
Earnings	4,701,422	3,963,635

s-Restated.

APPLIED DATA RESEARCH
Year Ended Dec. 31

	1677	s1976
Shr Ernd	$1.16	$1.11
Revenue	16,630,241	12,912,511
Disc Op	(146,469)	103,446
Tax Cred	.....	384,000
Earnings	1,636,531	1,440,164

s-Restated.

INFORMATION MAGNETICS
Year Ended Dec. 31

	1977	s1976
Shr Ernd	.....	$1.03
Revenue	$32,166,000	30,065,000
Disc Op Loss	1,169,000	648,000
Tax Cred	.....	48,000
Earnings	(484,000)	1,872,000

s-For 53 weeks; restated to reflect discontinued operations.

NATIONAL DATA
Three Months Ended Feb. 28

	1678	1977
Shr Ernd	$.18	$.14
Revenue	6,972,000	s7,649,000
Earnings	796,000	615,000
9 Mo Shr	.51	.37
Revenue	28,302,000	s22,405,000
Earnings	2,261,000	1,667,000

s-Restated.

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COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 12, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 12 1978	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	AMDAHL CORP	22- 55	46	- 3/4	-1.6
N	BURROUGHS CORP	55- 91	59 3/4	- 1/4	-0.4
C	COMPUTER AUTOMATION	18- 30	25 3/8	- 1/8	-0.4
N	CONTROL DATA CORP	20- 29	27 1/8	+1 1/2	+5.8
O	CRAY RESEARCH INC	15- 35	35 1/4	+3	+9.3
N	DATA GENERAL CORP	35- 54	46 3/8	- 3/8	-0.8
N	DATAPOINT CORP	18- 43	43	+1 1/8	+2.6
N	DIGITAL EQUIPMENT	37- 53	38 7/8	-1 1/8	-2.8
N	ELECTRONIC ASSOC.	2- 5	4	- 3/8	-8.5
A	ELECTRONIC ENGINEER.	8- 16	15 3/8	+ 3/4	+5.1
O	FOUR-PHASE SYSTEMS	13- 25	24 1/2	+2 5/8	+12.0
N	FOXBORO	28- 54	33	- 3/4	-2.2
O	GENERAL AUTOMATION	6- 9	9	+1	+12.5
C	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	62- 87	64 5/8	+ 1/4	+0.3
N	HONEYWELL INC	43- 55	45 1/4	+ 1/2	+1.1
N	IBM	236-286	236 1/4	-5 1/8	-2.1
C	MANAGEMENT ASSIST	5- 14	14	+1 5/8	+13.1
O	MICRODATA CORP	7- 18	10 1/8	-1 3/8	-11.9
O	MINI-COMPUTER SYST	5- 12	5 3/4	- 1/4	-4.1
O	MODULAR COMPUTER SYS	5- 12	12	+ 1/2	+4.3
N	NCR	32- 47	44 3/8	- 1/2	-1.1
C	PRIME COMPUTER INC	12- 32	30 5/8	+1	+3.3
N	PERKIN-ELMER	17- 22	17 1/2	- 5/8	-3.4
N	RAYTHEON CO	16- 38	37 5/8	+1 3/8	+3.7
N	SPERRY RAND	30- 42	35 5/8	+ 3/4	+2.1
O	SYCOR INC	8- 21	21 3/8	+ 3/4	+3.6
A	SYSTEMS ENG. LABS	5- 14	12 1/4	- 1/4	-2.0
A	WANG LABS.	10- 16	15 5/8	- 1/4	-1.5
	LEASING COMPANIES				
O	ALANTHUS CORP	3- 6	5 3/4	0	0.0
C	BOOTHE COURIER CORP	8- 16	16 5/8	+ 1/8	+0.7
O	COMDISCO INC	9- 16	12	+2 1/2	+26.3
A	COMMERCE GROUP CORP	1- 3	3/4	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	+ 1/8	+27.1
M	DATRONIC RENTAL	0- 2	1 7/8	+ 1/8	+7.1
A	DCL INC	1- 4	2 3/4	+ 1/8	+4.7
N	DPF INC	6- 10	9	+ 1/8	+1.4
N	ITEL	13- 22	18 3/4	+ 5/8	+3.4
N	LEASCO CORP	19- 32	31 5/8	+1 1/2	+4.9
O	LEASPAC CORP	1- 2	1 5/8	- 1/8	-7.1
A	PIONEER TEK CORP	5- 11	5 7/8	- 1/4	-4.0
N	U.S. LEASING	10- 16	13	0	0.0
	SOFTWARE & EDP SERVICES				
C	ADVANCED COMP TECH	0- 2	1	- 1/8	-11.1
O	ANACOMP INC	7- 12	9 7/8	- 1/4	-2.4
A	APPLIED DATA RES.	5- 11	10 1/2	+ 7/8	+9.0
N	AUTOMATIC DATA PROC	23- 30	26 3/4	-1 1/4	-4.4
O	COLEMAN AMERICAN COS	1- 2	1 3/8	+ 1/8	+10.0
C	COMPU-SERV NETWORK	9- 15	8 1/2	- 3/4	-8.1
O	COMP ELECTION SYSTMS	6- 10	9 1/8	+ 1/8	+1.3
C	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
C	COMPUTER NETWORK	6- 11	8 3/4	+ 1/4	+2.9
N	COMPUTER SCIENCES	7- 11	10	- 3/8	-3.6
C	COMPUTER TASK GROUP	1- 2	2	0	0.0
C	COMPUTER USAGE	1- 3	2 3/8	- 3/8	-13.6
O	COMSHARE	5- 11	10 3/4	+1	+10.2
C	DATA DIMENSIONS INC	3- 5	4 1/2	0	0.0
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	17 1/2	0	0.0
O	INSYTE CORP	2- 3	1 1/2	0	0.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
C	KEANE ASSOCIATES	3- 4	3 3/8	- 1/8	-3.5
O	KEYDATA CORP.	1- 3	2 1/8	+ 3/8	+21.4
A	LOGICON	7- 17	13 3/8	+ 3/8	+2.8
A	MANAGEMENT DATA	1- 2	1	0	0.0
A	NATIONAL CSS INC	10- 19	18 1/4	- 3/8	-2.0
O	NATIONAL DATA CORP	4- 9	8 7/8	+ 3/8	+4.4
A	ON LINE SYSTEMS INC	16- 24	22 7/8	- 3/4	-3.1
A	PLANNING RESEARCH	3- 6	5	- 1/8	-2.4
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
C	RAPIDATA INC	2- 4	3 7/8	+ 1/8	+3.3
O	REYNOLDS & REYNOLDS	17- 23	22 1/2	+1 1/2	+7.1
C	SCIENTIFIC COMPUTERS	1- 4	4	- 1/8	-3.0
C	TYMSHARE INC	14- 23	20 7/8	+ 7/8	+4.3
A	UPS SYSTEMS	4- 6	5 7/8	0	0.0
A	WYLY CORP	1- 5	5	+1 5/8	+48.1
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	10- 19	18 1/2	+1 1/8	+6.4
O	ADVANCED MEMORY SYS	7- 10	10 1/8	- 1/4	-2.4
N	AMPEX CORP	8- 13	13	+ 5/8	+5.0
O	ANDERSON JACOBSON	3- 6	5 3/4	0	0.0
N	APPLIED DIG DATA SYS	10- 20	14 1/2	+ 1/2	+3.5
O	BEEHIVE INT'L	5- 12	5 3/8	- 1/4	-4.4
A	BOLT,BERANEK & NEW	6- 9	7 3/4	+1 3/8	+21.5
N	BUNKER-RAMO	8- 14	13 3/4	- 1/8	-0.9
A	CALCOMP	3- 5	5	+ 3/8	+8.1
C	CAMBRIDGE MEMORIES	1- 4	3 7/8	+1 1/4	+47.6
N	CENTRONICS DATA COMP	16- 30	19	- 3/4	-3.7
O	COGNITRONICS	1- 1	3/4	0	0.0
C	COMPUTER COMMUN.	5- 8	9	- 1/8	-1.3
O	COMPUTER CONSOLES	4- 7	6	- 1/4	-4.0
A	COMPUTER EQUIPMENT	2- 4	4	+ 1/8	+3.2
O	COMPUTER TRANSCEIVER	1- 1	1 1/2	0	0.0
C	COMTEN	9- 15	14 1/8	- 1/4	-1.7
N	CONRAC CORP	19- 28	29 3/8	+ 7/8	+4.4
C	DATA ACCESS SYSTEMS	4- 5	4 1/2	0	0.0
C	DATA 100	6- 12	11 5/8	- 3/8	-3.1
A	DATA PRODUCTS CORP	9- 19	15 7/8	0	0.0
O	DATA TECHNOLOGY	3- 4	4	- 1/4	-5.8
O	DATUM INC	1- 4	3 3/4	+ 1/4	+7.1
O	DECISION DATA COMPUT	2- 3	1 3/4	- 1/8	-6.6
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
A	DOCUMATION INC	6- 13	12 1/2	+ 7/8	+7.5
C	DATARAM CORP	2- 24	17	+ 1/2	+3.0
N	ELECTRONIC M. & M	4- 5	5 1/8	- 1/8	-2.3
O	FABRI-TEK	1- 2	1	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	8- 15	12 5/8	- 1/8	-0.9
N	HARRIS CORP	28- 48	47 1/4	- 1/8	-0.2
O	INFOREX INC	4- 8	7 1/8	- 3/8	-5.0
C	INFORMATION INTL INC	8- 14	10	0	0.0
O	INTEL CORP	38- 57	44 1/2	+1	+2.2
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	6- 15	12 3/8	- 5/8	-4.8
N	MEMOREX	23- 36	35	+2 1/2	+7.6
A	MOHAWK DATA SCI	5- 9	8 5/8	- 3/8	-4.1
O	PENRIL CORP	2- 8	8	+ 1/4	+3.2
N	PERTEC CORP	7- 12	11 1/4	+1 1/8	+11.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
C	QUANTOR CORP	3- 5	2 7/8	0	0.0
O	RECOGNITION EQUIP	6- 10	7 1/2	- 1/2	-6.2
C	SCAN DATA	1- 2	1 7/8	- 1/4	-11.7
O	STORAGE TECHNOLOGY	10- 31	27 3/8	-3 1/4	-10.6
O	T BAR INC	7- 19	19 1/4	+3 3/4	+24.1
O	TALLY CORP.	4- 9	8 5/8	+1 1/4	+16.9
A	TEC INC	6- 10	7	+ 1/8	+1.8
N	TEKTRONIX INC	29- 40	36 1/4	+2	+5.8
N	TELEX	2- 5	4 3/8	+ 1/4	+6.0
O	TESDATA SYSTEMS CP	13- 20	15 3/4	+ 1/4	+1.6
C	WILTEK INC	1- 1	1/2	0	0.0
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS PRODS	6- 8	8 3/8	+ 3/8	+4.6
O	BALTIMORE BUS FORMS	1- 4	2 7/8	0	0.0
A	BARRY WRIGHT	10- 19	19	+1 1/8	+6.2
O	CYBERMATICS INC	1- 1	7/8	0	0.0
C	DUPLEX PRODUCTS INC	14- 21	21	+1 1/2	+7.6
N	ENNIS BUS. FORMS	6- 11	11 3/8	+ 1/8	+1.1
N	3M COMPANY	43- 56	44 1/2	+1 1/4	+2.8
C	MOORE CORP LTD	24- 37	29 1/4	- 1/4	-0.8
N	NASHUA CORP	16- 28	24 1/8	- 3/4	-3.0
C	STANDARD REGISTER	18- 25	23	0	0.0
C	TAB PRODUCTS CO	8- 19	9 3/8	+ 7/8	+10.2
N	UARCO	18- 24	24	+ 1/8	+0.5
A	WABASH MAGNETICS	10- 15	12 5/8	0	0.0
N	WALLACE BUS FORMS	17- 22	21 1/2	+ 7/8	+4.2

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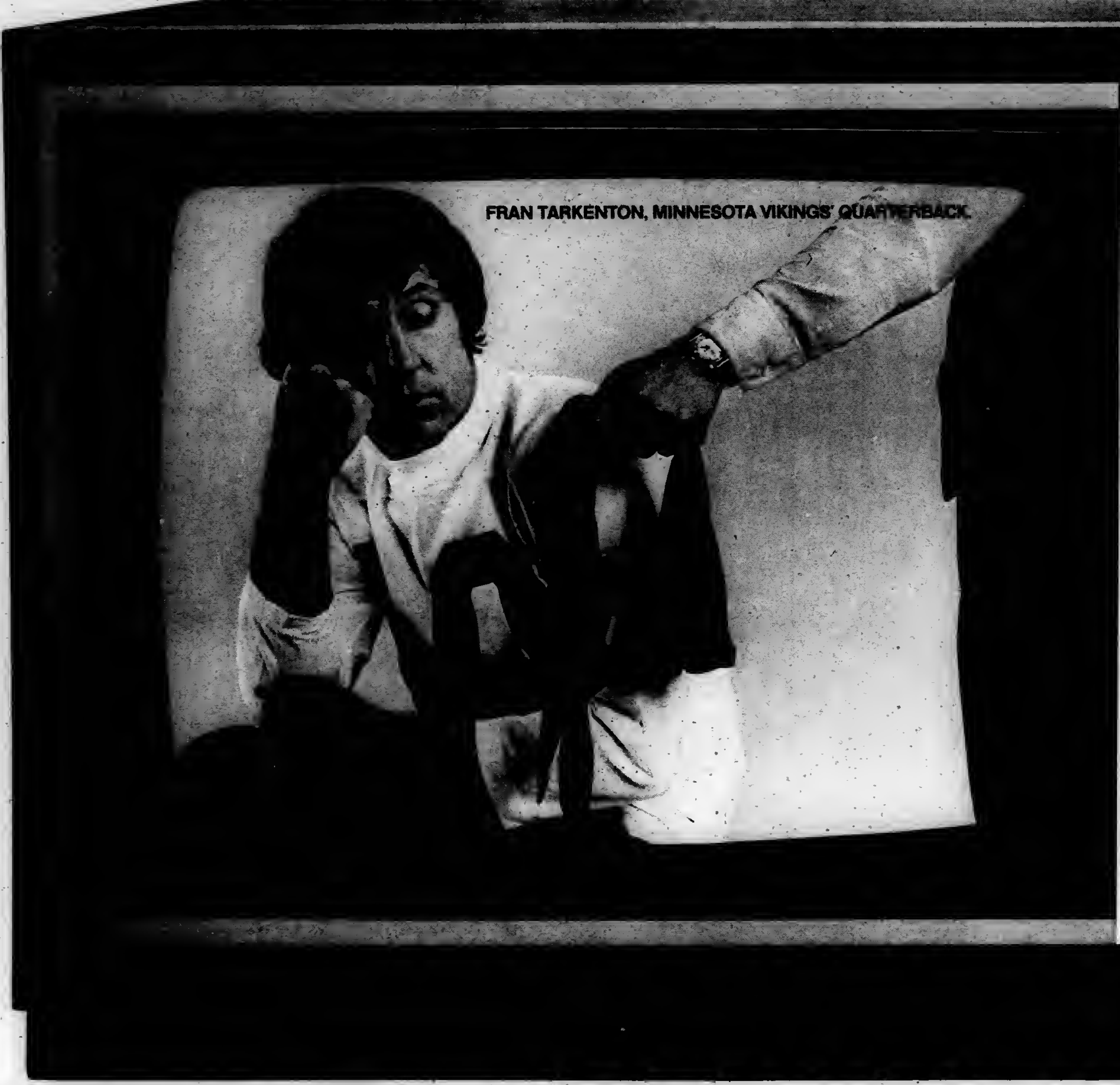

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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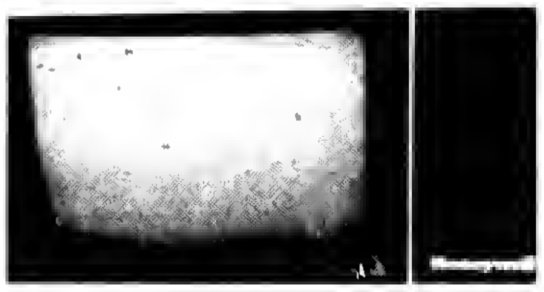

Long before Bill Rodgers arrived, a minicomputer was waiting at the finish line to record his winning time in last week's Boston Marathon. The system gave almost immediate information on the first hundred runners to finish the grueling, 26-mile, 385-yard race. See story on Page 4.

Users Tying Together IBM, Amdahl CPUs

By Ronald A. Frank
CW Staff

Some users with both IBM and Amdahl Corp. mainframes are interfacing their systems into loosely coupled configurations to schedule jobs more efficiently.

About 15 of the more sophisticated IBM/Amdahl users are now believed to be running these loosely coupled systems under IBM's SVS ASP or MVS JES3 without any unusual problems.

The main benefits of the interfaced machines appear to be in the area of job scheduling because jobs can be assigned to either CPU as the user desires. Either the IBM or Amdahl mainframe can assume the scheduling function, users said.

At Prudential Life in Roseland, N.J., Al Rivera, manager of operations, has one of the few triplex systems; it includes two IBM 370/168s and an Amdahl 470V/6. One of the 168s has the Attached Processor feature and is acting as the "global" CPU. The second 168 and the Amdahl machine operate as "local" mainframes.

Referring to the MVS JES3 "complex," Rivera said the shared-disk subsystems include mostly IBM 3350s with a few 3330 Model 11s. The DP Center converted from SVS ASP to MVS JES3 in about six weeks in the spring of 1977.

The global machine provides load balancing which can be used to "bias the system" when certain I/O facilities are available, so the loosely coupled configuration operates more efficiently than separate systems, Rivera said.

One 158, One 470

At Massachusetts Mutual Insurance Co. in Springfield, Mass., an IBM 370/158 is operating with an Amdahl 470V/6 under MVT. The 158, with a full implementation of ASP, acts as the global machine.

The loose coupling means job turnaround is better "and you don't have to manually decide when a job runs," according to Robert Bologna, director of the DP center. Jobs are submitted either from a card reader or from remote job entry terminals and the configuration makes it possible to access specific files faster, he said.

The 470 runs an on-line application processing life insurance claims plus IBM's Time Sharing Option and batch applications; the 158 runs an interactive APL application. Regardless of the individual tasks, the coupling provides a single systems image, Bologna said.

"If you were manually scheduling the work on one processor and also on the other, one of the systems might be saturated and the other might have spare capacity. With loose coupling, the resources can be assigned by the global machine as they become available," he pointed out.

Massachusetts Mutual has a second 470V/6 scheduled to come in next year. When that happens, the 158 will stay to form a triplex configuration. At first the three CPUs will remain under SVS ASP, but some thought is being given to going to MVS with JES3, Bologna said.

(Continued on Page 6)

Government Monopoly Feared

Fed Bucking Justice With EFT Plan

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Board of Governors of the Federal Reserve System last week moved forward with plans to create a nationwide network for making payments electronically rather than by check — despite opposition from the Justice Department.

The Department of Justice called the Federal Reserve proposal, which would employ telecommunications facilities to tie together the nation's regional automated clearinghouses (ACH) and increase the speed of the electronic funds transfer (EFT) systems, "an unwarranted intrusion into an area of developing technology that should be left to the private sector."

Similar objections have been made by the Justice Department to proposals that the U.S. Postal Service venture into the field of electronic mail [CW, Feb. 27]. In both cases, the department's Antitrust Division fears a government monopoly will cut short the growth of a promising technology.

While the Federal Reserve met resistance to its EFT network plan, the board won the Justice Department's approval to lend its services to facilitate the transfer of funds among Federal Reserve banks over a privately operated wire network known as Bankwire.

Assistant Attorney General John H. Shenefield said the Antitrust Division favors the Federal Reserve's support of Bankwire, a communications network owned by an association of banks, "because it promises to stimulate the development of funds transfer and clearing services by the private sector."

(Continued on Page 6)

Justice Decides Not to Request IBM Relief Now

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — After several months of soul-searching, the Department of Justice has decided against asking for interim relief in its massive antitrust case against IBM.

The decision was made, according to Antitrust Division chief John H. Shenefield, because such a motion would ultimately delay the case, which was filed more than nine years ago and has been in active trial stages for almost three years.

(Continued on Page 4)

Shop Floor Terminals Ease Production for Truck Maker

By Howard A. Karten
CW Staff

SALT LAKE CITY, Utah — "Occasionally, I wrap a tissue around one of the plastic badges and insert it in a [data collection] terminal to clean it."

That's the full extent of the preventive maintenance Steve Stephens, assistant controller of the Williamsen Truck Equipment Corp., does on the shop floor terminals used here to keep track of his firm's custom truck body manufacturing operation.

Despite the fact that the data collection devices operate in a dusty, greasy environment, they are highly reliable and get virtually no other maintenance, Stephens said. Since the system was installed last July, it has gone down "perhaps once every two weeks, on the average, for maybe two or three minutes," he said.

Those failures have been caused primarily by the buffers on the terminals filling too fast. When that happens, no

(Continued on Page 4)

'Source Data Entry: Getting the Job Done,' a CW Special Report, follows Page 50.

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Specialized DP Services Soon to Outpace Hardware, Communications Costs: Lotz

By Nancy French
CW Staff

ATLANTA — In the near future, hardware will be free, communications will be almost free and the user will be spending a major percentage of his DP budget on specialized services, Jack Lotz, president of Computerized Automotive Reporting Service, Inc. predicted here last week.

Speaking at an Expo '78 user forum on future computer resources, Lotz cited IBM's proposed Satellite Business Systems (SBS) as evidence of a new phase of DP history during which vendors will make the major portion of their profits from services.

Expo attendees who only moments before had struggled with questions involved with implementing a data base management system were treated to a view of a day when they could have $5,000 rooftop earth stations able to send or receive data from other company sites by satellite at speeds that will make today's DP and communications hardware obsolete.

Quoting IBM's SBS proposal to the FCC, Lotz said SBS will offer low-speed transmission rates to 19,200 bit/sec, medium-speed rates to 896,000 bit/sec and high-speed transmission rates to 6,212,000 bit/sec.

High-Speed Processors

To accommodate such high-speed transmissions, new high-speed processors will be needed, he predicted. IBM will fill that requirement with CPUs that are far larger than anything in use today, he said.

A system 80 with no relationship at all to the existing 360/370 line of processors will be introduced for use in conjunction with services available through the corporation's SBS subsidiary, he predicted.

"SBS threatens the very life of AT&T," Lotz said, predicting that AT&T will soon make a major computer-type announcement. It won't call it computing but it will be a computing rather than a communications product, he said.

CW Photo by T. Scannell
Jack Lotz

After all, AT&T did not hire Archie McGill, formerly an IBM marketing guru, for nothing, he indicated.

In the new world Lotz described, software development costs will continue to skyrocket, but users will avoid those costs by purchasing services from vendors whose development costs will be spread over many hundreds of users, he said. Along with new services and processors will come new mass storage devices, he predicted.

"By 1985, reliable sources tell us, it will be possible to obtain 1 billion bytes of high-speed random-access storage for $40,000," thanks to electron beam addressed memory (Ebam) or bubble memory — both of which have no moving parts, he said.

When this occurs, it will be cheaper to retrieve information electronically than on paper. Even though some users have so far resisted microfilm and microfiche, the future cost savings will break down their resistance to change, he predicted.

Crediting an E.F. Hutton analyst with his next idea, Lotz predicted that IBM will break itself into five companies much like General Motors. These will include a larger computer manufacturing firm; an office systems division, which will be a meld of the general systems and office products divisions; a plug-compatible peripherals company; SBS, the proposed communications firm; and a finance company to finance DP sales.

That this world is coming closer every day is at least partially borne out by the recent entry of National CSS, Inc. into the systems business as a vehicle for selling services, he pointed out [CW, April 17].

He also mentioned that Amdahl Corp. has taken a step forward with remote diagnostics of its CPUs under a system called Amdac.

Noting that IBM never got its promised remote diagnostics system off the ground, Lotz described Amdac as employing a Data General Corp. minicomputer tied into the console of its installed systems. The mini scans each of the processor's 16,000 self-correcting circuits and records when a component fails. That information can then be accessed by maintenance engineers, he said.

Lotz finally mentioned the introduction and pricing of IBM's new 3033 multiprocessor system as an example of the firm's need to "keep competition going for our own good as users."

IBM uses functional pricing rather than prices based on the cost of manufacturing and selling equipment. As long as nobody else can offer the same equipment, those prices will remain high, he said.

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(Name)

1 IBM Plaza, Chicago, Ill. 60611

Who sent the card and why? Speculation began to run rife through our office, and hypotheses sprang up like dandelions after rain. Here are a few of the more printable:

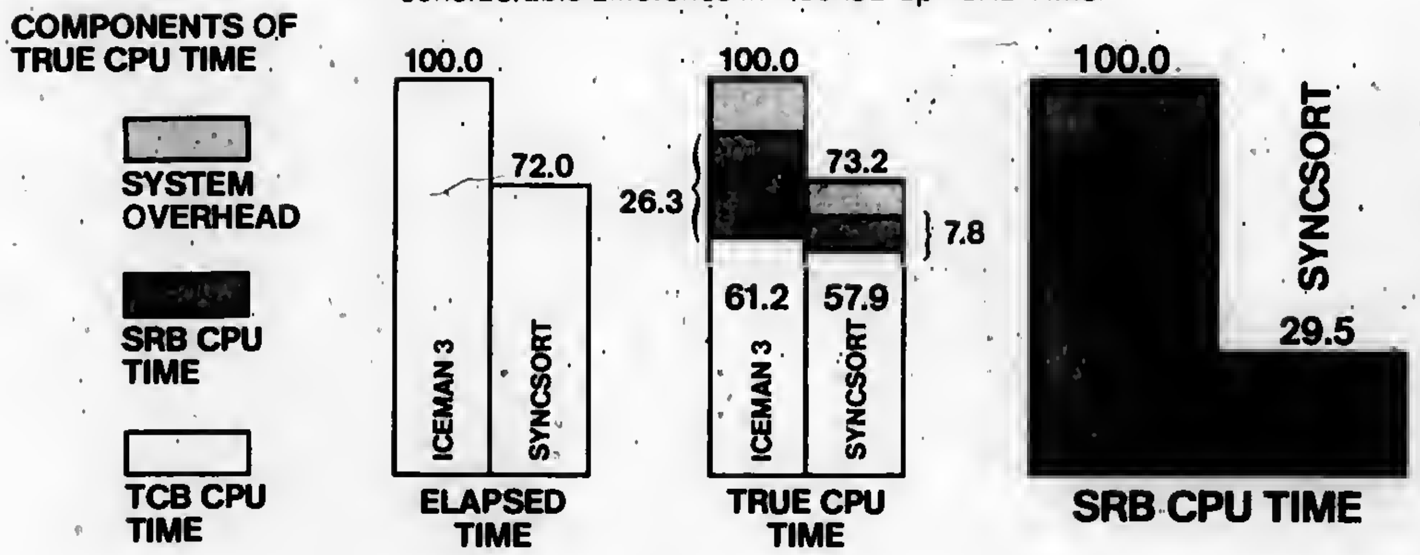
- **Hypothesis 1:** *A new IBM employee, his or her brain muddled by all those* Think *signs, sent the card by mistake. Only later will he or she learn the truth and gasp in amazement: "You mean we make sorts, too? But... but I thought we were a hardware company!"*
- **Hypothesis 2:** *Maddened by years of playing second fiddle in sorting, IBM has created a new, high-level Sorting Performance Investigation Team (SPIT) to find out what really makes SyncSort tick. As soon as the data is received and strapped to the operating table, voices will be heard muttering through surgical masks: "Scalpel...suture...somebody count those sponges..."*
- **Hypothesis 3:** *Deep in the caverns below IBM Plaza, a lonely researcher, doing advanced work on MVS performance, mutters: "If only I had a sort program that didn't chew up so many resources...something like (choke) SyncSort..."*

  Naturally we hope it was No. 3 who sent off the card. Because we'll be glad to help solve that nagging MVS problem.

  We'll begin by explaining that in MVS there are two components of True CPU Time, apart from overhead:

- *TCB Time, which is* interruptible. *If the CPU wants to switch signals and run another job, the message gets through.*
- *SRB Time, which is* non-interruptible. *The line is always busy—and too bad about those other, non-sorting jobs in the mix.*

Then we'll display the charts below, which compare SyncSort's overall performance with IBM's own 5740-SM1, Release 3, and pinpoint the considerable difference in "locked-up" SRB Time.



Finally, we'll welcome IBM as the newest SyncSort user—after they've signed the usual non-disclosure statement, of course.

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Mini Keeps Pace With Marathon Finishers

By Ann Dooley
CW Staff

BOSTON — Although the official timekeepers never made it to the finish line, a Honeywell Information Systems, Inc. minicomputer kept pace with the 5,492 runners who completed the 82nd Boston Athletic Association (BAA) Marathon — the country's oldest — last week.

As each runner finished the race, a Marathon official pushed a button attached to the Level 6/33 minicomputer that recorded the finishing time and provided information on the runner. The button could be pushed up to 30 times a minute and the runners' scores were recorded to the nearest second.

Data on the first 100 runners who completed the race was retrieved almost immediately from the Mini's data base and their names and numbers were called out to the thousands of spectators lined up to watch the end of the race.

The crowds all along the Marathon course were so dense that the official timekeepers, riding along the race route, never made it to the finish line to see William Rodgers of Melrose, Mass.— or any of the runners — complete the course. Rodgers ran the 26 miles and 385 yards in 2:10:13 to become the second American to win the Marathon twice.

Runner's Data Base

Once the first 100 runners had passed the minicomputer located at the finish line a different procedure took over, the runners' numbers were collected at a check station as they finished and listed with their finishing times.

Numbers and times were then entered into one of six terminals located at the nearby Prudential Insurance Co. building and the data was sent over telephone lines to a Multics system at HIS facilities in Billerica, Mass., where more complete information had been stored prior to the race.

The Multics system matched the runners' numbers and finishing times with their names. It also gave a complete rundown on each runner's height, weight, sex, age and country.

HIS had taken this information from the runner's entry blanks to form the data base. It assigned the runner numbers in order of qualifying times except for the top few numbers, which were preassigned and reserved for previous Marathon winners or Olympic champions.

HIS programmers divided the data base into three pools — those runners over 40 years old, female runners and men under 40.

The system was programmed to sort out the "unofficial runners" — those who had not officially qualified for the race — who had their times clocked as they went over the finish line, HIS officials reported. The total number of finishing times entered into the system was 5,492, but only 3,826 of those belonged to runners officially entered in the race.

HIS output the information by geographical area, finishing time, alphabetically by name, by runner number and by country, state and city.

Manual System Impossible

Whereas final race information previously took BAA officials months to compile, all the results were tallied and printed later that night, according to Jim Hannigan, HIS' manager of technical operations.

HIS has donated its equipment and programmer time for the last four years.

With the number of runners who now come from around the world to compete, it would be impossible to keep track of the race manually, he pointed out. In addition, the number of runners who cross the line at the same time and the speed with which they follow one another also makes it impossible to manually record the race results accurately, he added.

One problem occurred midway through the race when a spectator ripped out a cable connected to the mini. The system was inoperable for several minutes because of it, Hannigan reported.

Since BAA officials were unable to get through to the finish line because of the huge crowds along the way, "we had to manually handle the times ourselves," he said. "Every 15 seconds, we recorded a runner number, then collected all the numbers and later spread out the times within a few seconds and kept it fairly accurate that way.

"But even though it's a madhouse, we're looking forward to next year's Marathon," he added.

Justice Decides Not to Ask Interim Relief

(Continued from Page 1)

Meanwhile, apparently less worried about delaying the case, IBM is still planning to ask Judge David N. Edelstein, who is hearing the case, to dismiss the charges against it when the government finishes presenting its final witness, probably by mid-May.

The government can ask for interim relief in antitrust cases when it feels it has made a strong prima facie case that the firm on trial has monopolized. Such proposals, which are rare, ask the court to restrict the activity of the alleged monopolists while the firm presents its defense in the case.

Previously, interim relief in the IBM case had been supported, at least philosophically, by Shenefield and by Sen. Edward M. Kennedy (D-Mass.), head of the Senate Antitrust and Monopoly Subcommittee [CW, March 6].

Delay Unwarranted

Shenefield said last week that while the Antitrust Division feels it has made a strong prima facie case that IBM monopolized the general-purpose computer market and interim relief might have been granted, the delay in the case would not warrant asking for such relief.

He noted that evidentiary hearings would have to be held on the government's interim relief proposal and that any decision in the matter would certainly be appealed, thus delaying the main portion of the case and the final resolution.

Justice was worried about delay in the case, sources said, because it felt that IBM would demand an evidentiary hearing on the matter, which could take several months — at a minimum — and then the appeals could last for a year or so. All during this time, the main part of the case would probably be held in abeyance, the sources said, because IBM would claim that it could not carry on both actions at once.

At the same time, Justice feels it will be able to get fairly quick action on the remainder of the case — the IBM defense — since the government hopes to keep its cross-examination much shorter than IBM's cross-examination of government witnesses has been.

Because of these factors, sources said the Justice Department feels it can finish the entire case in the time that would have been spent arguing the interim relief motion and therefore have a final resolution of the case rather than an interim solution to the problem of IBM's alleged monopoly power.

IBM Dismissed Motion

IBM still plans to present its motion to dismiss the case when the government finishes with its last witness, Dr. Lee Preston, in early to mid-May, according to current schedules.

However, the IBM motion to dismiss will not take as much time as would the government's interim relief motion.

Motions to dismiss are rather routine in large cases, and even IBM has expressed some surprise when they have been granted as in the Greyhound Computer Corp. and California Computer Products, Inc. (Calcomp) cases against IBM.

Instead of a lengthy evidentiary hearing on the matter as would have been required in the interim relief proposal, Edelstein has given each side just two days to argue the motion to dismiss.

Most observers feel Edelstein will quickly dispose of the IBM dismissal motion by rejecting it and thus call on IBM to begin presenting its defense in the massive case sometime in June.

Terminals Aid Truck Maker

(Continued from Page 1)

data is lost, and the terminals are merely reset to continue operation, he explained.

Only one terminal has been removed since they were installed, but even that did not significantly affect operations. "We just removed the terminal and jumpered the connections," he said.

Although the company has not yet calculated how much money is being saved, it is pleased enough that expansion plans are under way.

The system consists of six Epic Data Corp. Model 1647-2 data collection terminals connected to each other in the plant and by phone lines to a local service bureau.

To input production data, an employee inserts his plastic-coated identification badge and an 80-column punch card representing the job he is working on.

The information by the terminals on the shop floor from the punch cards and ID badges is recorded on cassette at the service bureau for processing the following day and on a printer in Williamsen's offices for backup.

With this information, the company can spot bottlenecks by comparing the actual duration of any particular task with the expected duration.

The cards, which are prepared for each job on a keypunch, pick up dirt and grease from the manufacturing shop but only rarely cause misreads, Stephens said.

The terminal system, which was installed to replace a manual system, represents the first effort by the company at automated source data collection. Under the manual system, the time needed to complete tasks performed in building or repairing truck bodies was recorded by punching a time clock. Collecting, collating and transcribing the data from the time cards was inefficient and subject to errors, Stephens said.

After looking at systems offered by IBM and Panasonic Corp., Williamsen selected the one made by Epic of Bellevue, Wash., because it is compatible with the Xerox Corp. Sigma 7 mainframe used by its service bureau.

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Service Bureau Head Says 'Yes'

Federal Control of Data Leading to '1984'?

By Marguerite Zientara
CW Staff

CAMBRIDGE, Mass. — The Orwellian world of *1984*, in which the government controls the collection and dissemination of information and thereby controls much of what people know and think, is just around the corner, according to Jerome S. Rubin, president of Mead Data Central, the Dayton, Ohio-based service bureau that runs the computerized Lexis law library.

Speaking at a seminar here on "Data Banks and Information Services: Public or Private" as part of Harvard University's Program on Information Resources Policy, Rubin was joined by Andrew A. Aines, senior staff associate for the National Science Foundation, who discussed information dissemination from the government's standpoint.

Besides the danger of an Orwellian society, Rubin said, there is another danger inherent in the collection, organization and dissemination of information by government: The government has difficulty regulating Itself, since it is not responsive to a market or to shareholders.

At the same time, the private sector is subject to close government regulation such as that provided by the antitrust laws. The government, therefore, is powerful in both the public and private sectors, Rubin warned.

As an example of this governmental power, he cited the October 1977 announcement by the Government Printing Office (GPO) of the availability of free government-produced microfiche of such things as federal regulations, congressional debates, legislative bills, appropriations committee hearings and statistical publications.

This service, Rubin said, is a duplication of the products provided by the Congressional Information Service (CIS), a private firm. It is unclear at this time whether CIS will be forced to withdraw its competing line or go out of business completely, he added.

Rubin sees the plight of CIS as an example of the government's capitalizing on the work of the private sector. If private firms dealing in information are forced to go out of business, the government will then be the sole arbiter of what information is made available to the public, he pointed out.

Self-Regulation Lacking

As an example of the government's inability to regulate itself, Rubin cited the 1973 system development of Mead's Lexis, which was soon followed by Juris, a similar computerized law service at the Justice Department. Juris proved not to be a workable system, Rubin said.

The Justice Department then installed the successful Lexis system and modified Juris by copying features of Lexis, resulting in a better product, Rubin said.

A 1975 investigation into the matter by Antitrust Division of the Justice Department was inconclusive, Rubin said, and the publicly available files of the investigation indicate Justice was "embarrassed to investigate itself."

Under the Carter Administration, a new investigation was carried out last summer by Justice employees with no previous connection to the case and by Federal Bureau of Investigation auditors. They found Lexis would save half the department's annual budget compared with the government's Juris system, Rubin said.

Questionable But Necessary

The role of the government "has always been a question and will always be one until the end of the earth," Aines maintained in his presentation. He contended, however, that if government were to get out of the information business completely, "there would be real calamity, the government would be in utter collapse and society as we know it would be impossible."

Aines said that the government recognizes such problems as those presented by Rubin, but is concerned with the "information have-nots." These include U.S. citizens who need equal access to information In order to do their jobs and live their lives, as well as developing countries which have begun to demand free access to scientific and technological information, Aines said.

The problem of access is the major issue to be dealt with today, he added.

In an age of "paradox and irony," Aines said, one private group will demand the withdrawal of the government from information dissemination as other groups — governed by the tenets of freedom of information and disclosure — demand greater dissemination of information. The federal Freedom of Information Act is supported by consumerists, the media and a Congress exasperated by executive power, he said.

The "for-profit" sector lacks a vociferous group to back it up and there is no incentive for the government to divest itself of the responsibility of information dissemination, he added.

There are presently 328 bills before Congress dealing with information computers and communications. The bills, Aines said, indicate Congress wants "better handling of information

(Continued on Page 8)

"ALL TP MONITORS ARE NOT ALIKE"

To the first time user most teleprocessing monitors must appear alike: "Multi-threaded, 3270 Mapping, Recovery, ease-of-use". That's what they all say. The new user often can't ask the specific technical questions necessary to choose between the alternatives. But, they learn the hard way after they select a product that won't do the job, consumes excessive computer resources, or provides poor performance.

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IBM-Amdahl Links Easing Users' Workloads

(Continued from Page 1)

"JES3 has had a lot of bugs associated with it, we've heard, and we are waiting until these are cleared up before we seriously consider moving into it," he added.

The company does not totally share all files between the two CPUs. "We've got our network files accessed only by the 470 because we do not want the 158 getting at them," Bologna said, but he noted this type of isolation is strictly a user option.

Part of a Mix

Combustion Engineering in Windsor, Conn., runs a loosely coupled configuration as part of a larger mix that also includes Central Data Corp. mainframes. The Amdahl 470V/6 acts as the global machine for a 370/168.

The Amdahl CPU replaced a 370/158 that was used as a back-end machine to the 168. When the 470 was installed in February 1977, this relationship was reversed and the 168 became the back-end machine to the Amdahl mainframe, according to Harry Dillman, director of computer services.

The smaller version of ASP that resides on the 168 takes about 5K to 7K bytes of storage, which is probably less than 3% of the total CPU memory, Dillman estimated. This is only a handshaking piece of software that links to the channel-to-channel connector between the two mainframes.

If the 168 were not loosely coupled to the 470, it would need the full ASP implementation instead of a smaller subset. You wouldn't want to run ASP on both CPUs because this gets very expensive. ASP is using about 23% of the storage in the Amdahl CPU," Dillman said.

The ASP controls all the scheduling within the DP center as well as the firm's terminal network, and the preexecution of all I/O peripherals at the DP center.

The ASP code was "absolutely transparent and we lifted it right out of the IBM machine and put it in the Amdahl. There was a slight change in the SVS operating system where Amdahl had to provide for error recovery management, but this was minor," Dillman recalled.

"If the transparency had not been there, I doubt we would have considered an Amdahl in the first place," he added.

Dillman is planning to install an IBM 3033 at the end of this year. "We have every expectation the 3033 will work in the loosely coupled configuration. We have talked to IBM and Amdahl. Nobody has done this yet, but we see no problem with it at this point," he said.

Calvin Ross, a headquarters system engineer at Amdahl, is not convinced there are storage savings associated with the loosely coupled configuration. He pointed out that if a user decides to run separate, free-standing systems, he would need JES2, which probably requires just as much code as having JES3 in global and local machines.

JES3 is a very large complex software system, Ross believes. Typically a global CPU has 1M byte or more of software and the local mainframe has 200K to 300K of an abbreviated version of the utility.

The major benefit of a loosely coupled complex, according to Ross, is that one machine can have responsibility for scheduling. It can determine how heavily or lightly loaded a local CPU is at any moment and make adjustments in the job. This has the effect of balancing the workload in the entire shop, he said.

Preexecution setup of I/O tape or disk subsystems is also important. If a particular job needs a tape or a disk setup it is much easier for a single mainframe to track the status of all the I/O devices rather than to have separate systems trying to do the same work.

In a loosely coupled system, each CPU must have a channel path to the I/O subsystem controllers so all of the needed devices can be accessed.

As part of the coupled capability, a CPU-to-CPU channel adapter is required; this can reside in either the IBM or Amdahl machine, he said. This channel-to-channel connection enables the global machine to send scheduling information to the local CPUs.

Fed Bucking Justice With Network Plan

(Continued from Page 1)

Federal Reserve computers sort and clear payment information recorded on magnetic tape and exchanged between financial institutions which subscribe to the board's services. Presently, 32 of the country's 33 ACHs receive direct operational assistance from the Federal Reserve.

The board intends to replace the check courier transportation system and low-speed communications lines that now link these offices with high-speed communications lines, a member of the Board of Governors, Philip E. Coldwell, said at a recent banking conference in New Orleans.

No Monopoly Seen

A spokesman for the Federal Reserve said last week that comments critical of the plan — including the opinions of the Justice Department — have been considered.

"The Board has no intention to establish, and does not believe that its ACH activities will lead to, a governmental monopoly in the field of electronic payments," the spokesman stated. He added that "at the present time, alternative private-sector sources do not exist that have the capability to provide an adequate level of service on a nationwide basis."

While the Federal Reserve expects the private sector to develop the capability to provide interregional ACH sources in the future, the board has no intention of ending its current involvement in the operation of electronic payment systems, the spokesman said.

Coldwell warned that the Federal Reserve might be just the balancing force needed to prevent the nation's largest banks from taking over this field. To withdraw from theft effort would be to abdicate "long-standing payment mechanism responsibilities," he added.

The feasibility and potential benefits of a nationwide ACH facility have been demonstrated in the U.S. Treasury Department's direct deposit program, in which consumers can have such recurring payments as Social Security benefits credited directly to their accounts, the spokesman said.

The Federal Reserve conducted a pilot test of interregional commercial payments during 1977. In the test, a low-speed 2,400 bit/sec line between the Federal Reserve's Dallas and Kansas City offices was replaced by a 56 kbit/sec line.

A file representing 10,000 payments could be transmitted in 3-1/2 minutes over the new line; the low-speed link required two hours to send the same payment volume, according to Coldwell.

The Federal Reserve argued that its creation of a nationwide ACH network would be a good research and development program, providing technical data and experience in the operation of such facilities. The ACH interconnection "is likely to encourage the private sector to provide more efficient and innovative payment services to the public."

The Federal Reserve System will make its R&D results available to those in the private sector interested in developing alternative systems, its Board of Governors promised.

Meanwhile, yielding to the pressure of the Justice Department and others that the board at least charge its member banks for EFT services, the Federal Reserve said it will publish a schedule of proposed prices for ACH services "as soon as [they] can reasonably be developed."

Overall, the board expects its actions "to enhance and improve financial services to individuals and to financial institutions, to encourage the use of electronic movement of funds as a more efficient and less costly alternative to check payments and to stimulate the development of nongovernmental services that will lower the cost of banking services to the public."

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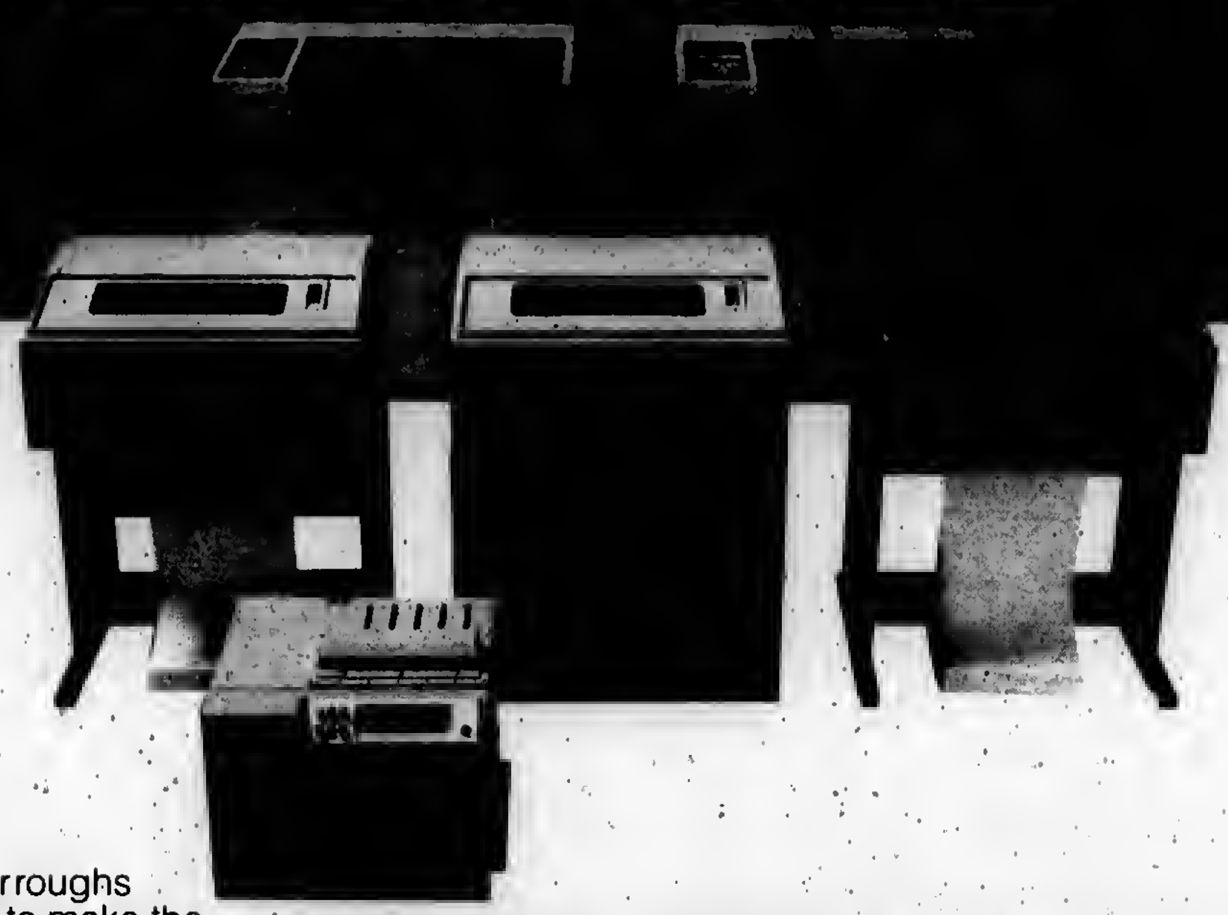

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EFT Endangering Savings, Annunzio Charges

By Catherine Arnst
CW Staff

ST. PAUL, Minn. — Electronic funds transfer (EFT) systems could cause an individual to lose his entire life savings "without any possibility of getting the money back," Rep. Frank Annunzio (D-Ill.) charged here recently.

He pointed out that under present law, there is no legal limit on the amount consumers can lose from their accounts when an EFT card is used without permission. In contrast, the maximum amount of consumer liability when a credit card is similarly misused is $50.

Annunzio made his charge at last month's hearings here on H.R. 8753, the Consumer's Credit Protection Act Amendments of 1977. Annunzio introduced the bill last August to protect consumers using EFT and credit cards. That bill is now in the final mark-up stage in the House Consumer Affairs Subcommittee, of which Annunzio is chairman.

A major provision of the bill would place a $50 consumer liability limit on EFT cards. In addition, if funds were transferred from an account without the use of a card, the bank would be totally responsible for the loss.

Other provisions of the bill would give consumers the right to "stop payment" when they buy goods or services, just as a check can be stopped; would allow consumers to request and receive corrections of errors in their accounts, a service now provided at the whim of the bank; and would make the bank responsible for any loss or damages that occurred to a consumer because the bank didn't make an electronic preauthorized payment, such as an insurance payment.

Bank Requirements

The bill would also require a bank to provide vital information to a consumer before he receives an EFT account, such as any charges levied and the terms and conditions of the account agreement, as well as his rights under the law. Banks would also be prohibited from sending out unsolicited EFT cards.

The bill also calls for giving the consumer a receipt listing details of the EFT transaction whenever something is paid for electronically or funds are transferred. Today, no receipts are required by law. A seller would be prohibited from charging more for a purchase paid by check than by EFT, and false or misleading advertising of EFT services would be prohibited.

The consumer subcommittee held hearings on the bill recently in Washington, D.C.; Chicago; Columbus, Ohio; and St. Paul, Minn. In opening remarks at the Columbus hearing last month, Annunzio charged that "EFT systems and the Edsel have a lot in common." They "look good on paper but simply will not sell. I am not convinced that large-scale developments of such systems are presently in the interest of the country, banks or the public."

He quoted Robert E. Knight, research officer and economist at the Federal Reserve Bank of Kansas City, Mo., as saying in 1974, "If I were to receive an [EFT] card tomorrow . . . I would do only one thing — cut the card up into 25 little pieces and send it back to the bank."

Annunzio cited the testimony of a Texas man whose EFT card was either lost or stolen and subsequently used to withdraw $2,300 from his bank account. Although the personal identification number was not used with the card, the bank refused to reimburse the consumer, even though he had reported the loss of the card, Annunzio said.

After he asked the Federal Deposit Insurance Corp. to look into the situation, that institution wrote that although the facts of this case were in dispute, "even if we were able to document what actually occurred, the law is unclear as to where the liability would lie . . . Since there is no federal statute controlling liability in this situation, it would appear to require both a court's interpretation of state law and a court's resolution of disputed facts."

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Orwellian World Coming Soon?

(Continued from Page 5)

by federal agencies" rather than private-sector handling of information.

In this post-industrial era of U.S. development, Aines said, half the gross national product is associated with the "knowledge industry." Data is changing the way people communicate and is changing the whole structure of society as well.

The government must try to develop a policy for managing its own huge information programs efficiently while maintaining the privacy of individuals, he stated, and the private sector must support the existing information systems.

Aines said he could not imagine how the private sector can say "with a straight face" it is effective when all its information is obtained from the government free of charge.

Maintaining that the U.S. needs a strong "for-profit" sector as well as strong federal programs at all levels, Aines recommended high-level government programs to oversee the transmission of data and maintain information networks while trying to minimize duplication and overlapping of information.

But Could Open Pandora's Box

Ribicoff DP Crime Bill Called Valuable Weapon

By **Edith Holmes**

CW Washington Bureau

WASHINGTON, D.C. – Passage of the computer crime bill introduced in the U.S. Senate will certainly be "a new and valuable weapon in the fight against white collar crime," the assistant attorney general of the Justice Department's Criminal Division, Benjamin R. Civiletti, recently wrote to Sen. Abraham Ribicoff (D-Conn.), the chief sponsor of S. 1776.

But the proposed law as currently drafted [CW, July 4] will also provide a key to the Pandora's box of the computer and communications industries, unlocking such issues as the taxation of software and the professional status of systems analysts and programmers.

For example, the bill, which would make abuse of government systems, computer operations of certain financial institutions and systems involved in interstate commerce a federal offense, specifically defines computer programs as "property." As "property," software is eligible for taxation, attendees at a breakfast meeting sponsored by the Washington office of the Data Processing Management Association held to discuss the bill noted.

The proposed legislation contains no reference to the malpractice liability of systems analysts and programmers who may ignore established security techniques in designing a computer system or writing a program for it. However, the bill's passage and the creation of criminal sanctions against computer faud and abuse would bring industry practitioners a step closer to civil penalties for failing to emphasize security in system design and operation, other attendees suggested.

Philip R. Manuel, an investigator on the Senate Governmental Affairs Committee, which conducted the study that led to Ribicoff's introduction of computer crime legislation last June, told the meeting that the proposed law is intended to "bring us up to speed" in legal protection against electronic forms of white collar crime.

Current Law 'Inadequate'

Current law is inadequate to permit easy prosecution of the computer criminal, Manuel said. He referred his listeners to a case cited in the Governmental Affairs Committee Computer Security Study as an example of the deficiencies in present criminal law.

In the case of U.S. vs. Bertram Seidlitz, the computer was used as an accomplice, Manuel explained. Seidlitz used a portable terminal, the telephone system and his knowledge of certain access codes to obtain access to the computer operation of his former employer, Optimum Systems, Inc. (OSI).

Seidlitz worked from his home in Maryland and from his computer business in Alexandria, Va. He accessed various portions of OSI's Wylbur system (a software package governing the firm's contracts with various government agencies) at least 40 different times in approximately four months to build his own data base of contract information.

OSI discovered Seidlitz's activities by accident and called in the Federal Bureau of Investigation (FBI). Working with the telephone company, the bureau succeeded in tracing Seidlitz's telephone calls. The FBI used search warrants to seize computer printouts with OSI information at his office and the terminal was located at his home.

Seidlitz was indicted on two counts of wire fraud and one count of interstate transportation of stolen property, according to Manuel.

FBI agents were fortunate in receiving cooperation in the case from OSI officials and from the telephone company. They were also lucky to find the "stolen property" in such a tangible form as a computer printout.

If Seidlitz had transferred the information he obtained from OSI onto magnetic tape and stored them with his library of tapes, would investigators have been justified in searching his entire tape library? This is a very important question, Manuel said.

Presently, there exists no federal legislation which specifically is intended for such computer-related crimes, he indicated.

Example of Limitations

"The wire fraud statute is useful if it can be proven that an interstate communication was made; on the other hand, if Seidlitz had used his residence as his base of operations to obtain the computer program, then the wire fraud statute would have been useless," Manuel said, quoting the U.S. attorney who handled the case.

He also pointed to the wire fraud statute requirement that "money or property" be stolen or used for fraudulent purposes.

So far, Manuel noted that neither the Senate Governmental Affairs Committee nor Ribicoff's office have received opposition to the bill on the basis of its implications for software taxation or for the licensing and regulating of computer programmers and analysts. He invited debate on these issues, however, at hearings on the computer crime bill to be held soon before the Senate Judiciary Committee's Subcommittee on Criminal Laws and Procedures under the chairmanship of Sen. Edward M. Kennedy (D-Mass.).

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Conferees Urge MIS Heads to Know Business

By Brad Schultz
CW Staff

NEW YORK — A new breed of management information system (MIS) administrator is emerging because top management now stresses businees acumen more than technical expertise in evaluating MIS chiefs.

Several speakers at an MIS state-of-the-art colloquium held here recently presented this view, explaining that administrators grounded in general business, rather than technology, are better qualified to present MIS designers with the needs of their firms.

Today's MIS chiefs report to the "mainstream" of their organizations and must have insight into profit and loss, production and other business considerations, according to Fred H. Lambrou, General Foods Corp. information services director.

Less than 30% of today's MIS managers report exclusively to the financial wing of their organizations. This figure was about 90% 10 to 15 years ago, Lambrou said at the one-day gathering sponsored by The Conference Board for senior general and technical managers.

Objectives Confused

Paul Dixon of Massey-Ferguson, Ltd. indicated that technically oriented MIS managers have occasionally lost sight of their objectives, striving to create a technically sophisticated system that may not be cost-justified. The primary purpose of MIS is to make more money for the organization. Only after doing that should an MIS be used to figure how much money has been made, Dixon said.

Dr. John F. Lubin, the keynote speaker, told the MIS experts that "a lot of management doesn't trust you anymore because corporate leaders have been stuck with an MIS 'juggernaut' they don't know how to stop."

An MIS that was designed to meet the demands of a departed chief executive may prove inadequate for a firm because his demands may have become unrealistic in the period between design and implementation — if they were not so at the time they were made, Lubin explained.

Lubin called this the "standard incumbent problem" and said that two remedies are to shorten the time interval between major revisions of the MIS or to ensure that the system can handle a rapidly changing environment.

Earlier designs of MIS have in many cases turned out to be "absolutely naive and crazy" for use in 1978, Lubin said, noting that these designs were done by technicians who did not properly understand the business needs involved. The dean of the University of Pennsylvania Wharton School also said organizations should do careful feasibiilty studies before implementing any MIS.

Business-Oriented Managers

"I seriously question whether there are that many computer technicians still managing all of a major corporation's information services functions," Herbert Z. Halbrecht, president of the Society for Management Information Systems, told the conference.

"Bright, capable, ambitious young people" are no longer attracted to MIS positions or departments, which they regard as "dead-end," Halbrecht added.

"Ten years ago, the more entrepreneurial, ambitious professionals in the information services field had opportunities outside their companies to obtain venture capital to start their own firms . . . Those days are now long gone and in all likelihood will not return," Halbrecht asserted.

"Competitive, ambitious risk-takers who want to run their own show look at the history of advancement opportunities for MIS directors and decide that's not the function they want to enter," he continued.

Management Pyramid

Where an organization's management structure and information flow might be represented by a pyramid, technically oriented MIS managers perhaps function best, according to Glen W. Belder, president of United Airlines' Computer and Communications Division. In such a scheme, the number of managers diminishes as the information flows up the corporate hierarchy. A given individual in this environment usually reports only to one superior.

However, many firms have discovered the inadequacy of pyramidal information flow, Belden continued. For example, if a new product line is introduced by a manufacturing firm, a large number of higher management people will be interested in its marketing progress and will want to access the MIS that reports this progress.

These higher management people will each have needs germane to their functional interest — production, operations, marketing or development —

(Continued on Page 11)

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. . . But One Firm Tells Them to Talk Business

NEW YORK — The nation's largest diversified financial company operates its management information system (MIS) with an emphasis on regular, open communication between departments, according to Aetna Life & Casualty's vice-president for DP and administrative services, Irwin J. Sitkin.

Sitkin told a special session on financial industry MIS evaluation at The Conference Board's MIS colloquium held here recently that "Aetna's business is information, and it is essential that we get the right information to the right peole at the right time so the right decision can be made in the effort to stay ahead of our competitors."

Most of Aetna's operations are of a DP or information management nature, Sitkin said. "Our management considers the DP resource an integral part of our business activity and a major factor in achieving the company's business goals," he added.

Aetna's systems analysis and programming staffs function in the "mainstream" of activity, working closely with decision makers, he noted.

Steering Committees

Every major Aetna division has its own systems development department to perform its systems analysis and development work and a steering committee to assure responsible management direction, he continued.

The steering committee is normally chaired by the division head and serves to direct DP plans and budgets, establish priorities for major projects and oversee the application of resources.

"There is also an informal or 'matrix' organization structure (including committees, task forces and project teams) that provides needed communications channels and greater visibility of information processing resources to all levels of management," Sitkin added.

During the annual planning effort, the development departments establish production service goals and objectives for creating or enhancing information systems.

These service goals include availability and response time targets for Aetna's major on-line systems and networks, rerun and timeliness goals for reports produced in a batch production environment, turnaround time measurements for remote job entry work and person/day forecasts for systems design and development, he said.

Hardware Management

All of the large-scale DP hardware and much of the smaller hardware is centrally located at corporate headquarters in Hartford, Conn. Sitkin manages the hardware, 2,100 people and a 1978 budget of more than $63 million.

All hardware failures are documented daily, showing cause and corrective action taken, and are recapped monthly, Sitkin said. Extended outages are researched and documented to assist in monthly management review sessions with major vendors.

Hartford and 945 other U.S. installations provide input to a data base to track hardware reliability, and the ratio of error recovery activity to use by device type is reviewed monthly, Sitkin added.

In addition, teleprocessing network costs and volumes are tracked over time to monitor the relationship between expenses and resource utilization by major on-line systems, he said.

Aetna's DP planning and control department presents a quarterly report that provides current status information on all major DP projects to the firm's corporate management committee. This committee is comprised of Aetna's five highest ranking officers, Sitkin said.

MIS Heads Need Business Skills

(Continued from Page 10)

and the MIS manager will be confronted with a diversity of information needs that require him to have a business insight that a DP technician would not have, Belden indicated.

William I. Spencer, Citicorp president, told the conference that "no MIS, however sophisticated, can replace effective line managers. The ability to convert business information to sound judgments is distinctively human."

"That intuitive, gut-level sixth sense we sometimes call a 'good head for business' is actually the ability to assimilate and analyze information so quickly as to seem unconscious," Spencer said.

"Even managers with this knack and with long career experience to draw on should be able to tap the MIS in forming judgments. If the only person who finds a use for the MIS is the company president, something is drastically wrong with it," he added.

Isaacson Named Fellow at EDS

DALLAS — Dr. Portia Isaacson, international authority on microprocessors and home computers and a pioneer in the field, has been named a research fellow by Electronic Data Systems here.

Isaacson will continue writing and lecturing widely to business, academic and professional groups. In addition, she will be working for EDS as a teacher and advisor.

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Mr. Klein is Manager of Data Processing for West Valley Community College District in Santa Clara and Saratoga, California. From its two campuses in the heart of the Santa Clara Valley, home of the semiconductor industry, the district serves over 23,000 students. Approximately 500 of them are enrolled in courses involving direct use of the college's data processing system.

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Parent Locator Service a Success

DP Snare of Runaway Parents Nets $1.6 Billion

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The federal-state "runaway parents" program has helped the states net $1.6 billion over the past two years by using computers to trace absent parents — chiefly fathers — and then forcing them to support their children.

Department of Health, Education and Welfare (HEW) Secretary Joseph A. Califano has deemed the effort a success, pointing out that the funds recovered equal 10% of the national cost of the Aid to Families With Dependent Children (AFDC) program.

And critics who initially called the Parent Locator Service an unwarranted intrusion of the federal government into personal lives — an invasion that would yield little while costing much — are not nearly so vocal.

Califano has directed his aides to try to double the amount collected — from $1 billion in fiscal year 1978 to $2 billion in 1979.

When the program to track down parents of welfare children was pushed through Congress by Sen. Russell B. Long (D-La) in August 1975, leading social welfare experts testified in Senate hearings it would be pointless because most of those sought would have no money for the federal and state governments to collect.

While all the statistics are not yet complete, last year's experience indicates at least half of the fathers traced "Have the capacity to pay some reasonable level of child support and some have rather substantial incomes," according to the deputy director of the Office of Child Support Enforcement, Louis B. Hays.

For example, officials in Sacramento, Calif. working on one nonsupport case discovered the father was a retired military officer who was collecting a pension as well as a salary from a second job and had a total income of $60,000 a year, Hays said.

In another case, in Michigan, a former law student who had divorced his wife years earlier and had fallen $5,000 behind on $20-a-month child support payments was tracked down when his family went on welfare. By this time the man had become a judge.

A Million 'Found' Parents

After just over a year of operation, the Parent Locator Service, which comprises one-third of the effort of the Child Support Enforcement Office, has one million parents making regular payments, when they would otherwise pay nothing to aid their children, Hays said.

Some states have reaped big dividends, he added. For example, in the past year California collected $141 million and Pennsylvania $156 million under the program.

Four years ago, a woman who wanted child support from the father of her children had to go to court or to a state welfare agency, establish paternity if it were in doubt and then seek an order requiring payment by the father. The process required money for legal fees and an understanding of the court and welfare systems; few states had agencies that could provide guidance or take over these responsibilities.

'You Must Learn to Unwind.'

Long changed all that by proposing the amendment to the Social Security Act that created the Parent Locator Service in HEW. The amendment required that every state, as a condition of receiving federal AFDC welfare subsidies, set up a unit specifically charged with finding "fleeing fathers."

The states were required to give assistance not only to welfare mothers, but to any parent with children when the other parent was absent and not participating in the children's support.

Weekly Procedure

Much of the federal assistance to states has been automated or will be within this year, Hays said. Thirty-one states are linked to the Office of Child Support Enforcement through Computer Science Corp.'s Infonet time-sharing network.

Every week, Hays said, his office takes all the requests for information on absent parents and generates computer tapes which are then fanned out to such federal information sources as the Social Security Administration (SSA) and the Internal Revenue Service (IRS).

The SSA responds to these requests weekly, providing Hays' office with the address of the delinquent father's or mother's employer. The IRS provides on a monthly basis (the exchange will become weekly this summer) the parent's home address and some determination of ability to pay child support based on past income tax records.

The HEW child support office also has an automated link to the General Services Administration's National Personnel Records Center in St. Louis, where additional information on all civilian employees of the federal government is maintained.

VA Involved

Still another agency providing income information to the locator program is the Veteran's Administration (VA). So far the exchange with the VA has been manual, but Hays hopes to see it automated this summer.

Once the computer tapes containing the answers to the states' questions have been returned to Hays' office, the data is entered into Infonet and the states either receive a printout of the information on their terminals or get a hardcopy of the data in the mail.

Hays' office is also seeking to help the states with their efforts to computerize by creating Locator program computer models to handle the heavy fiscal and management responsibilities required by law.

The deputy director indicated that privacy constraints on data passsing between his office and the other federal agencies involved in the program are not as great as they are between the state and local agencies and the Office of Child Support Enforcement.

Privacy Enforcement

"We do have to enforce confidentiality of this information by the states to ensure that the data won't be used for anything else," Hays stated. His office enforces privacy by requiring written certification from the states that they will keep Locator information confidential.

In addition, Hays noted, there are routine, on-site audits made of state operations by the federal government.

Some privacy concerns over the program remain, however. Central to these concerns is the provision in the federal law that requires a welfare mother to cooperate in establising paternity and locating the father unless it is determined such action would not be in the child's best interest.

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GAO Finds Agencies Lack Top Management Support Of DP Security Functions

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — A General Accounting Office (GAO) survey of 10 federal agencies has revealed a lack of top management support for computer security, according to Morey J. Chick, a GAO supervisory auditor.

Addressing a symposium on privacy and security sponsored by the Social Security Administration (SSA), Chick reported that the security personnel in these agencies have been given neither the authority nor the independence necessary to effectively guard sensitive and personal data.

Generally located within the DP operations in these agencies, the security offices suffer from fragmented responsibilities and an inability to go directly to top management when problems arise, the GAO auditor said.

The GAO findings will be released in report form within the next few months, Chick added. The study of the 10 agencies, begun in March 1977, surveyed the U.S. Postal Service, the National Park Service, the U.S. Customs Office, the Civil Service Commission, the U.S. Mint, the Department of Health, Education and Welfare's Office of Education, the Small Business Administration, the former Federal Energy Administration and Energy Research and Development Administration and the SSA.

While the GAO has not yet determined what recommendations it will make to the federal government regarding computer security, Chick strongly suggested the need for a separation of the security and DP functions and for top management "support and interest."

"Comprehensive procedures" — to protect individual and business data that could be sensitive and to permit quick action in emergency situations — are a must, he noted.

'Intuitive' Selection

Eight of the 10 agencies surveyed selected their security safeguards "intuitively," Chick stated. No risk management techniques were used to determine which security threats needed to be minimized to bring these agencies in line with such laws as the Privacy Act of 1974.

In all probability, the GAO will recommend that such risk assessments be made. Risk analysis should consist of a data sensitivity study, a determination of where an agency is vulnerable, the potential threats to which the agency is subject, the probability of those threats occurring or being carried out, the safeguards available and the costs and benefits of the safeguards the agency would like to implement.

Even after they are selected, safeguards should be routinely evaluated, particularly when a new recordkeeping system is installed, Chick said.

Because they did not perform risk analyses, eight of the federal agencies surveyed did not know whether they were under- or oversecured, the GAO auditor added.

Neither management nor procedures required the two agencies that conducted risk analyses to monitor the safety measures they had in place, Chick continued.

One agency with a total of 290 data systems, 80 of which contained sensitive information, had only one person manning its security office. "He couldn't monitor the agency's security program all by himself," Chick said.

Another agency, which had its DP operation supported by an outside contractor, never tested the safeguards promised by its vendor, he stated.

Sketchy Training

The agencies polled offered employees little or no training in security measures, the GAO found. One agency provided training on physical security requirements; two others treated their employees to five hours on privacy regulations; still another regularly showed its people a 10-minute film on security, Chick reported.

The GAO believes none of these efforts constitute sufficient security training, Chick said. Terminal users, in particular, need to know about their responsibilities for system security and the vulnerability that accompanies keyboard or CRT access to a DP system.

In its survey, the GAO observed that remote terminals were not locked at one agency, that keys were given out to the janitorial staff and that there was no list of keyholders.

Ineffective Measures

Many security measures were ineffective because they weren't routinely checked by the agencies, Chick stated. For example, in one agency there was no control over building entrances and exits. In another, a television camera had been set up to monitor the computer room, but no one was assigned to watch the screen, Chick reported.

Printouts containing information on individual citizens were found all over the desks of employees of one agency, Chick added.

Some technical safeguards were ineffective because they weren't observed by the agencies. In one instance, several employees used the same password to access their agency's CPU; in another, no effort was made to encrypt or otherwise disguise passwords in the job stream.

GAO headquarters here indicated the report will come out in three months and will probably be sent to Rep. Richardson Preyer (D-N.C.), whose House Government Information and Individual Rights Subcommittee has expressed an interest in the government's computer security.

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Editorial

Fiber Optics

Fiber optics is not the latest thing in technology. The principle of transmitting information on a beam of light have been understood for some time.

Like other breakthroughs, when someone actually inaugurates a commercial application, the technocrats come out with glowing promises on how great it will be.

The transmission of data between a terminal at the Houston city library [CW, April 17] and a remote Univac CPU has some important implications for data communications users.

The biggest hurdle for any network is the availability of economical local loops. These are the connections between a DP user's premises and the nearest central office or terminal of a common carrier, such as the telephone company. Fiber optic cable, compared with copper wire, may be a low-cost method to expand local-loop facilities.

Until now, fiber optic technology has been marking time until some basic features could be worked out. A beam of light cannot make sharp turns like an electrical wire unless the conducting material remains in one piece to carry the beam without interruption. And the splicing of a glass conductor must be done with precise alignment to be sure the light is not interrupted in its path.

These problems are being worked out and the viability of fiber optic links, at least for short-haul transmissions, is growing. For longer haul links in which optical repeaters are required, the cost may be less attractive.

From the user's standpoint, signals are converted from electrical to optical impulses and the technology is essentially transparent to existing DP equipment. Another benefit is security — data sent over a light path cannot be tapped in the way electrical signals can be intercepted by unauthorized eavesdroppers.

Presumably, once a fiber optic link is properly installed, very little can go wrong with it as long as the integrity of the optical path is not altered.

All in all, this form of transmission promises significant, if not startling, benefits for users in certain applications. Hopefully Univac and others will continue their research to make this technology commercially available at an early date.

Watching Job Trends

Programmers and systems analysts don't really need the U.S. Department of Labor to tell them that their jobs are changing and will continue to change over the next few years [CW, April 17].

But the labor agency's review of the occupational outlook for such DP workers should help to emphasize the changes that are occurring and alert programmers and analysts once again to the need to keep up with changes in technology and the marketplace that will affect their careers.

Although the analysis by the government agency is rather superficial, it does note the movement toward smaller computers in many applications, which will change the way analysts and programmers work. It does not, however, discuss the probably longer lasting effects of moves toward structured programming and the like that attempt to make programming into more of an assembly line technique.

Both of these moves will have wide-ranging effects on the way DPers work and even on the type of people that might be attracted to the computer field over the next decade.

All programmers and analysts — as well as managers — would be well advised to keep current on the changes occurring in the industry in order to be in a position to take advantage of them as they happen.

Data Past

Five Years Ago
April 25, 1973

TULSA, Okla. — Relying almost solely on previously secret IBM documents to prove its claim that IBM used monopolistic practices, Telex began its $1.2 billion antitrust case against IBM here.

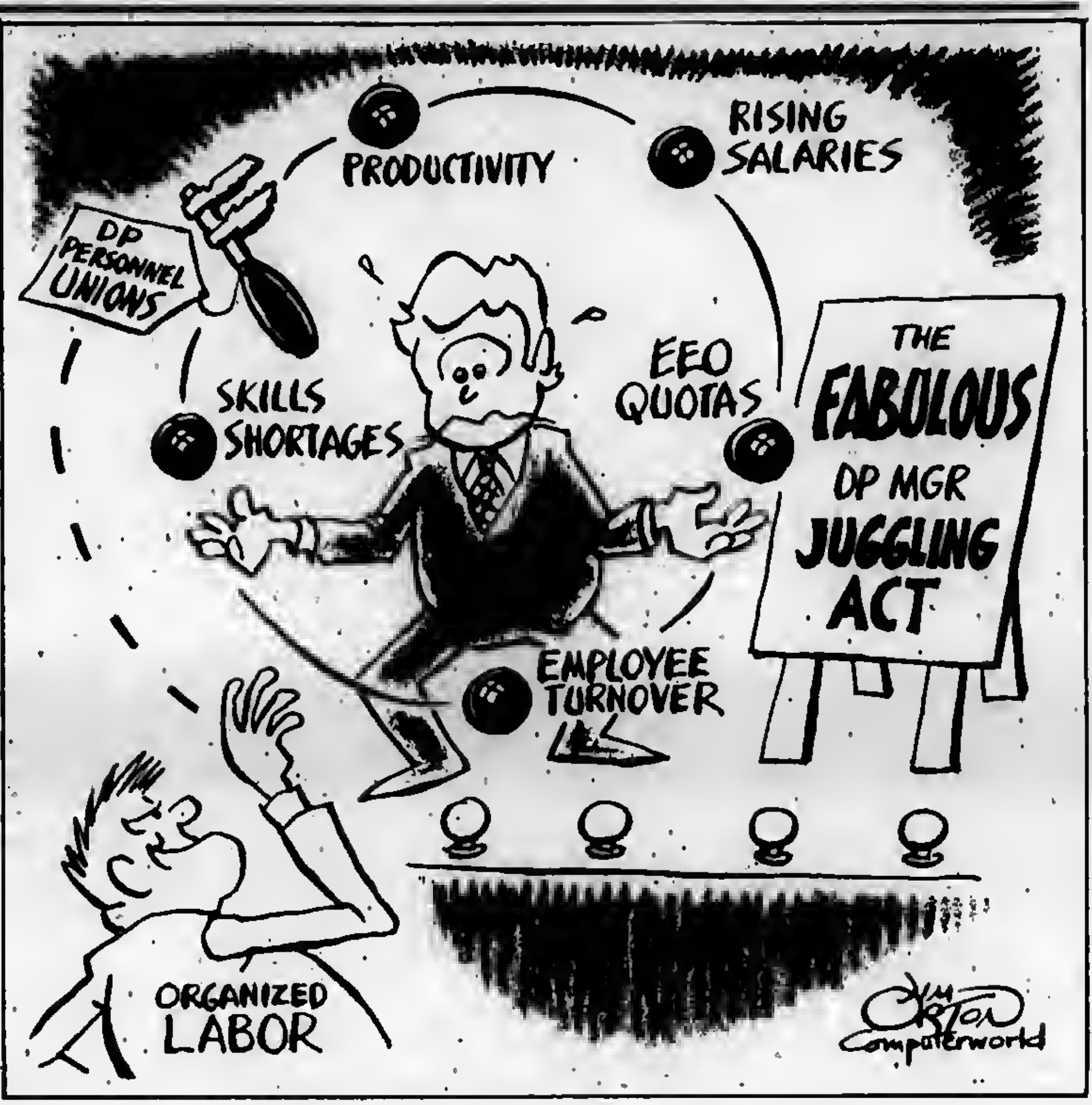
— — —

LOS ANGELES — County supervisors filed a civil suit in Superior Court here against Ampex Corp. seeking $4.25 million in damages against the firm for not living up to an $8.1 million contract to provide a sheriff's video-file system.

Eight Years Ago
April 29, 1970

MONTREAL — Ten students were convicted of "conspiracy to obstruct the use of a computer center" in the Feb: 11, 1969 burning of a DP center at Sir George Williams University. The students were acquitted of conspiracy charges relating to the destruction of the computer; if convicted, they could have received a sentence of life imprisonment.

The students had occupied the center for two weeks in a dispute growing out of a charge that a biology professor never gave black students grades higher than "C." When the police arrived on the last day of the occupation, students threw printouts, tapes, cards and small pieces of equipment out the windows. When the police tried to oust the students, a Control Data Corp. 3300 was smashed with axes and the center set on fire. The loss was estimated at $1.6 million.



Letters to the Editor

Hardware Not to Blame

I must state my objection to the tone set in "Kentucky County Claims Multiple Benefit Without IBM 3270s" [CW, April 10].

I am not an IBM employee and never have been, but one cannot lay the blame for the Jefferson County fiasco on hardware.

My shop is currently running 65 IBM 3270 CRTs on-line to a 370/145 for nine hours a day. If our 145 goes down once a week, it is unusual and our CRTs *literally* never go down.

If Jefferson County has a problem, it was caused by uninformed users expecting the world from a DP department that is apparently inexperienced in on-line systems, data base design, telecommunications and user relations. I am forced to conjecture as to the situation there, but I must ask: Did the users really want to be automated or was it forced on them? Who "sold" Cars, IBM or the DP department? Was this the first on-line system? Was data base involved? Was adequate training provided for DP and the user?

I agree that IBM has marketed some "turkeys" in the past, but to blame the hardware and software is a little much and to categorize these problems as a "classic textbook case" is unforgivable. In today's technology, the only thing that is classic and textbook is the inept DP personnel who give the rest of us a bad name by their failures, or more politely, their lack of successes.

Paul J. Goldak
St. Louis, Mo.

They've Been Around

While I congratulate Cybertek Computer Products on the announcement of its new operating systems for Interdata, Inc. computers, I must chide *Computerworld* for choosing the headline "Interdatas Get Multitasking" [March 27].

Interdata has offered multitasking operating systems for its product lines for many years. In 1970, RTOS was available for 16-bit users. It was superseded in 1976 by OS/16 MT2, an advanced multitasking environment for user applications written in Assembler, Fortran or Basic.

Interdata pioneeered the era of the supermini with the introduction of the 7/32 in 1974. As early as January 1975, OS/32 provided a multitasking environment for Assembler and Fortran users. Today, Dynamic OS/32 MT, OS/32 MTM and the Interdata Transaction Controller provide a comprehensive set of operating environments. The event-driven, multitasking environment supports a variety of real-time applications. Time-sliced multiaccess is provided for interactive terminal users who can program in a variety of languages.

David J. Saunders
Product Manager, Software
Interdata Division
Perkin Elmer Corp.
Oceanport, N.J.

Price 'More Than Nominal'

"EFT Systems? No Thanks, Not Yet" [CW, Jan. 9] mentioned the availability of a newsletter, "Cabin," and the proceedings of a Dallas seminar. An address was provided.

I wrote to the office of the National Consumer Study of Electronic Funds Transfer in Washington, D.C., indicating an interest. The group responded with a request for a $50 check for the seminar proceedings and an additional $50 check for a subscription to the newsletter.

The article should have indicated the charge is more than nominal.

Arlan R. DeKock
Rolla, Mo.

Article Stresses Understanding

Culture Gap Seen Between DPers and Users

By Jack Stone
Special to CW

Cultural differences between the DP department and user groups are important topics I always include in my lectures, and DP management development programs.

Recently, my mail brought me a publication which did a superb job of bringing the subject into much sharper focus for me. Ronald S. Kintisch, president of Executive Services, Inc. of Abington, Pa., sent me a reprint of an article he coauthored with Marvin R. Welsbord of Block Petrella Associates, Inc. dealing with this cultural gap. "Getting Computer People and Users to Understand Each Other" appeared in the American Management Association's *Advanced Management Journal*, spring '77 issue.

Let me share its ideas with you.

The writers pointed out that the DP department/user schism is not really a new phenomenon. C.P. Snow, they noted, first raised the isue in his book *Two Cultures and the Scientific Revolution*. Snow expressed the belief that the attitudes, behavior and even the language of the scientist and the nonscientist are so different that in effect, they define separate cultures.

He went on to write; "Between these cultures is a dangerous gulf of mutual incomprehension. It is dangerous because the scientist is leading the revolution without much direction and understanding from the rest of us, perhaps creating a world in which none of us would want to live." The statement well characterizes the situation in most computer centers today.

Kintisch and Weisbord echo Snow's sentiment: Business and government continue to live through a computer revolution mainly directed by computer people, not by management or by those who use computers . . . The computer people often do not understand the company's needs, and the users are alienated and resentful. Although there are exceptions, the specialists and users approach problems differently, use different languages and have different goals."

Goal Orientation

The writers then examined the cultural differences in more detail. First, they said, there are differences in goal orientation. "The computer specialist is interested in applying the latest computer technology to the problem at hand — to solving the problem in the most elegant way. He is the agent of change. The user wants the cheapest, simplest, most workable solution to a problem, not the most elegant. Change represents an added burden to him, and he may feel personally threatened by it."

Second, there are differences in time orientation, where the computer person works on development projects that are relatively long term. To a user, such projects appear to be theoretical.

The third difference is the gulf in interpersonal orientation. It's not news that computer people tend to be problem-oriented and that users tend to be people-oriented.

The Human Connection

Finally, there are differences in organizational structure. The usual computer department allows more freedom and less formality than the user department. The DPer is more project-oriented compared with the hierarchical structure in which the user lives. And the computer person's performance is difficult to measure as contrasted with the situation of the typical user, whose performance is often measured according to long-established standards.

Management Strategies

The writers did not advocate restructuring the cultures in order to get the users and computer people to work together. Instead, they suggested special management strategies are necessary to have them work as teams. Here is what they said on how to handle the culture clash.

- "The user and the computer specialist must both feel they have a great deal of influence over the team's decisions." This implies the user should not only have an important say in making the decisions, but understanding the key issues, particularly the technical ones.
- "Team members should be at a level in their own organizations to have both the knowledge and the authority needed to make the best decisions." Unfortunately, most user teams are composed of individuals too low on the ladder. The user department's members often effectively abdicated their responsibility in the project, and the computer members take over.
- "The team should not be afraid to examine differences candidly and to resolve them through discussion." Of course, this rarely happens. People avoid conflict like the plague. In addition, to be effective and candid requires a large measure of self-confidence, substantial mental discipline and superior skills in dealing with people. (There aren't too many of these folks around.)
- "The time, goal and interpersonal orientation of the team leader should be midway betweon those of the computer specialist and the user. (And the same for the leader's organization.)" He must be viewed as independent of any point of view except project success.
- "The leader must command respect from the team by virtue of his knowledge and position." He should be not merely a mediator or coordinator, but in fact a real leader.

Recruiting Abuses Rumored

Readers See Some Dangers in Headhunting

Rumors about unethical practices of the recruiting industry have abounded for years. However, never having worked with a recruiting agency myself, I did not think about them much until readers wrote me suggesting there were more than minor abuses. As a result of mentioning this situation [CW, Feb. 27] I have received a number of informed descriptions of recruiting practices from inside the agencies, from customers of these agencies and from people who have been hired through them.

The Taylor Report
By Alan Taylor CDP

The situation can be dangerous. There are many cases of honest behavior, but no assurance can be given to the person being recruited through these agencies that details of his resume will be kept private. There are many occasions when, for one reason or another, material is not kept confidential, either at the time of recruiting, at the time of placing or subsequent to placement.

This is perhaps not surprising, because normally the person being recruited is not paying the agency. Even if he is, the amount he pays is inconsequential compared with the amount some employers regularly pay for multiple placements.

Suggested solutions varied, but readers basically advised that if you have a large employer that dominates a particular recruiting agency, then don't go to it. Pick one that has less dangerous connections. Another suggestion is to disguise your connection with your current emplyer by using a coded name or other means.

Most of the danger springs from being blacklisted by the current employer, although on some occasions, it appears blacklisting can be done by a group of employers working in concert.

Employer Victims

Equally interesting, though, employers may also be victims. This comes about when the personnel department receives applications from, or leads to, worthwhile people other than through a favored agency. Different versions of this scheme work if these leads come directly to the personnel department or from a less favored agency.

The technique is to credit an agency with recruiting it did not do and see that it is paid by the firm. Usually, the agency, in one way or another, rewards the person giving it the tip-off to go "recruit" an already-selected job applicant.

Another method is to have the agency put in a bill to the personnel department that is honored without the candidate or his technical management being aware of it.

This employer-victim situation seems to be prevalent in organizations that have frequent demands for hiring and rehiring.

In some cases, the scheme has apparently been detected, and a system of giving bonuses to employees of the firm who supply successful recruiting leads has reduced the number of candidates available for the false credit scheme.

However, the door is still wide open when a candidate replies to an advertisement, and the reduction in available targets does not translate into a reduction in manipulated referrals.

Still Valuable

It is interesting to notice that despite the abuses, no one has suggested the headhunters don't fill some useful purpose. None of the many writers gave any details, for instance, regarding headhunters falsifying the characteristics of an applicant more than in a comparatively minor way — and even then it appears it was done with the consent of the applicant.

Nor does there appear to be any general use of blacklists against any category or individual, except where these were originated by the firm that was the headhunters' best business contact.

It appears that firms' internal auditors should consider reviewing the controls over payments to headhunters, just as the people who want jobs should be awaro that no matter what their own ethical standards are, they cannot guarantee the ethics of the headhunter. They should therefore proceed cautiously.

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'Face It, Melmoth — Your Systems Just Aren't Integrated Anymore.'

Battle Between Languages Merely Political

By Miles Benson
Special to CW

Sociology of Computing

Languages can be status symbols. Remember the story about Ourownia, a programming language which turned out to he functionally identical to the Marketronics company's PL/PI and which existed only because a government agency wrapped its ego around having its own language?

If you found that story hard to believe, then you won't believe this one at all. Because this is the story of a competition between two such languages in a winner-take-all battle.

And the battle — cross my heart and hope to Cobol — is taking place even as we speak.

For openers, we need to disguise the two programming languages. Let's call them Ourownia 3B and Ourownia 73. O3B and O73, for short.

Then let's disguise the ego-invested agencies. Let's say that O3B is the choice of the Division of Social Services (DSS) and O73 is the darling of the Division of Consumer Services (DCS). And let's assume that supervising these two divisions is the Cabinet-level Department of Public Concern (DPC).

Now, let's look at a little history. Ourownia is the generic name for all languages defined by the DPC. DPC, aware that a proliferation of languages has occurred in its domain, is trying to slam the door on that problem by choosing one standard.

Getting that door shut is proving something of a dilemma. The political problems, arising from each Ourownia splinter group backing its own language, are horrendous.

But wait — DPC language specialists, aware they must solve the political problems first, have neatly finessed the politics and the inevitable confrontations by moving toward a new language, to be called Ourownia '80 (for 1980).

Whether Ourownia '80 is good or bad is irrelevant. What is relevant is the reactions of people in DPC to this kind of change.

Back to the history. Ourownia '80 finessed the political problems for the DCS next-generation language, right? Except for one. How do you get there from here?

I mean, in 1980 the whole DCS world switches over, OK? But in the meantime, to make that event feasible, you have to stop the proliferation and even weed out a few of the bad guys.

Well, now we're back to our original story line. The target goal for DCS is to narrow the number of acceptable Ourownias to three. It's what the Ourownia '80 folks are calling the "interim list."

Throwing out the first half-down or so Ourownias proved easy. Picking the top two of the existing Ourownias wasn't bad, either.

It was when the time came to pick the No. 3 language that all political hail broke loose. Ourownia 3B and Ourownia 73 backers, sensing that supporters of the loser will no longer have anything to back, are flailing away at each other with all the might only a good political brawl can muster.

Sometimes I really wonder who represents Public Concern in the government. I mean, it's certainly not those who are pouring their energies into getting their programming language chosen as the standard.

Take a "for instance." The company where I work, Softpro Software, has a large contract with DPC. That job is being coded in Ourownia 73. Recently we were asked, under the terms of our contract, to evaluate the impact on cost and schedules of changing over to Ourownia 3B.

Well, the changeover wouldn't be cheap. Neither, in fact, was the evaluation. And every company doing work for DPC and using O73 or O3B, as I understand it, is being asked that same question.

In the political world, it's called "gathering data." In the lingo of the folks back home, it's "wasting money." The irony of it all is, of course, that both are right. But how do you avoid wasting money in a world of imperfect politics?

Actually, there is one other irony here. You may have noticed that nowhere in this story have I mentioned the technical capabilities of O3B and O73. I mean, one or the other must be a better language, right? Why not select the winner by a technical scoring process, instead of a political power play?

The answer to that is the saddest of all. There is no technical difference. Both of the impacted divisions agree O3B and O73 are both capable of doing the job.

The battle, if there is to be one, *has* to be fought on political lines.

Well, there you have it. Not one, but two (count 'em, two) duplicative languages, slugging it out to see which will be the third-string member of an interim list.

Sad as it may seem, computing folks can be just as dumb for the sake of politics as those in any other field!

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Character Design Also Backed

IBM 3800 Gives Graphs With Reports

WHITE PLAINS, N.Y. — IBM has released a pair of Field-Developed Programs (FDP) designed to enhance the use of the company's 3800 printing subsystem under a variety of operating environments.

Business Graphing on the IBM 3800 is an assembler module that uses new functions to provide the capability to generate graphs at the same time reports are printed. The resulting graphs can present mulitple plot lines with identifying text and references, a spokesman said.

The IBM 3800 Interactive Character Design FDP reportedly enables users working under a number of operating systems to simplify and shorten the extensive interactive process normally needed to create and debug standard or special characters and logs for the 3800.

The character set design logic can be used under the Time Sharing Option (TSO), the Virtual Machine Facility/Conversational Monitor System (VM/CMS), Virtual Storage-Personal Computing, OS/VS or the Automated Text Management System II under OS/VS. A separate FDP is available for each of these environments, the spokesman noted.

User-Controlled Graphics

Under the Business Graphing FDP, the user controls the form and size of the graphic output. The graphs are printed a line at a time, starting at the top of the graphs, and both lines and text are created through a series of dots, 24 dots to the inch both horizontally and vertically, IBM said.

The software operates as a subroutine to the user's program, which can be in Assembler, Cobol or PL/I. The subroutine is said to be system-independent, running under OS/VS1, SVS or MVS.

Listed by IBM as 5798.CRB, the package is available under license for $225/mo for 12 months.

The Interactive Character Design FDP consists of several modules: a set of skeletal modules that provide the JCL needed to use the IEBIMAGE utility; a set of character design dot matrices formatted by pitch; and modules designed to create COPY-MODS and character test programs.

Although there are separate FDPs for each user environment, each costs $165/mo, which is waived after the billing of 12 consecutive months.

As with all FDPs, these are provided "as is" with central service provided only until Jan.31, 1979. The service is limited to either "issue of corrected code or notice of availability of corrected code" when problems are reported.

'Infotrieve' Eases Use of Novas

IRVINE, Calif. — The Infotrieve and Infomat packages now available from Educational Data Systems were designed to give the non-DP-trained user an access route to the capabilities of the company's Iris operating system for Data General Corp. Novas.

Infotrieve, a CRT-oriented query system, operates on a wide range of file types including those with formatted, contiguous and indexed random organizations. The utility is said to be self-guiding in operation; it does not require any memorization of formats or protocols, a spokesman asserted.

Infotrieve includes subsystems for definition of files, creation and modification of records and protection of fields at the read/write level. The query capability allows the user to search the data base and identify segments that satisfy relationships of expressed interest, the spokesman said.

Records satisfying the user's criteria are displayed on a CRT or directed to a line printer for hard-copy output. If authorized, the user can also modify selected fields before they are displayed or printed, the spokesman noted.

Infomat is a general-purpose report writer that uses the selection facilities of Infotrieve but extends the formatting facilities of that package to meet virtually any user need, the vendor said.

All formats are designed interactively at the CRT with no need for conventional programming, the spokesman added.

Most of the expected capabilities are available including support for multiple control breaks and the accumulation and printing of subtotals and totals. Page headings, column headings, pagination and other format niceties are also provided.

Once created, procedures for report generation can be stored and later invoked for repeated use, the spokesman noted.

Infotrieve costs $2,000. Informat by itself cost $1,000, but because it requires Infotrieve to function, the total cost to a new user would be $3,000. Educational Data Systems is at 1682 Langley Ave., Irvine, Calif. 92714.

'Focus' Set to Access IMS Data

NEW YORK — Information Builders, Inc. (IBI) has completed an interface between its proprietary information control system, Focus, and IBM's data base management system, IMS. The report generator features of Focus are now transparent to the IMS user, according to IBI.

Among the Focus facilities available to the interface user are graphics, financial modeling and statistical analysis subsystems and a nonprocedural report request language, a spokesman said.

Focus itself was developed to support both the DP professional and the novice. The focus report request language uses simple English statements to screen, sort and format data; it also includes computational and logical facilities that exceed those of many programming languages, the spokesman claimed.

Shared Hierarchies

Creating and maintaining Focus files is done through a nonprocedural language. Various structures are available, the most complex providing multipath, shared hierarchies in which any segment can be viewed as the top of the file and any number of physically separate files can be logically interconnected, IBI said.

Focus was designed to run on IBM 370s including the Model 135 and Model 138 in batch or Time Sharing Option (TSO) mode under OS/VS, as well as in Conversational Monitor System (CMS) mode under IBM's Virtual Machine Facility (VM/370).

Available on Tymshare's remote computing network, Focus can be acquired for in-house use for $39,000, with the IMS interface adding $8,000 to the purchase price.

The Focus package and IMS interface can also be leased for $1,175/mo, the company noted from 254 W. 31st St., New York, N.Y. 10001.

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'MCS3000' Aids HP-Based Communications

E. LANSING, Mich. — A "major new release" of the transaction processing and network control program MCS3000 is now available from Systems Research, Inc. for use with Hewlett-Packard Co. HP 3000-II minicomputers, according to a spokesman.

MCS3000 ties the HP 3000 with one or more HP21MX-E front-end processors and system software to provide host-independent communications processing, including terminal handling, message prioritizing, message queuing, transaction-based security and forms handling, he said.

With the use of the front-end design, all overhead associated with message processing is external to the HP 3000.

MCS3000 enables several communications protocols and terminal types to be used in combination. The software supports synchronous communications up to 19.2 kbit/sec and asynchronous work up to 9,600 bit/sec. Standard protocols include IBM's Bisynch, Burroughs' poll-select and HP's 264X page mode, the spokesman said.

MCS3000 is said to support a sustained data input rate of 30,000 char./sec on up to 208 point-to-point terminals, up to 40 multidrop lines or a combination of both. The system's store-and-forward capability allows it to interface with remote hosts such as IBM 360s or 370s, the spokesman said.

System functions include on-line network generation and status control over users, terminals and application programs. Also included is a Cobol program "skeleton" that includes all data areas to simplify application development.

CRT display forms are created on-line regardless of terminal type. MCS3000 then "maps" appropriate forms mode control characters for each device type in the network.

A turnkey MCS3000 system including software and a single front-end processor is available for $60,000. A dual front-end configuration costs $125,000, Systems Research, Inc. said from 241 E. Saginaw, E. Lansing, Mich. 48823.

Interface Backs IBM 3, 370 Ties

MILWAUKEE — The Communications Interface Program from Medistat is said to maximize the interactive capabilities of any installation using both IBM 3 and 370 hardware, if IBM's IMS data base management system is available on the 370.

The package establishes on-line, real-time communication between the IBM 3 and the host 370, permitting concurrent processing of local and remote data. It supports CRT-based inquiry and update, batch transmissions and report retrievals, a spokesman said.

The increased flexibility provided by the interface is said to lead to a system that is a combination of centralized and decentralized processing, easing hardware upgrades and minimizing the impact often associated with changes in the corporate environment.

The interface is accomplished using IBM's Communication Control Program (CCP) on the 3 and the Intelligent Remote State Support component of IMS on the 370. Since the architecture of the 3 and the IBM System/34 are similar, the software should work on the 34 as well, the spokesman added.

Written in Assembler and requiring 12K bytes of memory, the interface runs as a task under CCP and is CPU-active on a demand basis only, conserving resources on both satellite and host, he said.

Developed to enhance the use of Medistat's own data center here, the interface costs "about $6,000" and can be ordered for immediate delivery from the company at 4115 N. Teutonia Ave., P.O. Box 459, Milwaukee, Wis. 53201.

MVS Time-Sharing Eased Under 'Tone 4'

GARDEN GROVE, Calif. — An MVS version of the Tone 3 time-sharing support package currently available for IBM OS/VS1 will be ready for release in July, according to the vendor, Tone Software Co.

The new product, Tone 4 MVS, provides the user with all the capabilities of standard IBM Time-Sharing Option (TSO) but with a significant reduction in memory and access time requirements, a Tone spokesman claimed.

Tone users may, through terminal commands, create and edit data sets, submit jobs and scan output; and interactively compile, link edit and execute programs and utilities. Working in this mode, users save paper costs since hard copy is avoided until it is needed, the spokesman noted.

Tone 3 — and presumably its successor — is a completely virtual system, without any page fixing. The modules are completely reentrant to minimize working set page counts.

Tone supports IBM 3270s, 2740s and a range of other terminal units. Enhanced 3270 support is said to include informational screen formatting and prompting, 133-character "logical windowing" and instant interrupt capability.

The system runs on CPUs ranging from IBM 370/135s with 384K memory to a 370/168 with 3M bytes of memory, the spokesman said.

Orders for Tone 4 MVS are being accepted for deliveries starting July 1. The enhanced software costs $500/mo, Tone said from 11588 Trask Ave., Garden Grove, Calif. 92643.

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DOCS is currently used in over 250 installations world-wide including diverse businesses and US Army bases.

DOCS is available from CFS, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

SPEED
DOCS provides significant through-put improvement by the very nature of the speed of the 3277 display unit alone. Operators can even pre-answer messages on the console.

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DOCS allows from 1 to 16 3277 display unit consoles to be used simultaneously as SYSLOG devices.

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DOCS provides a separate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a background partition problem program. A unique Interrupt key is provided for each DOS/MVT region.

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Send requests for DOCS to CFS. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:

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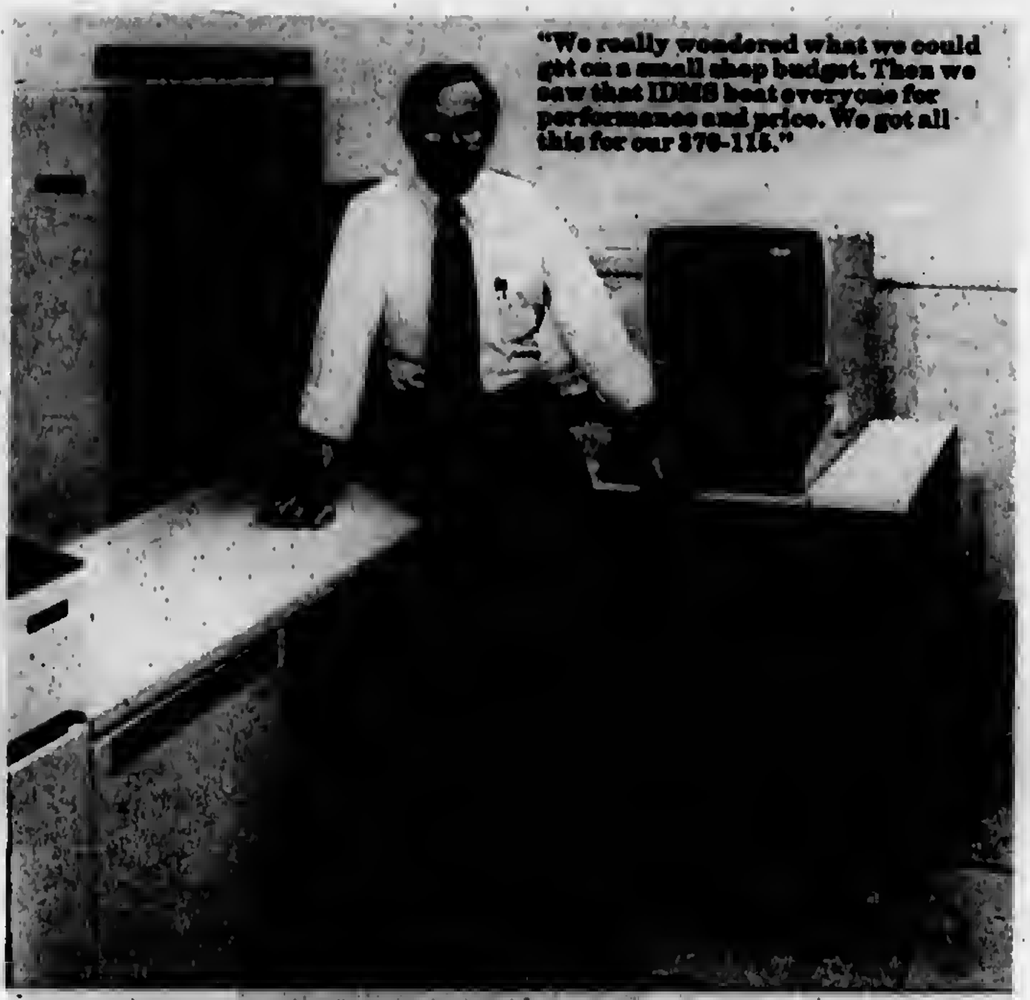
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Nucon to Key on Management

NEW ORLEANS — "Management of DP" is the focus of the NCR Users Conference (Nucon) to be held April 30 through May 3 at the Fairmount Hotel here.

Keynoting the general management sessions will be Ira M. Hayes, an assistant vice-president of NCR, who will speak about "Keeping Pace With Tomorow." Others on the agenda include *Computerworld* columnist Jack Stone, discussing the importance of the human connection in DP, and consultant James F. Towsen, focusing on "Why Managers Fail."

Benjamin R.W. Knowles of Brandon Systems, Institute, Inc. is scheduled to lead a trio of sessions dealing with planning. "User Application System Planning" will be followed by "How to Develop a Long-Range DP Plan" and then "Pitfalls in Long-Range DP Planning."

In addition to general management presentations, the conference will feature programs addressed to users of Criterion and Century CPUs and NCR's smaller X99 system.

There will also be talks about user-developed and installed applications programs, terminal products and software services, the firm noted.

A special four-hour seminar, "Structured Programming for Management," will be held on the afternoon of May 3, just after the regular conference.

Interested users who have not already registered can do so at the conference, which carries a fee of $150. Additional information is available from General Chairman Grace Householder at Weirton General Hospital, St. Johns Road, Weirton, W.Va. 26062.

'MTX-11' Drives Micros

WALNUT CREEK, Calif. — A multitasking executive for Digital Equipment Corp. PDP-11 minicomputers and LSI-11 microcomputers, MTX-11 from Virtual Systems, Inc. (VSI) throughput and efficiency, a VSI spokesman claimed.

MTX-11 executes multiple tasks on an interleaved basis, he said, with user-set priorities determining what to execute if competition exists for the CPU or other resources.

Rapid response times and high data throughput make the software a "most attractive enhancement" for systems in real-time process control, data acquisition and data communications environments, the spokesman asserted. MTX-11 is also the "ideal foundation" for time-sharing and general-purpose operating systems, he said.

Costing $1,395 plus $100 per CPU, the package is a member of the Microbench family of programs for microcomputer applications development. VSI is at Suite 406, 1500 Newell Ave., Walnut Creek, Calif. 94596.

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Dictionary Enhanced

DENVILLE, N.J — Level 3 of the HSI Data Dictionary package from Haverly Systems, Inc. (HSI), developed for use with DMS/1100 Level 6 data bases on Univac 1100 hardware, is said to help data base administrators manage all data and programs in their installations, even if they are not under the data base system.

Unique features of the enhanced software are the schema and program analyzers that "greatly facilitate" the entry of data into the dictionary, according to HSI.

The analyzers read the user's production or test schema or programs and capture desired data directly.

The HSI Data Dictionary uses DMS/1100 as its own data base handler to support descriptions of data base structures and cross-references to programs using them.

The base HSI Data Dictionary costs $14,300; the fully extended version, $22,000. A minimum six-month lease costs $785/mo, the vendor said from 76 Broadway, Denville, N.J. 07834.

Package Aids Use of PDS

HOUSTON — Gulf Computer Sciences, Inc. has an enhanced release of its Partitioned Libraries Management System (PLMS)

PLMS was designed to support the use of partitioned data sets (PDS) in an IBM OS or OS/VS environment with, for example, a tape dump/-restore facility that allows retrieval of dumped material by member and not necessarily by whole data set.

While it is supportive of the programmer, however, PLMS also includes various audit facilities so PDS can be restored right up to the point of a system problem, a spokeswoman noted.

PLMS II extends member Update control beyond the linkage editor and IEBUPDTE to such functions as Copy, Rename, Catalog, Uncatalog and Scratch, while retaining full backup and audit capabilities for these functions, Gulf said.

PLMS II supports expanded member passwords including passwords assigned by the user. The package also enables the restriction of installation-specified utiities which, uncontrolled, would have the ability to modify PLMS-controlled libraries, the spokeswoman claimed.

PLMS II costs $8,000 and is available from Gulf Computer Sciences, Suite 160, 1775 St. James Place, Houston, Texas 77056.

CAI Backed on PDP-11

PHILADELPHIA — A computer-assisted instruction (CAI) package for any Digital Equipment Corp. PDP-11 minicomputer or LSI-11 microprocessor has been introduced by Advanced Interactive Systems (AIS).

Called Avid, the package permits students to ask questions in colloquial English, directing the system to a lesson or portion of a lesson.

Student Records

Avid also has facilities for response-contingent presentation of textual and graphics information for student record management and for the controlled administration of examinations, AIS noted.

Single-user systems including a graphics CRT cost upward of $12,000; four-user systems start at $24,000, AIS said from 8216 Pickering St., Philadelphia, Pa. 19150.

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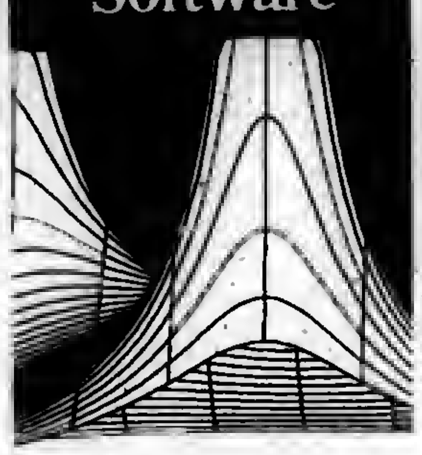

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DP Dialogue

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Notes and observations from IBM
that may prove of interest to
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SDLC at Seibels, Bruce: Flexibility and Economy

The property and liability insurance business of Seibels, Bruce & Company is conducted through more than 300 online terminals — one for every two professional employees. Underwriters, claims adjusters, investment managers, and others in many locations all access a common data base, resident on an IBM System/370 Model 168 at company headquarters in Columbia, South Carolina.

The Seibels, Bruce network grew from 32 local terminals to 300 units across the continent in a period of two years. The company attributes sharp rises in productivity to the computer system. "Operating expenses used to be 34 percent of premiums," explains G. Larry Wilson, senior vice president. "Now they are down to 28 percent. Using terminals, some of our underwriters have experienced work output gains as high as two to one, while an increase of 25 percent is typical.

Why SDLC?

"The extremely rapid growth of our network," Wilson notes, "was our reason for looking at SDLC." Synchronous Data Link Control (SDLC) is an advanced line control discipline for communication between terminals and a computer. It is a key element of Systems Network Architecture, IBM's most advanced telecommunications technology.

"SDLC accommodates a dynamic network," Wilson says. "We can add terminals or replace one type with another without adding telephone lines. We can put as many as 62 visual display terminals—more than twice as many as before—on a single line.

"The architecture permitted us to phase in SDLC one line at a time. The Network Control Program in our 3705 Communications Controller took over such functions as polling and error recovery on SDLC lines, freeing capacity in our 370/168. The 3705 can accomplish an error recovery on one line while the rest of the system continues to work normally."

Consistent Response

Response time of the system to terminal inputs, Wilson reports, was significantly improved by SDLC. "But even more important is the greatly reduced variation in response — within three seconds more than 90 percent of the time. Users work more easily and make fewer errors when the system responds consistently.

"One additional benefit relates to our data communication link via satellite to other sites. There is a propagation delay through a satellite that can be troublesome under the older line disciplines, but SDLC tolerates it without any difficulty."

Minimizing the number of leased telephone lines has also held down the required number of modems and other line-terminating equipment, Wilson points out. Today's network costs the company no more to operate than did the considerably smaller configuration, a year and a half earlier.

Seibels, Bruce uses one visual display station for every two professional employees. Synchronous Data Link Control lets the company add or replace terminals easily, without adding telephone lines.

Who's Zoo: A Social Register for Animals

One American zoo needed a Celebes ape not long ago. Another needed an echidna (or spiny anteater). A computer helped each identify a zoo with a surplus of the desired animal.

The American Association of Zoological Parks and Aquariums, in conjunction with Federal agencies and private foundations, sponsors a project that some day will store data on every animal in every zoo in most countries of the world. The association's International Species Inventory System (ISIS), headquartered at the Minnesota Zoological Garden, Apple Valley, has already placed in an IBM computer detailed information on 25,000 mammals and 10,000 birds located in zoos in the United States, Canada, and Europe. ISIS will someday also include data on reptiles, amphibians, and fish.

A Vital Task

Says Janice M. Olsen, systems manager of ISIS: "A vital task of modern zoos is to develop and maintain self-sustaining populations of captive wild species and—in certain cases—to provide the only reservoir of species on the verge of extinction. To do this, we must collect data and share it.

"ISIS tells us the captive numbers and reproductive rates of animals on the endangered species list, such as the Indian rhinoceros, Siberian tiger and orangutan. This information aids the development of breeding management programs for captive wild animals."

Finding Rare Mates

Another valuable service of ISIS—the acronym spells the name of the Egyptian goddess of motherhood and protection—is the finding of a mate for a rare species in a zoo that does not have one of each sex. The computer, which is an IBM System/370 Model 158 in the state data processing center in St. Paul, Minnesota, helps to match animals needing mates with available candidates, to the benefit of the rare species themselves and of zoos all around the world.

The International Species Inventory System (ISIS), a computer data base of animals in zoos, is helping endangered species like this Siberian tiger.

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Net Offering 'Librarian'

WOODBURY, N.Y. — The Librarian source program management system from Applied Data Research, Inc. (ADR) is now available on Calldata Systems, Inc.'s TS RJE/Batch remote computing service.

The Librarian supports storage of source programs, test data and job control language statements on disk, including the commands needed to alter stored material in a variety of ways and in an orderly and annotated manner.

The advantages of The Librarian fall into two basic areas, according to Calldata. Programmer benefits include fast, efficient updating, detection of grammatical and keypunching errors and support for a scan facility, enabling the user to search for any given string of characters.

Benefits accruing to management are said to include a summary report of the status and attributes of all programs under Librarian control; documentation including a record of specific changes made in individual programs; and job stream generation.

While using The Librarian on the Calldata network supports other work by the user in that environment, it may also provide a means of testing the package prior to acquiring it from ADR.

The Calldata service is available nationwide. The network is headquartered at 20 Crossways Park North, Woodbury, N.Y. 11797.

Utility and Its IMS Interface Ease Insurer's Operations

LOS ANGELES — Occidental Life of California, a subsidiary of Transamerica, is rapidly altering its IMS data base structure to more easily accommodate a vast and growing appetite for facts and figures, according to two auditors.

Dick Ryan, assistant general auditor, and Gary Hill, senior DP auditor, use a pair of IBM 370/168s under MVS. In addition to DYL-260 and the DYL-IMS/DL1 interface from Dylakor Software Systems, Inc., the Occidental system utilizes IBM's IMS Advanced Life Insurance System (Alis) and Pansophic System, Inc.'s Panvalet.

Extensive on-line facilities have been established tying corporate headquarters here to sites in other cities.

One of the first major applications for the DYL-260 report writer/utility package was the processing of complex, variable-length Alis files. The master file for the life insurance portion of this system normally resides in a six-reel file. DYL-260 was put to work extracting pertinent data and condensing it to one reel of tape.

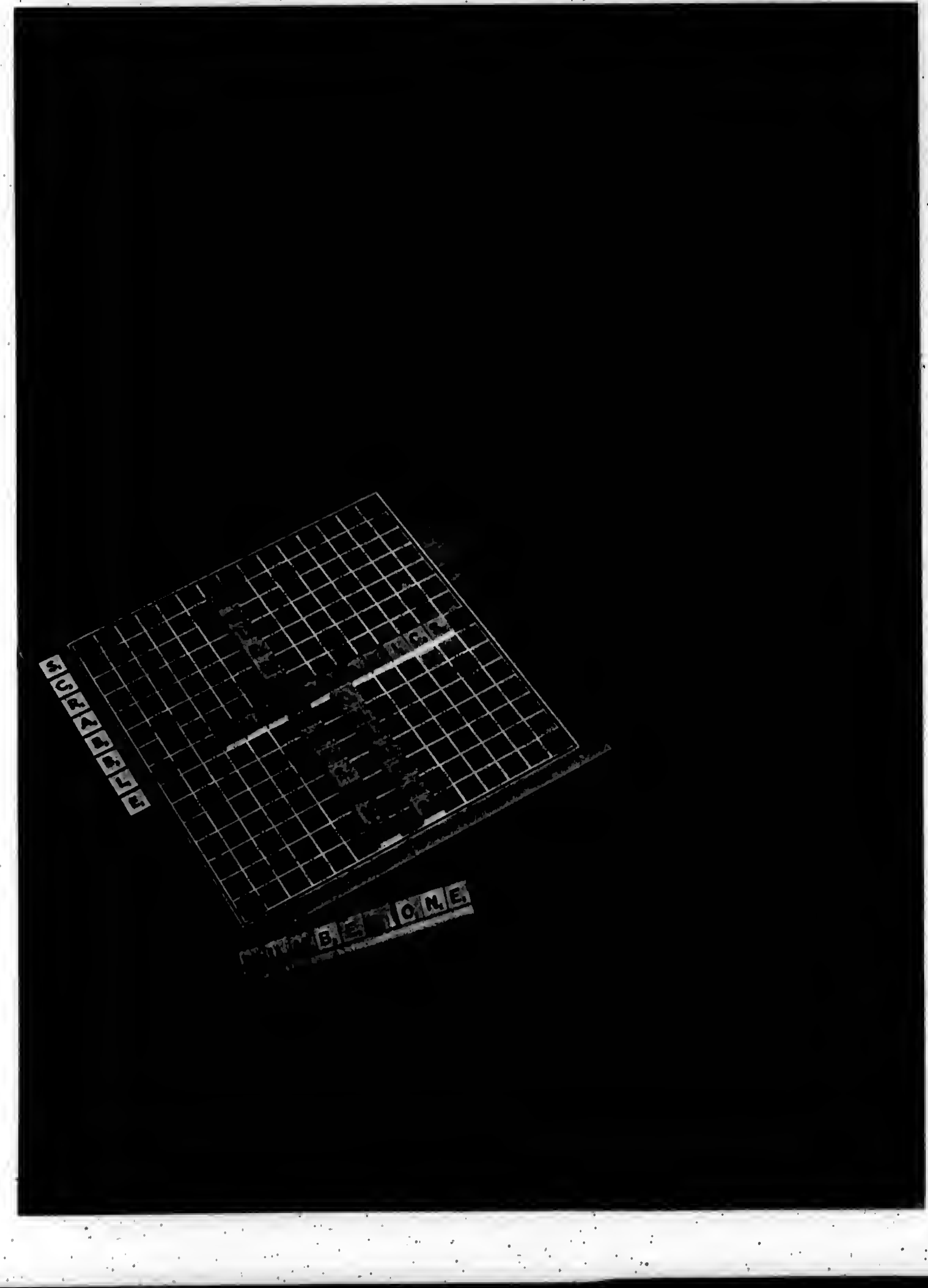
The Dylakor system is also utilized for production of reports taken from the new "minimaster". One is a quarterly run of stratification of annualized premiums by year of issue and an historical file of lapsed policies.

DYL-260 has become extremely important to the auditors at Occidental. With the advent of a data base system, they found data retrieval time escalating, desired records increasingly difficult to pinpoint and special reports taking longer to develop.

In addition to the Alis routine and the generating of various production audit reports via DYL-260, the auditors made the move toward the package for data base accessing procedures using the optional DYL-IMS/DL1 interface.

The Occidental auditors extract entire segments from the IMS data base and create their own fixed-length files. From these selected and highly manageable segments, they utilize pertinent data to produce quick reports requested by management.

This method boosts responsiveness and vastly improves cost-effectiveness, according to Ryan.



Training System Aids DP Auditor

WOODLAND HILLS, Calif. — Audics, a self-study package on internal control of financial systems, is aimed at DP auditors, according to its vendor, Info 3.

Audics provides training in the basics of developing DP systems, preparing systems for acceptance testing by auditors and incorporating internal financial controls within an organization, a spokesman said.

The package contains audiocassette tapes, workbooks, case studies, forms for controlling the system development process, a tape recorder and locking briefcase.

Audics costs $595 from Info 3 at Suite 193, 21241 Ventura Blvd., Woodland Hills, Calif. 91364.

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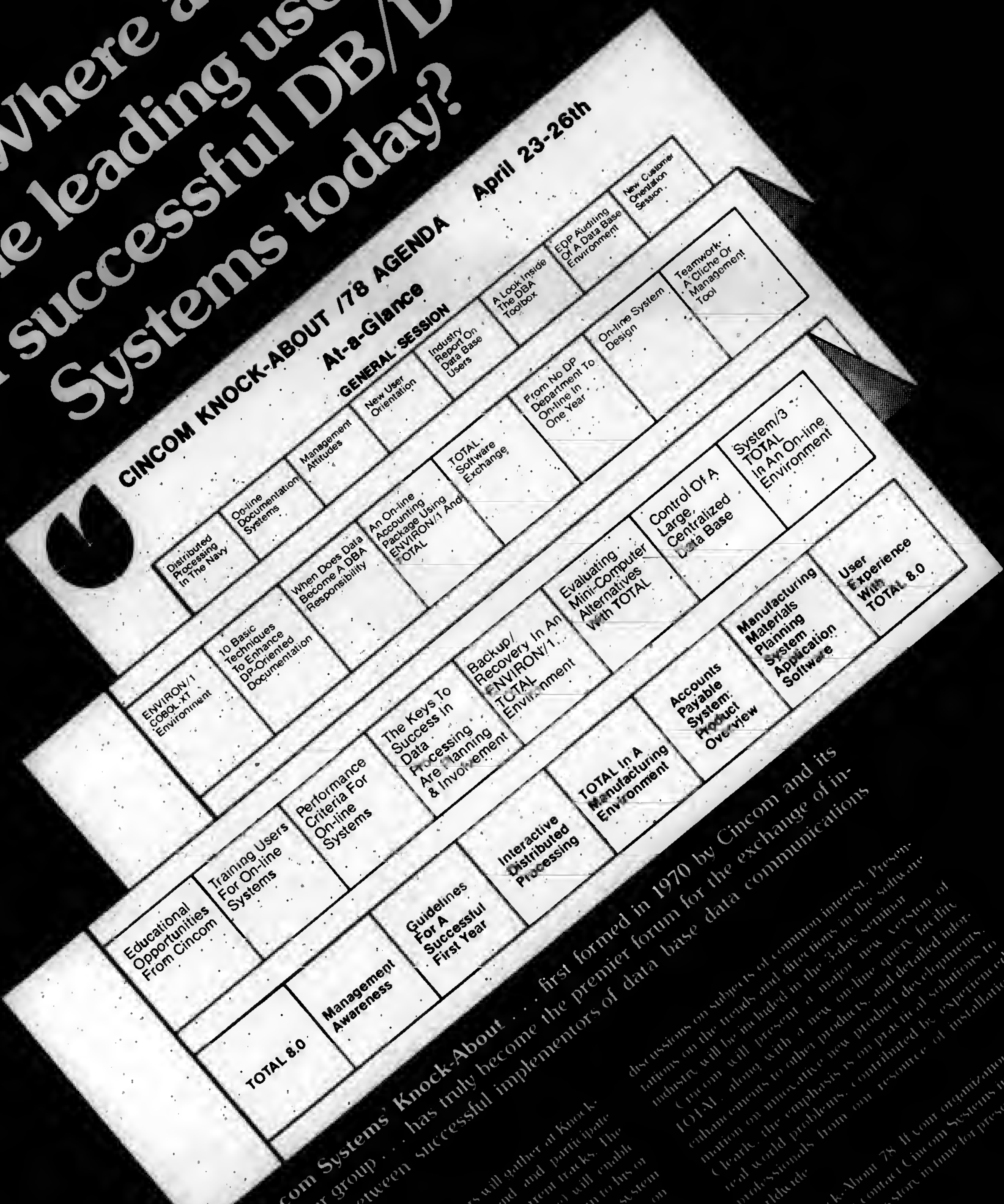

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Growth in Use of Pascal Called Revolutionary

By Richard J. Cichelli
Special to CW

There is a revolution occurring in programming languages and its leaders are programmers like you and me. Mainframe and system vendors are worried and sometimes hostile toward us because of our interest in the revolution.

The thing that has caught our interest is the "do-it-yourself" language Pascal. It's been around for about 10 years, but of the more than 65 different implementations now available, not one has vendor support. Yet implementations and use of Pascal are skyrocketing.

There are Pascal compilers for the Zilog, Inc. Z80 micro to the Cray Research, Inc. Cray-1 supercomputer and for nearly everything in between. Most of the compilers are available from "underground" user groups whose members continuously polish and improve their systems.

The language was designed in 1968 by Niklaus Wirth of Eidgenossische-Technische Hochschule (ETH) in Zurich, Switzerland. It combines power, simplicity, machine independence and security. It has excellent facilities for structured programming and data structuring.

Compiler Development

It wasn't until 1970 that the first Pascal compiler came into existence. Urs Ammann (also of ETH) implemented Pascal for the Control Data Corp. CDC 6000 and 7000 machines. Ammann wrote the compiler in Pascal and bootstrapped it by hand translation. The result was a small (4,500 lines of Pascal) core resident, extremely fast compiler that proved ideal for systems work and teaching.

The Zurich compiler has gone through several generations. The current version makes use of all the library facilities on CDC machines and runs compatibly under all of CDC's many operating systems. The Pascal 6000 compiler outperforms CDC's Fortran, Cobol and Algol compilers.

Compatibility and performance are the areas in which Pascal beats vendor-supplied compilers for standard languages. CDC seems to have accepted this fact and now markets a front-end communications system (the CDC 2550) for which the software is written entirely in Pascal.

Other vendors are learning of Pascal's power and efficiency. Recent benchmarking on Digital Equipment Corp. hardware showed Seved Torstendahl's PDP-11 Pascal compiler (free!) produced tasks that were 80 times more efficient than the code produced by DEC's Cobol compiler for the same DP applications.

The one-year-old Pascal Special Interest Group within the DEC Users Society (Decus) now numbers 400 members. Some of them are producing an optimized compiler for Pascal that runs under all PDP-11 operating systems and hardware configurations. It also runs under the highly acclaimed Unix operating system developed by Bell Labs for the DEC environment.

Operating Systems for PDP-11s

Several operating systems for PDP-11s have been written entirely in Pascal. Prof. Ken Bowles of the University of California at San Diego has a system that runs on LSI-11s and supports graphics. It is a complete stand-alone single-user interactive educational and business system and it is available.

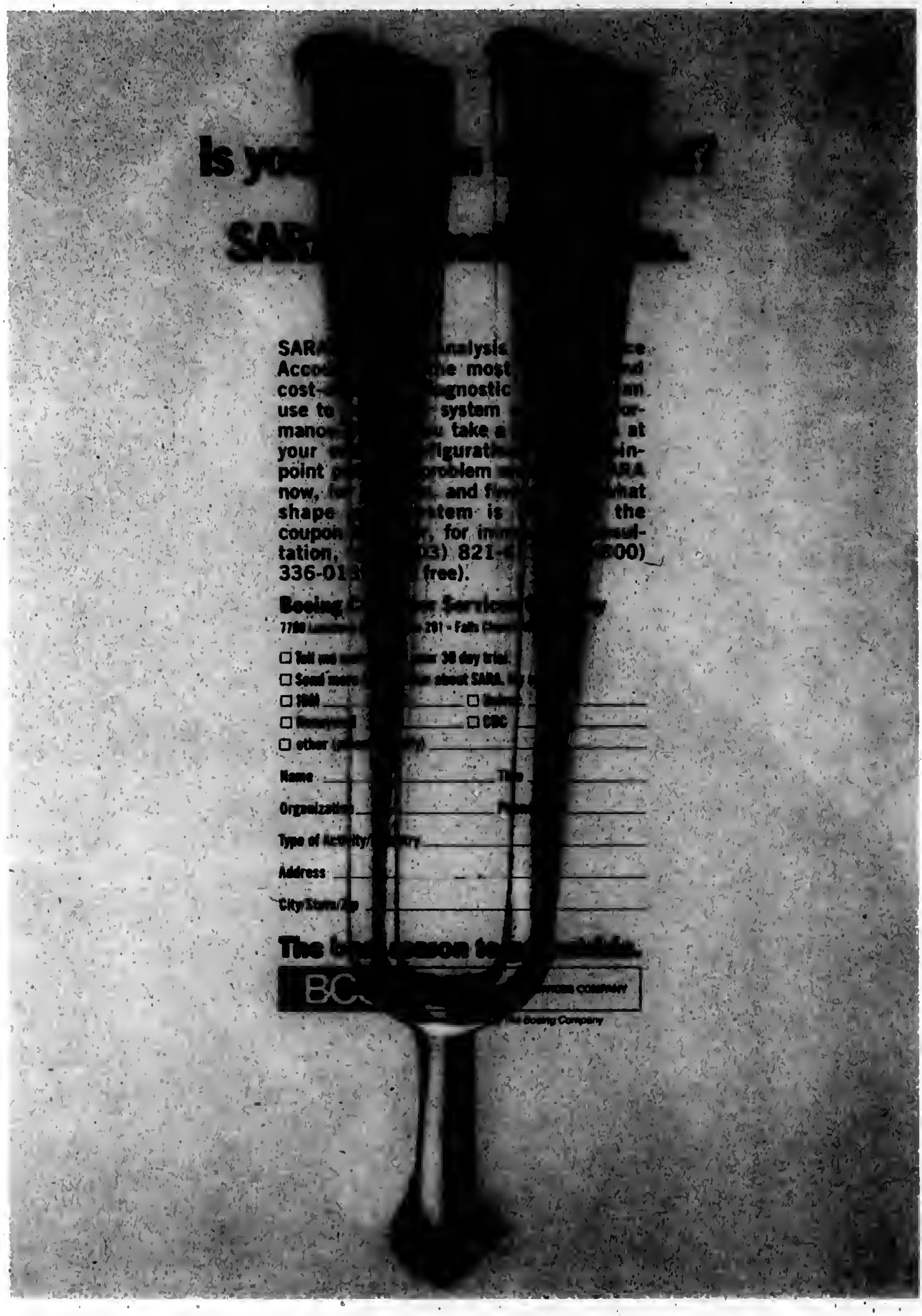
IBM users are also discovering Pascal. The Australian Atomic Energy Commission distributes its OS-compatible compiler for $A100. This compiler was adapted from one developed for the Hiatachi Ltd. computer by T. Hikita of the University of Tokyo. It outperforms the PL/I Optmizing Compiler six to one on compile speed and produces code that is much faster and much smaller as well. Many users characterized Pascal as "PL/I done right."

You can join the 2,000 members of the Pascal underground by sending $4 to the Pascal User's Group (PUG), c/o Andy Mickel, University Computer Center, 227 Experimental Engineering Building, University of Minnesota, Minneapolis, Minn. 55455.

This will make you a member of PUG and will get you four issues of *Pascal News* a year.

The Decus Pascal SIG can be reached through John R. Barr — 377/C209, Hughes Aircraft Co., Box 92919, Los Angeles, Calif. 90009.

Cichelli is research manager of computer applications for the American Newspaper Publishers Association/-Research Institute and an adjunct lecturer in the graduate school of Lehigh University, where he has used Pascal for courses in advanced programming techniques and compiler writing.



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Business Schools Providing More DP Exposure

More than 100,000 people graduate each year from U.S. schools of business. A 1977 survey by the University of New Hampshire revealed that 94% of all accredited schools now require computer proficiency of undergraduates. Over 80% of accredited M.B.A. programs have such a requirement.

Graduates of these schools are permeating the managerial ranks in industry and government. The computer requirement has been in existence long enough so that many of these graduates have reached middle management.

What do these students learn about computing and management information systems? The survey was taken by Jane Clark, computer consultant at the Whittemore School of Business and Economics. This column provides a summary of the report on that survey, published in the October and November issues of *Computing Newsletter for Schools of Business* (University of Colorado, Colorado Springs, Col. 80907).

J. Daniel Couger On Education

Clark's survey did not include questions to determine computer content of the overall curriculum. My 1974 survey of accredited schools revealed that the majority had implemented four phases of computer curriculum:

- Coverage of computer fundamentals, system analysis/design and programming through a course required of all students early in their academic program.
- Coverage of the applications of computers through incorporation of this material into the functional area courses, e.g., computer applications in finance in the finance courses, computer applications in marketing in the marketing courses.
- Coverage of computer capabilities for abetting decision making in a dynamic business environment through computer-oriented business games.
- Coverage of integration and optimization of computer applications through a course on design and implementation of a sophisticated, computer-based management information system.

In all four phases of the computer curriculum, students deal directly with the computer — preparing input and evaluating output.

In Phase I, however, students learn to program. In 1967, when I wrote the book *Computers and the Schools of Business*, few schools required the course of all students. There were elective courses offered to seniors and second-year M.B.A.'s. The objective was to show the usefulness of the computer in business organizations.

That objective remains. However, an additional objective has been derived. Students are taught to program the computer so they can use it in their own educational process. With this capability, students can be assigned nontrivial kinds of problems to solve.

Phase II of the four-phase computer curriculum is coverage of the applications of the computer. Unlike Phase I, this is not accomplished by adding a course to the required curriculum. In the early 1960s, some schools had such a course.

A course of this type is not practical; it is also unsound from a pedagogical standpoint. There are more than 1,700 business applications of the computer. Which ones should be taught in a course covering applications?

It is much sounder pedagogically to teach the applications of the computer by incorporating that material in the existing functional area courses.

Phase II of the four-phase computer curriculum is taught at two levels. Students learn about the fundamental applications in the core courses. The advanced applications are taught when students move into their major fields.

To perform in-depth analysis in his/her major field, the student is taught about the computer applications for analysis.

To understand the information systems used in his/her field, the student usually is assigned a project requiring access to a data base.

To understand the use of computer-based models used in his/her field, the student gains practice in decision making through computer simulation.

Integrating Applications

Phases III and IV teach students the value of integrating applications into a computer-based management information system. Through participation in computer-based business games, they learn how models can be built for evaluation of alternative decision possibilities. Through the final course they learn how management information is generated through the data base approach.

This dramatic change in education of potential managers is beginning to have significant impact on business and industry. In a few years, these computer-literate graduates will begin to reach top management levels. It will be exciting to see the changes in computer use that occur.

Couger is professor of computer and management science at the University of Colorado.

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UCS Net Adds 'Topman' For Tracking of Projects

KANSAS CITY, Mo. — Topman, a project tracking system, is available to sites in more than 150 cities in the U.S., Canada and Europe served by the United Computing Systems, Inc. (UCS) Uninet communications network.

Developed to provide management with the tools needed for the planning, evaluation, resource monitoring and replanning of a given project, the Topman system combines established tracking techniques such as line of balance, critical path method and Gantt chart display in a single, easily operated system, UCS said.

As a planning aid, Topman can be invaluable to the project manager in determining the flow, sequence and interdependencies of all activities, identification of critical path, time estimates, slack time adjustments and project relative to the initial plan, a spokesman claimed. Topman provides graphical reports such as cumulative graphs and cost schedule status reports by individual resource category, he added.

Topman provides a variety of detailed reports to meet the requirements of each management level. The management groups identify the type of information needed, and the coding necessary to call out the report is incorporated into Topman's data base. The system lends visibility to the cost, scheduling and progress of each division and subdivision of the work to be accomplished, the spokesman said.

UCS customers use specialized, toll-free telephone circuits to gain access to the data communications network connecting U.S., Canadian and European cities with major computer centers in Kansas City, Mo; Boston, Ma. and London, England.

The company is at 2525 Washington, Kansas City, Mo. 64108.

Distributes Data Base

CA Architecture Backs Varied Protocols

IRVINE, Calif. — A network architecture that is said to eliminate system boundaries on intranetwork communications and concurrently support most major communications protocols has been introduced by Computer Automation, Inc.

Called the Syfa Virtual Network "because the location and function of any and all elements of the network are totally transparent to the user," the architecture concurrently supports IBM's Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC), CCITT X.25 and bisynchronous protocols, CA said.

The architecture allows the user to geographically distribute a data base but retain the ability to directly access any data base from any Syfa "information station" in the network, a spokesman noted.

The user can operate under any of the major protocols or configure a network that requires concurrent utilization of all three, he added. The Virtual Network architecture reportedly allows an unlimited number of processors, terminals and on-line mass storage units to be configured in an integrated telecommunications network.

With the Virtual Network capacity and flexibility, the user can proceed with network implementation "without fear of being made obsolete by changes in industry standards beyond his control," CA claimed.

Users presently committed to IBM's bisynchronous protocols can mix IBM 2780, 3780 and Hasp/20 batch protocols with interactive multidrop IBM 3270 protocol, the company said.

Implementation of SNA is supported using CA's recently announced support of SNA through IBM 3790 communications emulation and SDLC protocol.

By supporting X.25 protocol, the Virtual Network can optionally be interfaced to public packet-switching networks.

Besides configuring Syfa terminals and processors into the network, the user can interface such equipment as IBM 3270 terminal clusters, IBM 3790 (SNA/SDLC) systems, Bell System Dataspeed 40/4 clusters and X.25-compatible processors and devices, CA said. This means users can attach their existing terminal equipment to a Syfa Virtual Network and select the most cost-effective equipment for each application and each geographic location, according to the spokesman.

One or more host mainframes can be interfaced to the Virtual Network at various

(Continued on Page 28)

Bank Running in Bisync Links IBM 3600s With System/3

By Ronald A. Frank
CW Staff

VANCOUVER, Wash. — First Federal Savings and Loan Association here has combined IBM 3600 finance terminals with a communications-oriented IBM System/3.

The 3604 and 3611 finance terminals communicate in Binary Synchronous mode at 1,200 bit/sec over private lines to a System/3 Model 15. The processor uses the Communications Control Program (CCP) to oversee the terminal network, which operates in six bank locations.

A full-blown implementation of the 3600 terminals with Synchronous Data Link Control (SDLC) and a 370 Systems Network Architecture (SNA) environment would have been too much capability, according to Dan Myers, DP manager. The System/3 with a 160K of CPU storage can serve teller operations and allows for upgrades that will soon include a loan accounting system on IBM 3270 CRTs and administrative work, he said.

The CCP teleprocessing software operates with an on-line terminal program developed by two programmers at First Federal. The program is available from IBM as nonsupported software for other savings and loan associations with similar terminal requirements, Myers noted.

The First Federal Network is believed to be one of the first in which the 3600 finance terminals are linked with a System/3 under Binary Synchronous protocol, IBM indicated.

Quicker Transactions

"With our computerized communications system, we can provide our more than 25,000 customers with the convenience of fast and accurate savings and loan transactions," according to John Priel, president of First Federal. "Before installing the system, customers making deposits, withdrawals, loan payments or transferring funds between accounts would have to wait while the teller looked up their records and then hand-posted the transaction.

"Now each teller has a terminal," he explained. "He merely keys in the account number and the customer's record appears on a CRT screen. The teller then enters the amount and the transaction is recorded on the screen.

"Once the teller verifies the transaction, it automatically becomes part of the account record, and the customer receives a computer-printed receipt. That's all there is to it, and it only takes a matter of seconds," he said.

If a customer has a question about his account, the teller can give an immediate response because he has the latest information at his fingertips. "And we've eliminated the risk of misplacing loan payment cards and deposit/withdrawal slips because these records are handled only once — at the teller window," Priel pointed out.

Telenet Plans Uniform Rates

WASHINGTON, D.C. — Telenet Communications Corp. will initiate uniform nationwide pricing for its public data network on July 1.

With this proposed tariff structure, still subject to approval by the Federal Communications Commission, Telenet would become the first U.S. common carrier to offer data communications service at rates that are independent of distance and user location throughout the continental U.S.

The rates for dedicated access will range from $300/mo for 50- to 300 bit/sec transmission to $1,100/mo for 9,600 bit/sec. The charge will include a port at a Telenet switching center, the access line and the necessary modems or digital interface units.

Terminal users who dial into the network for a connection to a remote computer will pay a flat rate of $3.25/hour in all cities directly served by the network, Telenet said. Previously, hourly public dial-in rates ranged from $1.80 to $5.80 depending on individual city rate categories and the speed of the service. The $3.25 rate will apply for both 110- to 300 bit/sec and 1,200 bit/sec access.

Telenet has also announced plans to provide In-Wats service for 1,200 bit/sec terminals in addition to its In-Wats service for terminals communicating at lower speeds. Both In-Wats services will be priced at $15/hour.

For customers with a high concentration of usage in a particular city, Telenet has also filed rates for a service called the Private Packet Exchange (PPX). PPX will enable a customer to buy a group of ports as an alternative to a private concentrator or public dial-in service, a spokesman said.

The service will feature the automatic switching of overflow calls to public dial ports, he added.

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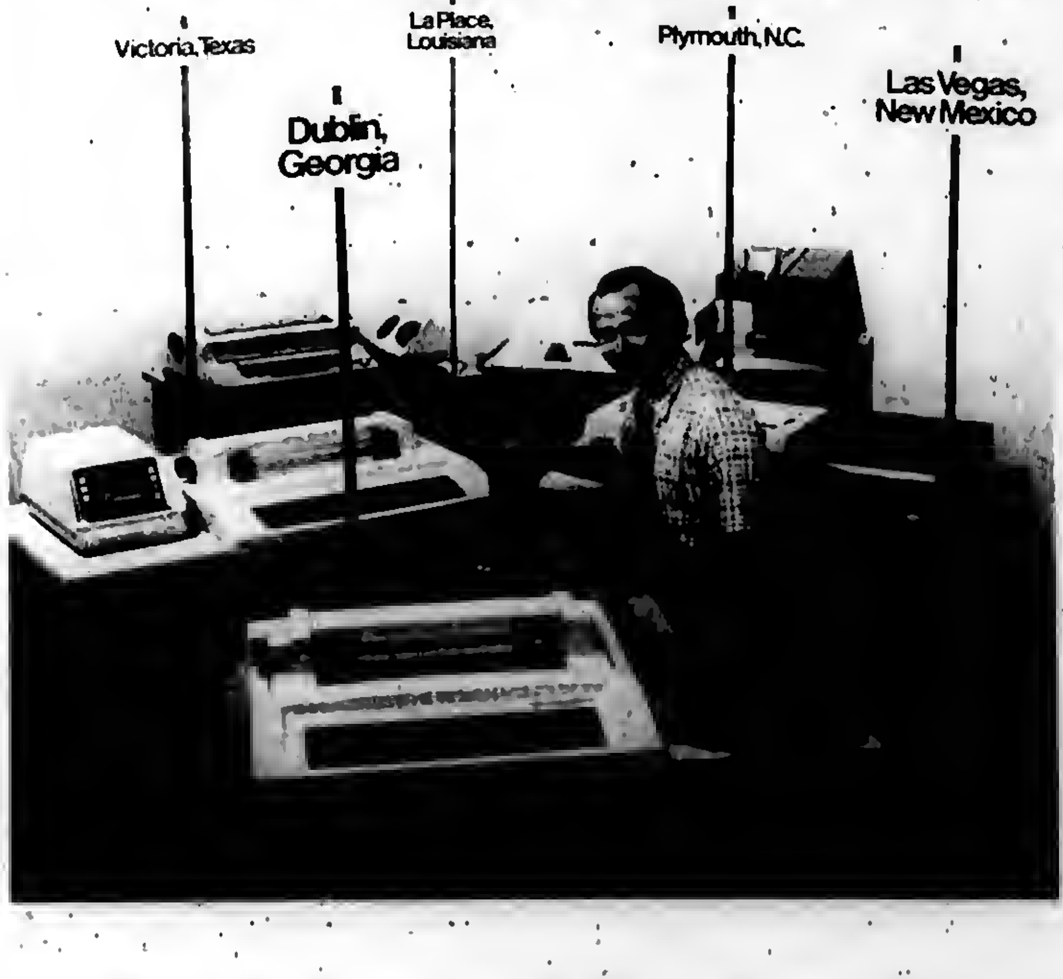

Maker of Phototypesetters Brings Out Smart Terminal

By Ronald A. Frank
CW Staff

WILMINGTON, Mass. — Compugraphics Corp. has used technology developed for its DP phototypesetting systems in an intelligent CRT terminal.

Called the Mini Disk Terminal 400 (MDT-400), the microprocessor-controlled device can be used for data entry, text editing and other distributed DP applications, the firm said.

The terminal includes a keyboard/-CRT, minidiskette, microprocessor unit and communications interface in a desktop configuration. Offering asynchronous and binary synchronous communications interfaces for line speeds up to 9,600 bit/sec, it was designed for larger users prepared to provide the necessary software support, the company said.

A text-processing package has been developed as the first applications software available from the vendor.

The MDT-400 includes a 8-bit Zilog, Inc. Z80 MPU with 32K bytes of storage as well as an additional 87K bytes of diskette storage. Users can write applications programs using the Program Development Facility which supports Assembler and high-level languages.

A file management capability allows data to be transferred to and from disk storage. Single keystrokes can be used for preprogrammed control keys.

Each of the 122 keys on the MDT-400 can be programmed and keyboard configurations can be loaded from the diskette. Eighteen user-defined keys can be changed by an operator.

The terminal includes cursor control, scrolling, intensity blink, reverse video and underline capabilities.

The Model 401 includes 8K bytes of random-access memory (RAM) a minidiskette, CRT and keyboard for $4,275; the Model 402 provides 16K bytes of RAM and costs $4,500; and the 60 char./sec MDT-441 matrix printer costs $2,495. Monthly maintenance is $50.

First deliveries are scheduled for November, Compugraphics said from 80 Industrial Way, Wilmington, Mass. 01887.

Azurdata Cuts Scorepad Prices

RICHLAND, Wash. — Azurdata, Inc. has reduced the prices of its Scorepad terminals by as much as 35%, according to a spokesman.

Scorepad is a microprocessor-driven, upgradable terminal that is said to complement the recently introduced Scorepad LC. Scorepad's solid-state memory is expandable to 88K characters and it is available with bar code scanning for Plessey, Codabar and Universal Product Code labels.

The basic price for Scorepad has been reduced from $1,350 to $1,200 and all options and configurations have been reduced as well. Azurdata is at P.O. Box 926, Richland, Wash. 99352.

CA Syfa Gains Architecture

(Continued from Page 27)

hierarchical levels. Any mainframe which supports SNA (3790), X.25 or bisynchronous communications can be interfaced.

Additional Elements

Most of the elements necessary for implementing the Virtual Network were incorporated in the earlier Syfa design, including the operating system, programming language, file management system, computer architecture and instruction set, CA said. However, Virtual Network does require additional elements.

Control of the total Virtual Network is vested in the Virtual Network Controller based on a version of CA's LSI 4/90 processor. The Virtual Network Controller is the "traffic cop" for intranetwork communications.

Each Syfa system will contain a microcomputer-based Distributed Data Base Processor, using X.25 protocol, to serve as an interface between the Syfa CPU and the Virtual Network.

Each Virtual Network Controller interconnects up to 31 Syfa processors and 992 Syfa terminals to geographically distributed data bases, with a capacity of up to 74.4 billion bytes of on-line storage. Access to all mainframe data bases is also provided.

Since multiple Virtual Networks can be interconnected, the total number of terminals, processors and on-line storage capacity which can be configured is unlimited, the company claimed.

With Virtual Network, every user has all of the resources of the entire network "at his fingertips," the spokesman said. Each terminal user on any Syfa processor can access any data file on any disk in the network. The transparency in this case is at the file management level, he noted.

"The terminal user neither knows nor cares where the actual data bases reside," he pointed out.

The basic price for a single Syfa system ranges from $29,000 to more than $150,000. The additional cost to configure a Virtual Network includes $31,500 for the Virtual Network Controller and $7,500 for each Distributed Data Base Processor. An optional backup network controller is priced at $20,000.

The Virtual Network Controller controls 15 Syfa systems, but each controller can be expanded in increments of four to accommodate an additional 16 systems. Each incremental addition costs $4,000. A 31-system Virtual Network Controller therefore sells for $47,500.

All necessary control software and operating systems are included in these prices, CA said. Communications emulators carry a one-time charge for the entire network and range in price from $1,500 to $7,500.

All Virtual Network components are field-installable making it possible for current Syfa users to upgrade to the networking approach.

First deliveries of the architecture's components are scheduled for the third quarter, CA said from 18651 Von Karman, Irvine, Calif. 92713.

Mailgram System Provides One-Day Service

McLEAN, Va. — Western Union (WU) Electronic Mail, Inc. was formed as a wholly owned subsidiary of Western Union Telegraph Corp. to meet a growing need for one-day mail preparation and delivery at competitive cost. The stored Mailgram system includes the installation of 1,200 terminals in user locations to speed the preparation of messages.

WU's goal with the stored Mailgram system was to take the idea of one-day mail delivery a step further and actually cut the cost of normal mail preparation. To do this, a combination of microprocessor-based terminal functions and CPU-assisted functions were utilized.

The user gains access to the WU service by dialing a toll-free 800 number. After call origination, the Mailgram terminal, supplied by Digi-Log Systems, Inc. is used to generate messages by a combination of on-line and off-line functions. The messages are generated by entering and editing new information from the keyboard or by "constructing" messages through the addition of variables to a standard text stored in the WU CPU.

Two Standard Modes

For simple operation, the network functions had to be largely invisible to the user. The terminal vendor met this requirement by providing multifunction, microprocessor-controlled terminal workstations.

The Mailgram terminal has two standard operating modes: Mailgram mode and general mode. It is switch-convertible to a general Ascii terminal.

The multiuse terminal feature cuts the entry level to the stored Mailgram system greatly, according to Al Talamantes, vice-president and general manager of Western Union Electronic Mail Co.

One of the first things a new Mailgram terminal user would do is create a user data base of standard messages and address lists. These are stored in Western Union Electronic Mail CPUs for later reference and use.

Each item is identified by a five-digit reference number. As is the case in later message preparation and distribution operations, the user message and address data base is keyed on the Mailgram terminal for direct entry into the WU.

Typical Operation

In a typical message preparation operation, a message and the desired address would be entered into the display area of the electronic mail terminal in accordance with format rules. After completion of the off-line function, the WU toll-free 800 number is dialed.

On connection to the computer, the terminal keyboard is automatically locked and the WU DP center here in McLean automatically verifies the user terminal's identification number. If the number is valid, the input message is pulled from the terminal.

The stored Mailgram processors (a mix of Interdata, Inc. and Univac equipment) check the message for format errors and signal message acceptance or rejection to the operator. If accepted, a message log number is displayed in a special protected area on the right-hand side of the screen. After correction, the operator reenters the message and the cycle continues until the message is accepted and a log number is assigned.

Addresses can be keyed or selected from the user address data base, which can be broken down in up to 99 different ways for fast reference without rekeying.

Once a message is keyed, the WU Electronic Mail System takes over, starting with the Interdata and Univac equipment at McLean. Interconnection to the WU Electronic Mail Network is controlled by WU's Info Master large-scale switch. It then proceeds through the WU land and satellite network to the receiving post office, where the message is printed for morning delivery.

Tel-Tex Renting Model 43 KSR

HOUSTON — Teletype Corp.'s Model 43 keyboard send/receive (KSR) matrix terminal is now available for rent or lease through the Tel-Tex, Inc. leasing and rental program.

A data set model will be available later this year, according to the firm.

The RS-232 Model 43 rents for $64/mo on a 12-month plan. The TTL version rents for $49/mo.

Maintenance is available through 45 Teletype Service Centers nationally or on a depot basis to Tel-Tex.

Tel-Tex is at 3203 Audley St., Houston, Texas 77098.

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Range of Standard Features Marks GE Printers

WAYNESBORO, Va. — General Electric Co. has introduced a matrix printer line with a number of features as standard equipment.

The Terminet 200 matrix models are available in both an interactive and line printer version. The interactive 1,200 bit/sec keyboard send/receive (KSR) unit is mated with a receive-only (RO) configuration that can be modified into a line printer with minimal hardware changes, according to the firm.

The Terminet 200 printers reportedly include servo control for both carriage and paper advance, 20 in./sec slew rate, a 1K buffer, multipart forms printing, 136-column print positions with variable operator-selectable character spacing, selectable vertical spacing, bidirectional printing (line printer only), vernier tractor adjustment for fine tuning paper and the ability to handle paper widths from 2 in. to 16-1/2 in.

Featuring straight wires, ballistic firing and a laminated core for reduced heat, the operator-replaceable print head has a 7 by 9 matrix for both single and multiform usage, the firm added.

As an option, a nonvolatile semiconductor memory module can be added to the KSR/-RO versions to provide more efficient and versatile forms handling. A multichannel, 128-position vertical format unit, which is both keyboard and remote source programmable, is included with this feature as is horizontal tabbing and an 85-character answerback, a spokesman said.

A self-test feature is available through a test button on the line printer that generates a preset test pattern.

The keyboard, available in either Ansi or Ecma standard layouts, has Hall effect switches and is similar to the Terminet 30 and 1232 keyboards, GE said.

KSR electronic options include data set control and line control. The line printer is microprocessor-based, allowing a variety of interfaces.

Terminet 200 peripherals include paper tape (pedestal required), a stand-alone magnetic tape teminal and a diskette storage terminal.

Transmission rates of the teleprinter are serial asynchronous at 110-, 200-, 300- and 1,200 bit/sec, full- or half-duplex. The standard interface for transmitted or received data includes EIA levels or 20 and 60 mA current loop (strappable). The optional data set control includes circuit call indication for the data set, GE said.

The Terminet 200 is designed as a desktop unit with an optional pedestal.

The printer costs about $3,000 from the GE Data Communication Products Business Department, Waynesboro, Va. 22980.

Limited-Distance Modem Offers System and Self-Test Diagnostics

FORT WASHINGTON, Pa. — Tele-Dynamics has introduced a limited-distance modem that provides data communications over unloaded private cable systems or over telephone company-supplied local exchange loops and features diagnostic capabilities for both system tests and self-test.

The Model 7300 modem provides full-duplex or half-duplex operation over four-wire lines or simplex operation over two-wire lines at rates of 19,200-, 14,400-, 9,600-, 7,200-, 4,800-, 3,600-, 2,400- and 1,800 bit/sec. Diagnostic features include analog and digital loop-back, command loop-back and a built-in test pattern generator, according to the company. Overall performance is monitored by six LEDs.

The 7300 meets the power vs. frequency specifications of Bell Systems Publication 43401 for private-line metallic circuits, the spokesman said. A compromise transversal equalizer offsets transmission effects of the cable and further extends the range. A typical range is 17 miles at 2,400 bit/-sec using No. 22 wire.

Synchronization is achieved by means of a sync pattern transmitted before the data and clear-to-send lines are enabled, the firm said. The receiver is data blind until this sync pattern is received. The carrier is detected by means of a digital technique instead of the usual amplitude sensing method, so that line noise does not affect carrier detection, the spokesman said.

The Model 7300 sells for $695 from the Tele-Dynamics Division of Ambac Industries, Inc., Fort Washington, Pa. 19034.

Coupler Operates At 1,200 Bit/Sec

PHOENIX — Omnitec Data Corp. has announced the Model 1200B acoustic coupler that incorporates LSI technology.

Designed to operate with a high-speed printer over dial-up lines as well as transmission rate-selectable CRTs, this unit allows for time-sharing and other remote computer access in nonpermanent environments, the frm said.

The unit sells for $975 from 2405 S. 20th St., Phoenix, Ariz. 85034.

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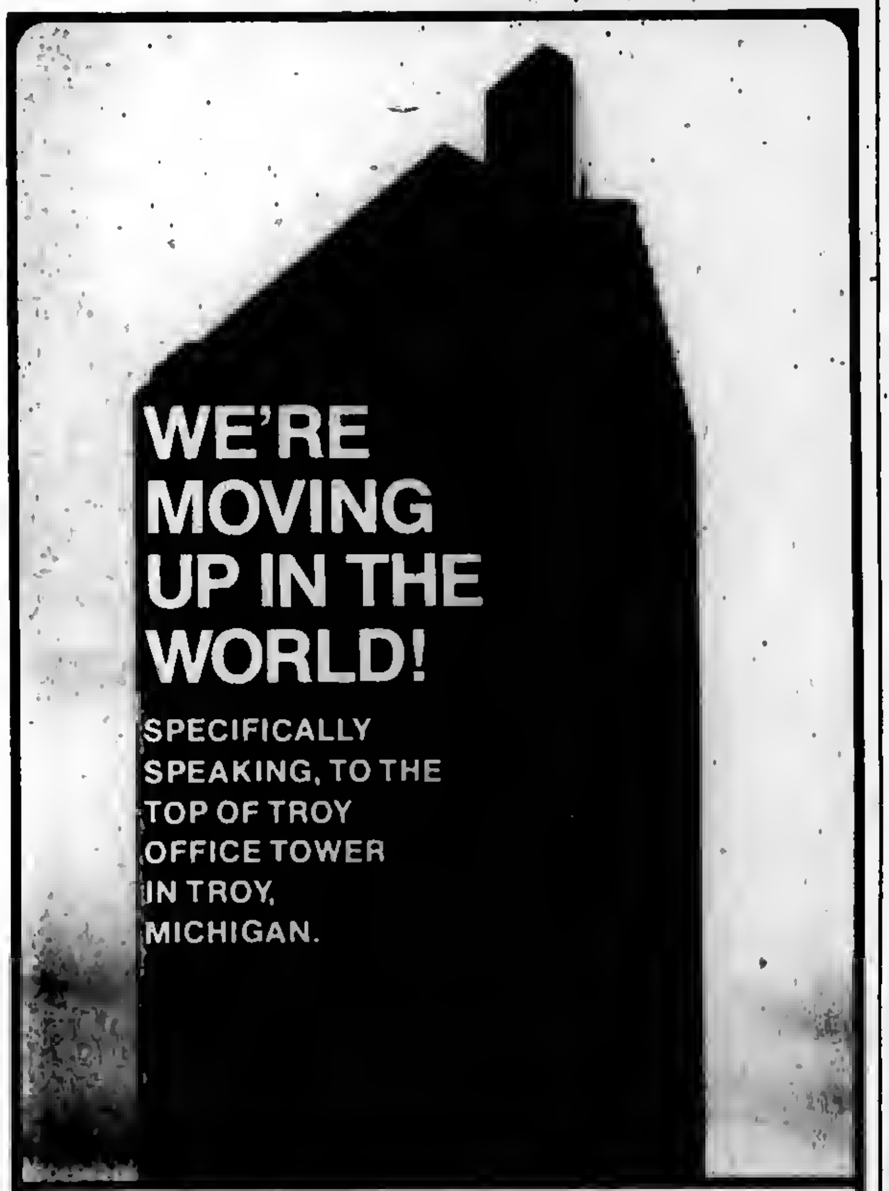
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HP Develops Terminals To Support Manufacturers

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a terminal designed for use in manufacturing operations. The Model 3070B reportedly offers facilities to enter information into an HP 1000 mainframe and can also act as the central controller and data collection center for a number of interconnected programmable instruments, according to the firm.

The 3070B can read standard Type 3 Hollerith badges and marked or punched cards. It has a keyboard for local numeric entries, a 15-char. LED display and a 50 line/min 20-character-wide alphanumeric strip printer, the firm said.

The 3070B also offers the user 15 prompting lights and 10 program-definable keys.

In use, the terminal's prompting lights might be programmed on an associated HP 1000 into a prompted sequence such as "Insert Badge," "Enter Work Order," then "Enter Customer Number" and so forth. Therefore, the 3070B can recognize the user and collect operating information in a consistent and orderly way from cards or from the keyboard, the spokesman said. It can then confirm the transaction with a message on the LED readout or with a printed slip.

Typically, the terminal would be used for such activities as work in progress, production scheduling, cost accounting and shipping and receiving.

The program-definable keys, each of which causes a single predetermined character to be sent to the computer, can be preprogrammed, for example, to provide a "yes" or "no" answer, to start a previously defined subroutine or to report an action by sending a previously agreed-upon sequence of symbols, according to the firm.

Terminal Transactions

As many as 56 of the 3070B terminals can be connected via a single multidrop two-wire cable up to 2.4 miles long. Earlier HP 3070A terminals can be mixed with 3070Bs on such a line, the firm said.

In addition to its CPU interconnection, the 3070B has a standard HP interface bus (IB) connector on its back panel. By relaying appropriate communications from the HP 1000, the 3070B can control a local array of instruments or other HP-IB programmable devices, collect the data produced and forward it to the computer, the spokesman said.

The price of the 3070B is $3,200 including the multifunction reader and the strip printer. HP is at 1507 Page Mill Road, Palo Alto, Calif. 94304.

CRT Offers Big Characters

ANN ARBOR, Mich. — Ann Arbor Terminals, Inc. has announced the availability of a double-size character option for its Model 400E CRT terminals for use in applications where readability at greater distances is desired.

Characters are approximately 1/2-in. high and can be read from distances of up to 15 ft, a spokesman said.

The unit's refresh memory stores 2,000 characters in a 50-line by 40-char. format. Twelve lines are displayed on the monitor at one time, with the remaining 38 lines accessible in either roll or scroll modes, according to the firm.

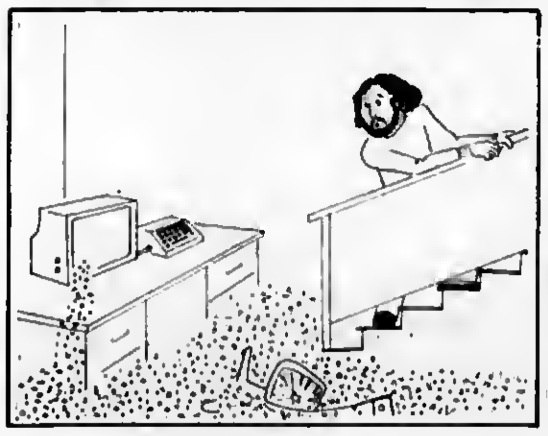
Three character accents — blink, dim and reverse video — are standard, as are an RS-232 interface and RS-170 video output for driving auxiliary monitors, the firm said. A 15-in. nonglare screen is included in the unit and the cursor is displayed as a blinking field.

The Model 400E includes a 72-key detachable keyboard which generates the full 128-char. Ascii set, the spokesman said.

The 400E responds to 14 commands from either the CPU or the keyboard. All operations controls may be changed from the keyboard including data speed (110- to 9,600 bit/sec), I/O mode (local, full- or half-duplex), keyboard mode (teletypewriter or full Ascii) and display mode (page, roll or scroll), the firm said.

Options include upper/lower case character display, export power, bell, current-loop cable and up to 36 function keys, the firm aaid.

Prices begin at $1,260 from the vendor at 6107 Jackson Road, Ann Arbor, Mich. 48103.



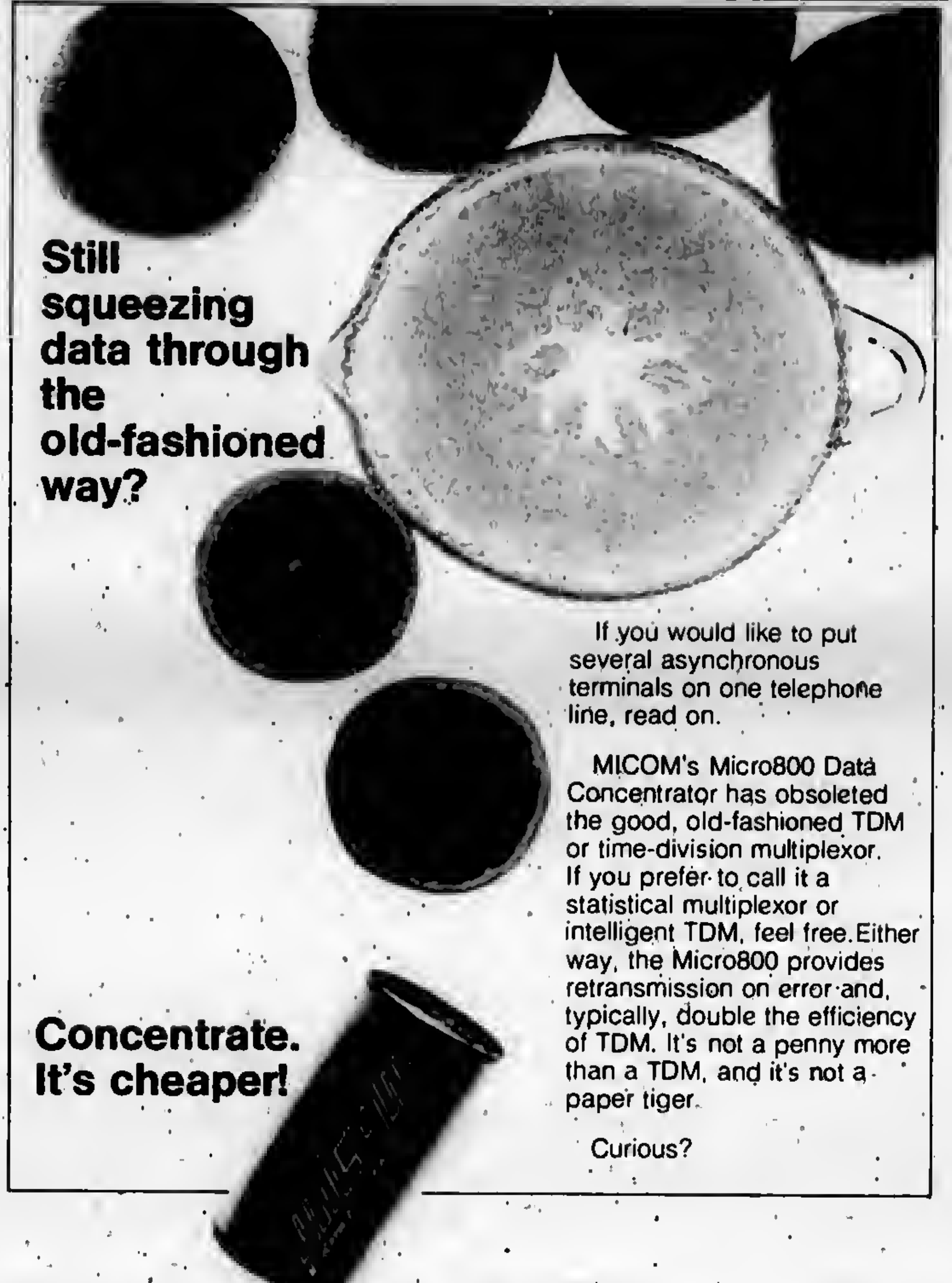
Tape Unit Works At 300 Bit/Sec

SADDLE BROOK, N.J. — Drillick LaManna Corp. (DLC) has introduced a paper tape punch/reader designed to be used with the current generation of 300 bit/sec printers, CRTs and other devices, a spokesman said here.

The DLC 3000 is connectable via an RS-232C interface to provide an automatic send/receive capability, according to a spokesman. The unit can also stand alone to send and receive data and to punch and duplicate tape, he said.

While the RS-232C/CCITT V. 24 interface is standard, current-loop interfaces are also available. Standard switch settings include half- or full-duplex, 110- or 300-bit/sec and remote control of the reader and punch. Units are also available that operate from 220V 50 Hz, according to the firm.

The unit costs $1,795 from DLC at 280 Midland Ave., Saddle Brook, N.J. 07662.



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MICOM's Micro800 Data Concentrator has obsoleted the good, old-fashioned TDM or time-division multiplexor. If you prefer to call it a statistical multiplexor or intelligent TDM, feel free. Either way, the Micro800 provides retransmission on error and, typically, double the efficiency of TDM. It's not a penny more than a TDM, and it's not a paper tiger.

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HP Adds Two Versions of Phone Line Analyzer

PALO ALTO, Calif. — Hewlett-Packard Co. has announced two versions of a telephone data line analyzer that measure both steady-state parameters and transients. Transient parameters can be measured simultaneously, according to a spokesman.

The Model 3771A is compatible with CCITT standards and the Model 3771B is compatible with Bell System Publication 41009. The instruments are used for troubleshooting telephone lines carrying high-speed data, the firm said.

Measurements of steady-state parameters include level, phase jitter, weighted noise and frequency shift. Transients measured include dropouts, phase hits, gain hits and three-level impulse noise.

Because of the nature of transients, they are normally measured over 15-minute intervals. By measuring transients simultaneously, the 3771A/B saves operator time and makes a comparison of results statistically valid, the spokesman claimed.

A portable CCITT data line testing facility can be made by combining the 3771A with either the HP Model 3770A amplitude/delay distortion analyzer or the Model 3770B telephone line analyzer, the spokesman said. Routine data line measurements can be made using the 3770A/B and troubleshooting measurements using the 3771A.

The Model 3771B Bell System version can be used with the Model 4943A and Model 4944A transmission impairment measuring sets for line characterization and testing.

While the 3771A/B can be used as a stand-alone test instrument, a forthcoming HP-IB (IEEE-488) option will make it usuable as part of an automatic test systm. This option, to be available in August, will allow the units to be controlled externally via the bus, according to the firm.

Other optional features include a printer output for recording transient measurement results and a loopholding option.

In the 3771A, these instructions can be supplied in English, French, German, Italian or Spanish, the firm stated.

The price of the 3771A and 3771B is $7,150 from 1507 Page Mill Road, Palo Alto, Calif. 94304.

Halcyon Unveils Link Analyzer, Extra Memory

SAN JOSE, Calif. — Halcyon, Inc. has introduced a data link analyzer with an optional memory cassette unit.

The Model 803A Ufox data link analyzer is a diagnostic tool for data communications facilities. For on-line testing, the instrument monitors the data stream in a variety of codes, checking text, control and protocol characters.

Used off-line, it simulates a CPU, a terminal or a modem to isolate any problem, a spokesman said.

Microprocessor control and a conversational language aid its operation by nonprogramming personnel, the spokesman said. An optional cassette unit supplements internal program memory, providing an extensive program directory.

The tape unit can also be used to record processed data on events of interest, he noted.

Factory programs include a diagnostic routine for the AT&T Dataspeed 40/4 and terminals with similar operating formats. Other programs to fit specific applications can be field-develped "in minutes," according to the firm.

Additional features include software updating by programmable read-only memory replacement, self-check routines, indicators to show the status of RS-232 leads and test points for all important leads.

The price of the unit is $8,995 from 1 Halcyon Plaza, 2121 Zanker Road, San Jose, Calif. 95131.

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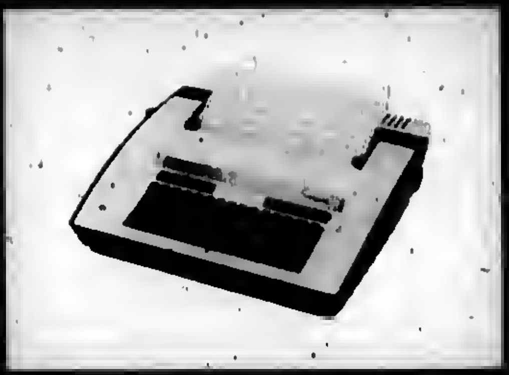
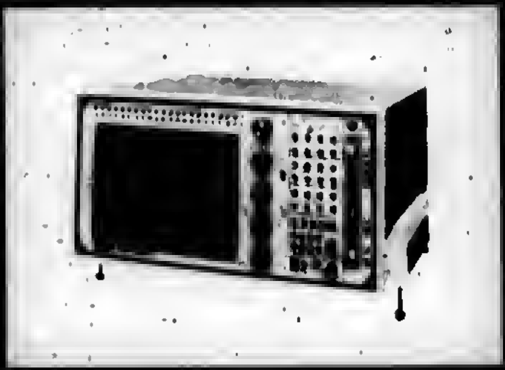
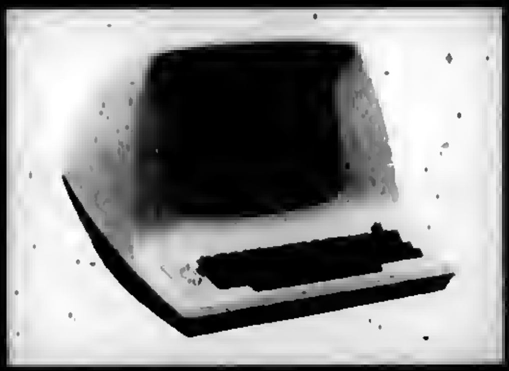

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Bits & Pieces

Splicer-Punch-Gauge Works on 1-In. Tape

MONTEREY, Calif. — The Datacq Co. has announced a splicer-punch-gauge for 8-, 7/6- and 5-channel punched tape.

The unit is said to work on every type of 1-in. wide tape, including metalized Mylar, and to simultaneously block punch all 90 holes of 10-level tape.

The device takes advantage of the static charge present in most splicing material by using it to align the splicing material and hold it flat on the unit before it is applied, according to the company.

The machine's price ranges from $75 (without bit punch) to $125 from the vendor at P.O. Box 3223, Monterey, Calif. 93940.

Matrix Label Printer Debuts

DAYTON, Ohio — A matrix label printer capable of printing in type sizes ranging from .1-in. to 1 in. has been introduced by Standard Register.

The Model 300 label printer is a microprocessor-controlled, tractor-fed, dot-matrix printer device with RS-232C interface and can be operated either stand-alone or attached to a standard data entry device, a company spokesman said.

The unit is said to be capable of operating speeds up to 300 line/min for .1-in. characters regardless of line length and can print the OCR-A font as well as scannable bar code.

The Model 300 is available for delivery with 90-day lead time, and prices begin at $12,550 from the company at P.O. Box 1167, Dayton, Ohio 45401.

Fire Extinguisher Uses Halon

WESTCHESTER, Ill. — A portable fire extinguisher containing the Halon 1211 fire-fighting agent is available from the Visible Computer Supply Corp.

The unit's discharge does not affect information stored on magnetic tape or electronic equipment, a spokesman said. The Halon mixture reportedly leaves no residue.

The extinguisher costs $84 from the firm at 9855 Derby Lane, Westchester, Ill. 60153.

3M Adds Extra-Capacity Cartridge

ST. PAUL, Minn. — The 3M Co. has an extra-capacity data cartridge that provides 150 ft. more of tape for users of that firm's Scotch DC 300A unit.

The DC 300XL is suitable for backup of disk data systems and in applications where extensive logging is involved, the firm said.

Price of the cartridge is $23 from 3M, Department 89, Box 33600, St. Paul, Minn. 55133.

Service Bureau Succeeds In Coupling Large CPUs

By Tim Scannell
CW Staff

PHILADELPHIA — Undaunted by the "horror stories" of other firms who had failed with similar projects, a service bureau here successfully linked two large-scale mainframes.

The Uni-Coll Corp., jointly owned by the University of Pennsylvania, Drexel University and the University City Science Center, joined its IBM 370/168 system with an identical CPU "in a tightly coupled multiprocessing system that will permit each computer to share the other's memory workload without changes in customer programming," according to James Gallagher, president and chief executive officer of the service bureau.

"The result will be a significant improvement in the services the company can offer its customers," Gallagher said.

Uni-Coll, incorporated in 1971, provides both academic and administrative DP services to approximately 30 colleges and 250 commercial and industrial users throughout the Northeast region of the U.S., according to David Workman, vice-president, controller and secretary. More than 80% of the users access the system via remote job entry (RJE) time-sharing terminals, Workman said.

"The commercial users are within the engineering and transportation fields," he explained, adding that various levels of the U.S. government also use the system for administrative processing.

Initial Apprehension

Officials at the firm were, at first, apprehensive about coupling the mainframes. "While it was . . . a carefully planned project from the start, we were concerned that adding the second machine might interrupt our time-sharing services," Workman said.

"Installation of IBM's MVS operating system was required before the mainframes could be linked," Workman stated. "We had heard a lot of stories concerning companies that had failed to install and bring up the MVS system," he said. However, the original 168 continued to operate while the second CPU was being installed "with no interruption of service whatsoever."

Of course, "there were some problems, as one would anticipate, but certainly nothing major," Workman remarked.

Before the final decision was made to acquire a second IBM mainframe, corporate officials briefly considered an Amdahl Corp. CPU, Workman said. "We decided upon IBM principally because we felt that the Amdahl, while a highly attractive system, was untested in the real world," he stated. "We wanted to go with something that had a

(Continued on Page 34)

Dallas County Switches CPUs To Gain Cost, Growth Benefits

By Tim Scannell
CW Staff

DALLAS — The County of Dallas Data Services Department here has increased the memory capacity of its DP center and expanded its growth potential by replacing an IBM mainframe with two Itel Corp. AS/5 CPUs.

The decision to acquire the Itel systems was based on department funding restrictions, according to Charles Collier, DP director. The AS/5s provided the necessary power and performance to handle all the department's on-line functions, and the county got two systems "for about the price it was paying for one 370/158," Collier said.

The Data Services Department is responsible for virtually all of the DP functions within Dallas County, he said. It handles personnel payrolls, budgets for the auditor's office, the county clerk's records and voter information such as certificate lists, precinct lists and guidebook mailings.

The department also maintains a file of the number of adults on probation and the "fees" they have paid. "These fees range from $1 to $10" and are added to the restitution that a probationer may have had to pay back, Collier stated.

The records for all the county and district courts, the district attorney's office and the sheriff's department are also processed by the department. "In all, there are about 350 terminals spread throughout Dallas County that come into our system," Collier explained.

The law enforcement branches access the network of the National Crime Information Center via the computers at the Data Services Department. Telephone lines connect the AS/5s with the Department of Public Safety switching stations in Garland and Austin, Texas, which, in turn, are linked to the nationwide crime reporting system, Collier noted.

(Continued on Page 34)

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Tandberg Offers Formatter

SAN DIEGO — A tape drive formatter, capable of generating and reading Ansi-, IBM- and Ecma-compatible tapes, has been introduced by Tandberg Data, Inc.

The microprocessor-based TDF 4050 is designed to work with 9-track 1,600 bit/in. phase-encoded and 800 bit/in. NRZI tape drives as well as 7-track 200-, 55- or 800 bit/in. NRZI drives. It can execute all standard commands, such as reading in forward and reverse modes, writing forward and writing forward in edit mode and writing file marks, according to the company. It will also accept customer-specified commands, the firm added.

The formatter can be equipped with an optional programmable read-only memory (Prom) so it can be serviced using normal test equipment and is controlled by a master crystal oscillator, a company spokesman said. It is compatible with both the Pertec Corp. and 50-lead flat cable standards.

The TDF 4050 is mounted on a single printed circuit board, and prices start at $2,300, Tandberg said from 4060 Morena Blvd., San Diego, Calif. 92117.

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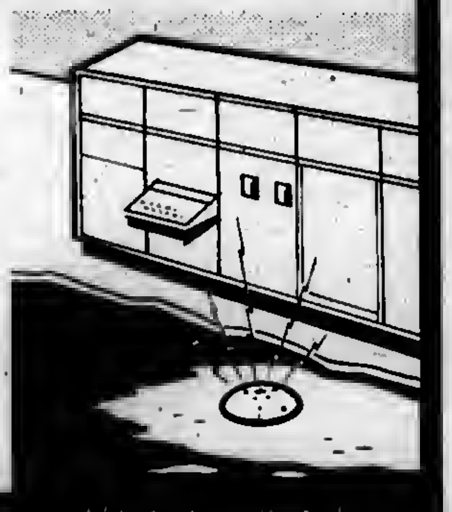

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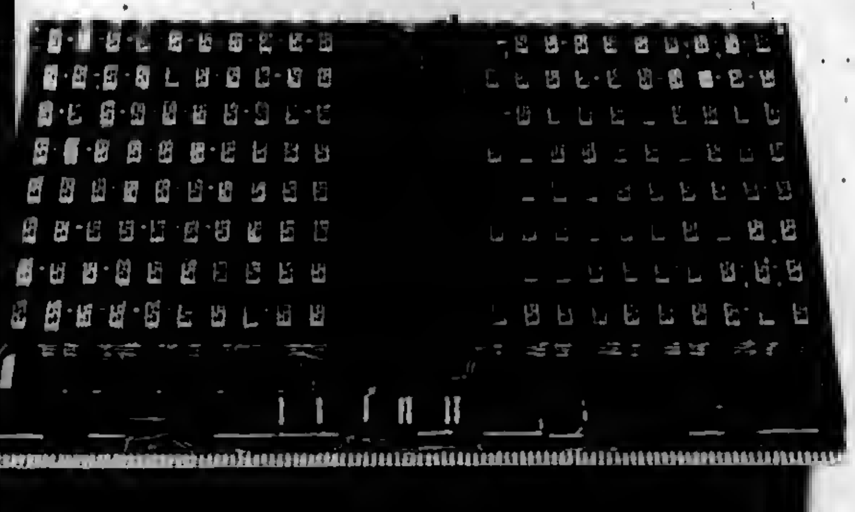

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County Switches Systems

(Continued from Page 33)

Although Collier is satisfied with the performance of the Itel mainframes and their easy adaptation to his department's configuration, he failed to note any marked difference between them and the previous IBM system. "It's hard to say that the AS/5 is faster or slower or anything like that because I made quite a few equipment changes when installing the new machines," he pointed out.

"I was also using Memorex Corp. 3675 disk drives [(before the conversion)], which were subsequently upgraded to the Model 3650, resulting in an increased throughput," Collier remarked.

"I like IBM equipment, but I had some budget restraints I had to fall into," Collier said. "I had to look for suppliers that could furnish the same performance level I was getting with my existing equipment — for fewer dollars.

"I think it's fair to say I did increase our capacity from 2M bytes with the 370/158 to 6M bytes with the AS/5s, and both machines function at a comparable level," he stated.

The current configuration at the department consists of four Memorex 3674 controllers, four modules of 3653 fixed-head disk drives and 11 Model 3650 disk drives.

Installing the AS/5 mainframes barely interrupted the department's work flow, Collier added. "Everything was switchable. We hit stop for a total of five minutes, moved some jobs over and were up and running."

Firm Couples Large CPUs

(Continued from Page 33)

proven track record of reliability . . . IBM offered this and Amdahl didn't."

Uni-Coll's equipment is mostly from IBM, with the exception of a few Memorex Corp. disk drives.

Distribution Activities

In addition to being a service bureau, the firm is also the exclusive distributor of the Wharton Econometric Forecasting Models, Workman said.

The Wharton group, headed by Dr. Lawrence Klein, produces models of the economies of various governments including that of the U.S., Mexico and Brazil. The group comes out with quarterly econometric forecasts to which many companies subscribe, Workman explained.

Wharton Econometric Forecasting Associates, Inc., originally a customer of Uni-Coll, was recently incorporated as a part of the bureau's regular operations.

Uni-Coll officials hope with the addition of the second IBM 370/168 and several enhancements in the firm's telecommunications network, the company will be able to expand from being a regional computer utility to a national and possibly international service bureau. "Our extensive software library including both utility-type software and application software . . . can then be available in principal cities throughout the world," Workman said.

Firms Offer Free Brochures

The following firms are offering free literature:

- Calma, a supplier of interactive computer-aided design (CAD) systems, is offering a 12-page brochure detailing their activities in research and development, manufacturing and marketing applications. The company is located at 527 Lakeside Dr., Sunnyvale, Calif. 94086.
- A microcomputer system configuration guide that shows users how to take a building block approach to the design of control and data collection systems is available from Wyle Laboratories/Computer Products. The chart is based on the Wyle line of prewired microcomputer rack, drawer and cabinet configurations and helps the user select the required complement of modules for a specific task, a spokesman said. The firm is located at 3200 Magruder Blvd., Hampton, Va. 23666.
- The Tandy Corp. has released a 52-page catalog illustrating its line of popular brand microcomputers and accessories, software packages, parts and literature. The booklet details microcomputer kits and assembled systems aimed at hobbyists, educators and business users. The catalog is available from the firm at Department R7, Box 2932, Fort Worth, Texas 76101.
- An eight-page brochure from Versatec describing their 7000 series of rack-mountable printer/plotters for military applications can be obtained from the firm at 2805 Bowers Ave., Santa Clara, Calif. 95051.
- A catalog detailing more than 2,500 computer accessory products is available from the Visible Computer Supply Corp., 9855 Derby Lane, Westchester, Ill. 60153.
- A literature packet from Dataware describes and illustrates the firm's chroma/numeric marking systems for tape libraries. The company can be reached at P.O. Box 22788, Houston, Texas 77027.
- The Capacitors and Electronic Components Division of TRW, Inc. has a 48-page booklet about its line of wound film and tantalum capacitors. Copies are available from 301 W. O St., Ogallala, Neb. 69153.
- A 12-page brochure from Powertec, Inc. describes the company's OEM II series of second-generation, open-frame DC power supplies. The firm is located at 9168 DeSoto Ave., Chatsworth, Calif. 91311.
- The Arnold Magnetics Corp. has a four-page pamphlet summarizing its submodular line of miniaturized AC-DC, DC-DC power supplies. Arnold can be reached at 11520 W. Jefferson Blvd., Culver City, Calif. 90230.
- An eight-page brochure outlining a fiche management system (FMS) for data base management of microfiche can be obtained from U.S. Datacorp, P.O. Box 3460, Portland, Ore. 97208.
- A booklet describing the Micro-Master line of automated microfilm duplicators and variable-distribution programmers is available from Keuffel & Esser Co., 20 Whippany Road, Morristown, N.J. 7960.

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CONTROL DATA CORPORATION

More than a computer company

On-Line Pest Control Firm Kills Paper Bugs

By Alan D. Reyelts
Special to CW

GRAND FORKS, N.D. — The summer of 1976 now seems like a bad dream. At the time, Lystads, Inc. had an IBM System/3 Model 12 installed and was processing strictly in a batch environment. The company had just completed one of the busiest seasons ever experienced.

At the time, Lystads, a pest control service-oriented business, had approximately 200 people in the field doing its contract work. The majority were in sales. Like most salesmen, they all left their paperwork until there was nothing else to do or until they were forced to do it in order to be paid — usually the last working week of the month — and would force 40% to 50% of the workload into that time frame.

Scheduling the peak workload was the biggest problem Lystads encountered that summer. It could not justify hiring enough personnel to handle that one-week overload. By using existing staff and scheduling many hours of overtime during that period, Lystads always seemed to get the job done.

The area that caused the largest problem was turnaround time of the month-end reports. Coding and keypunch errors seemed to be on the increase.

Looking into the crystal ball, Lystads could foresee the following summer would only be worse. Management had set a goal of 15% to 20% increase in business. The DP department met with the president of the company and explained what would be needed to meet the goal.

If the company was to grow the 15% to 20% management had set as its goal, DP would need to hire six additional people and put one additional IBM 3742 on order to handle that situation. This additional $4,500-plus expense was not a rosy picture to paint at that time.

On-Line Investigated

The DP manager had been involved in on-line processing in a previous job. He told management it should investigate going on-line rather than add the additional batch people and machine, stating that it might be a cheaper approach to take. He found management to be receptive to the on-line idea. A trip was scheduled to two installations that were processing on-line with a System/3. Management was pleased with the work being done in the shops visited and decided to investigate it further for cost.

Data Entry Dimensions

The time had come. The DP manager and the IBM salesman went to the president of the company and made a pitch to bring in a CRT for a two-month trial period, at which time they would try and show what type of job could be done in an on-line environment. The president agreed and said that at the end of the trial period he and the other office personnel would decide whether the firm would continue along those lines or go back to doing the job in a batch environment.

One additional selling point was that since the whole industry was going to on-line processing, it would be good to put all of the firm's development on-line.

Upon receiving the CRT, the DP department was ready. It had, at that time, programs written to show how maintenance would be performed, how the credit manager might use the CRT to look up previous accounts.receivables and how data entry punching could handle all cash coming

(Continued on Page 40)

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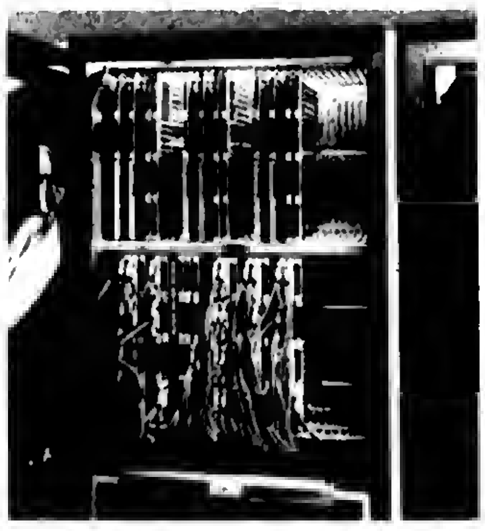

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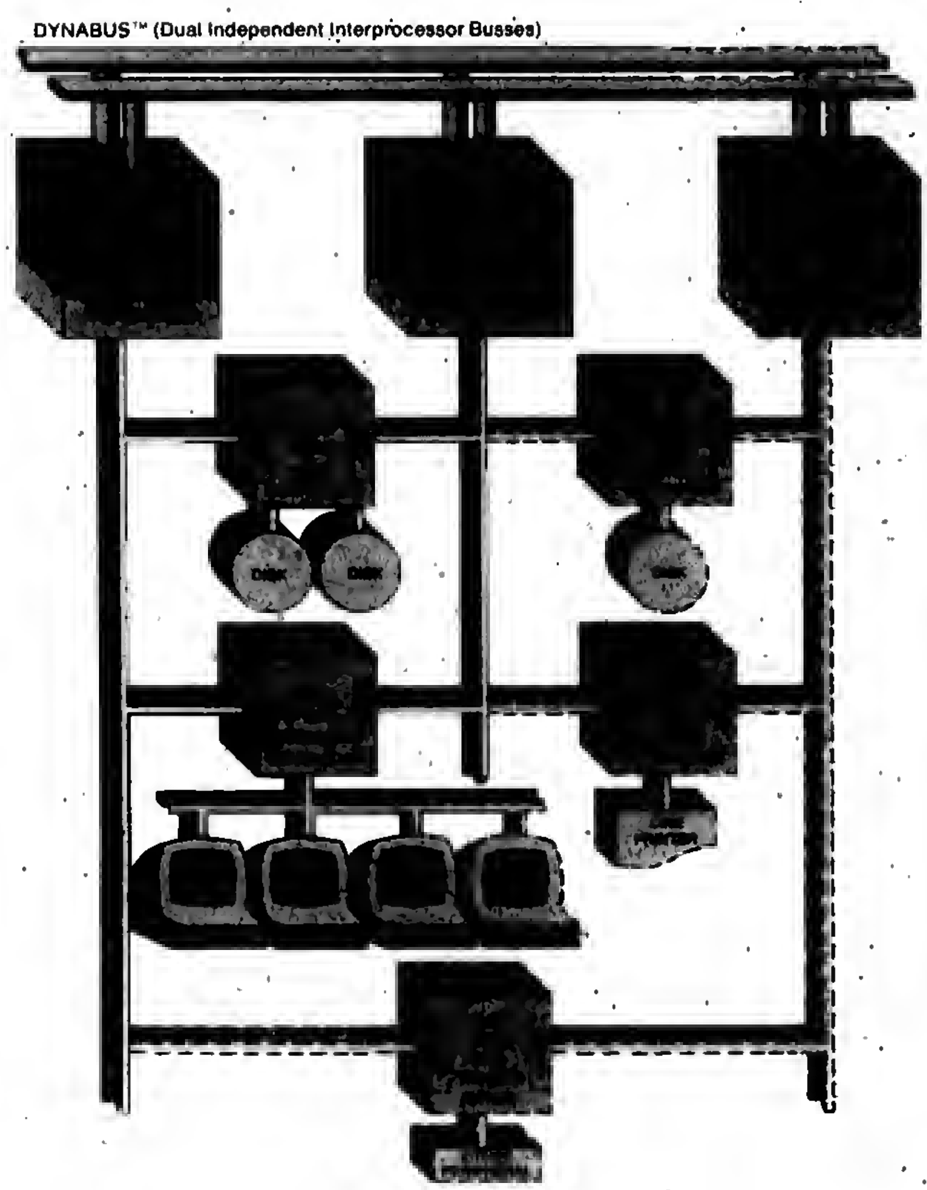

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RJE Net Tracks Big Number of Small Parts

By Rebecca A. Rouch
Special to CW

ALBUQUERQUE, N.M. — GTE Lenkurt, Inc. here, a manufacturer of communications equipment, has been using shop floor data collection devices for production tracking since early 1977.

The tracking system was developed in response to the problems involved with monitoring the production flow of over 400 types of hybrid circuits, any of which might be in production, with quantities varying from 200 to 50,000.

Compounding the problems of small size and large numbers, the parts are passed through more than 15 physical locations in the plant, from initial staging through manufacturing, testing and packing. A reporting system was needed to tell at any given time how many parts were available at various stages of completion in order to determine the length of time necessary to complete an order. When the problems were discussed with the DP department, the need was both serious and immediate.

The company's headquarters are in San Carlos, Calif., and the Albuquerque processing is done by remote job entry (RJE) under Hasp with the San Carlos CPU, an IBM 370/145. Two Data 100 Corp. remote batch entry stations are used by the plant here to communicate with the 370/145; a Model 78 configured as a 360/20 Hasp work station and a Model 76 simulating an IBM 3780 RJE terminal.

The Model 78 is configured with a 400 line/min printer, a 90 card/min punch, a 300 card/min reader and an 800 bit/in. 9-track tape drive. The Model 76 has a 300 card/min reader and a 300 line/min printer. The data entry function is handled by four IBM 129 keypunch machines.

For the hybrid tracking system, IBM 5230/3 data collection devices were selected. The 5230/3 was chosen because its 80-column punched card output fit well into Lenkurt's card-oriented environment. The 5230/3 consists of a control unit and from one to 15 data collection stations.

Each station resides on a coaxial cable that loops from the control unit to the shop floor and back. There can be four stations on each loop. The first loop has a test station at the controller and can maintain only three actual input stations.

The 5230/3 has two input device options: a stand-alone badge reader or an input "box" which has eight action keys, a 10-key keyboard, a card reader and a badge reader. The second type always has the keyboard, but the badge and card reader are optional depending on the application requirements. The action keys can be used to designate record types to the application programs.

The control unit builds a 199-character buffer record from data generated at an input station. The 5230/3 controller must be programmed to format records for application use. The output format is always as programmed, regardless of whether the input comes from cards, badge reader or keyboard. The Lenkurt system was programmed to create 80-column punched cards from the 199-character buffer.

The cards are used in application programs that select the appropriate input using a one-character code; therefore, although the output limitations may seem restrictive, the capability exists to develop different types of record formats.

(Continued on Page 40)

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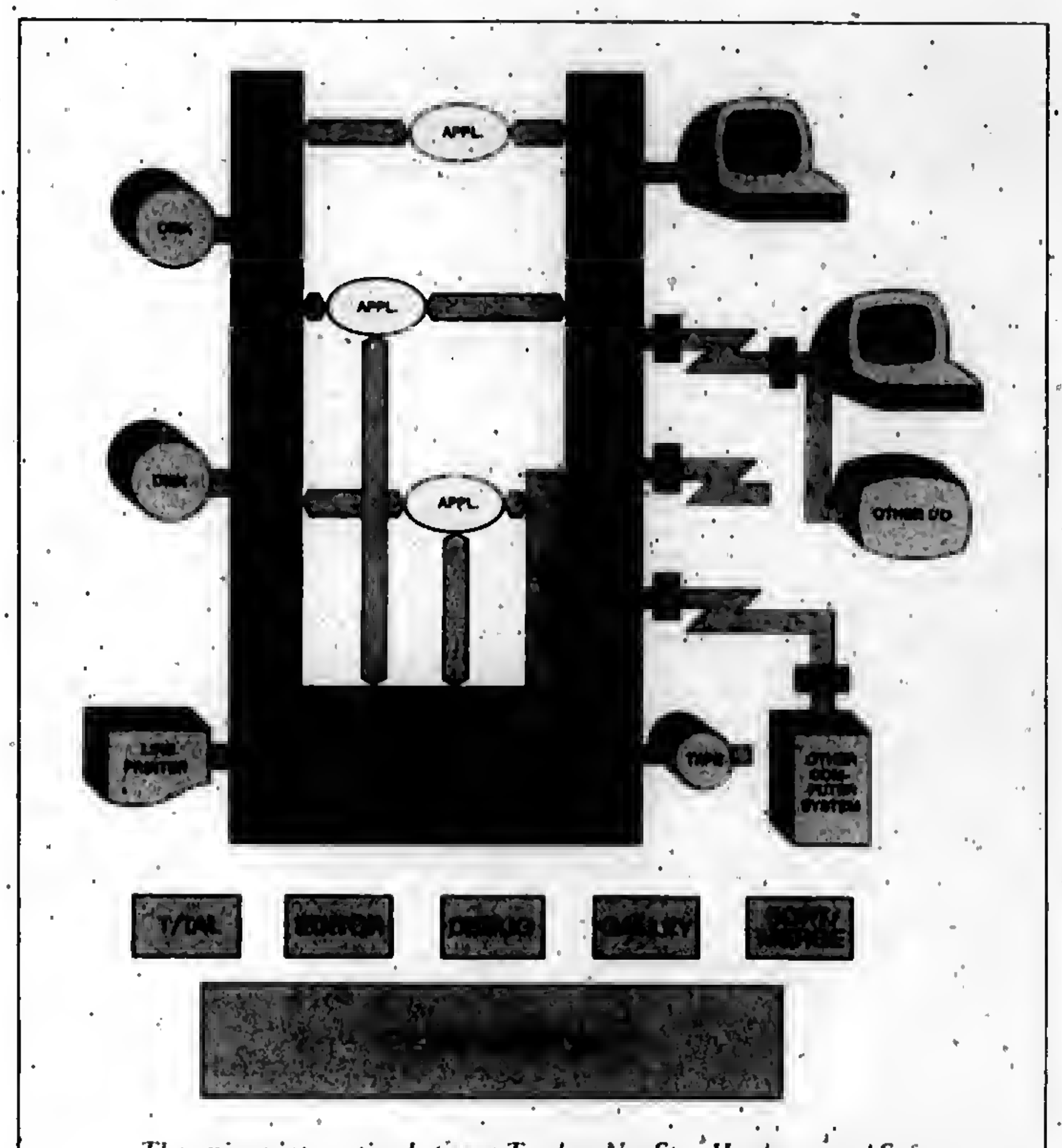

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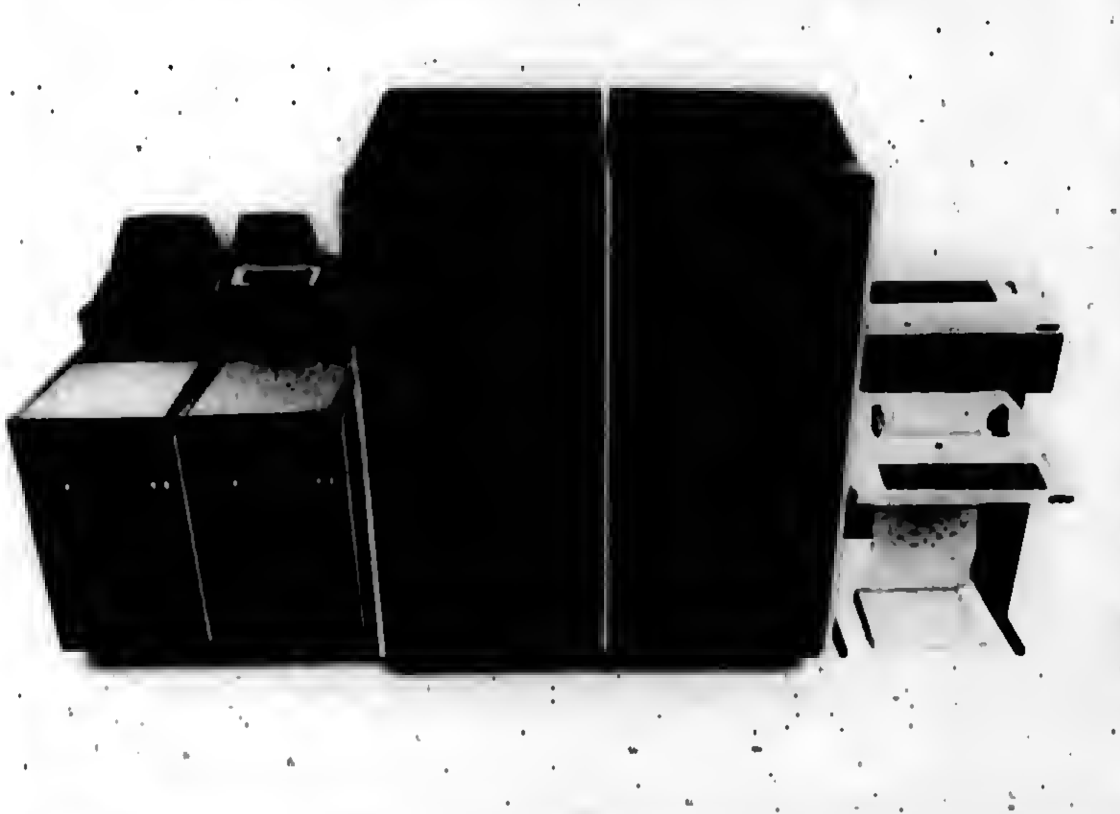

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OCR System Reads Handprinting

Mixed-Media Entry Sews Up Apparel Orders

By James L. Weaver
Special to CW

SHAWNEE MISSION, Kan. — The H.D. Lee Co., Inc. here is using a mixed-media data entry operation to process customer orders that are completed by hand by approximately 300 Lee salesmen.

Like most major apparel manufacturers, Lee is an active user of computers. The mainframe CPU is an IBM 370/158 operating under OS/VS1. Data entry equipment consists of a Scan Data Corp. 2250/1 optical character recognition (OCR) system and 2250/2 key-to-disk system.

The OCR system consists of a Digital Equipment Corp. PDP-8 CPU with 20K storage, 4.4 million bytes of disk storage, 9-track 1,600 bit/in. tape drive and a Scan-Plex I correction station. The customer order forms are 8.5 in. by 12 in. averaging 106 characters of handprint data per document. Processing speeds are 800 to 1,000 document/hour using the Scan-Plex I correction station for entry of nonrecognizable characters. Reject rate since January 1975 has remained at .5% for numeric characters.

Data Entry Dimensions

The 2250/2 key-to-disk system is a full key-entry system with more than 100 programs being used for various job requirements. The key-to-disk system consists of a CPU with 104K-byte storage, 4.4 million bytes of disk storage, 9-track 1,600 bit/in. tape drive, 200 line/min printer and 16 Scan-Plex II key stations. The key-to-disk system has a powerful, reliable operating system. Downtime for three years of operation has totaled less than 16 hours.

Constant Changes

In the apparel industry, seasonal, fashion and market changes occur constantly. These changes require sales information to be analyzed as quickly and accurately as possible. Reaction to sales trends is a requirement for forecasting, production planning; and numerous other critical functions.

On each release of one of Lee's four selling line announcements made each year, the resulting volume of customer orders increased up to five times over the normal volume. Despite all efforts and planning of the data entry section of DP, the manual key entry system could not and still cannot adjust itself to the volume fluctuations and maintain a current status.

In June 1974, Lee' management charged DP with the responsibility of seeking a lasting solution to the problem of backlogged orders. The means and methods were open as long as the cost was close to the current expenditure.

The manual key entry system used six IBM keypunches and 24 IBM 050 key-to-tape units. Using this system, overload help and mandatory overtime were considered normal during new line releases and were still unsuccessful in maintaining a current status of orders received to process.

The DP study reviewed numerous vendors representing every type of key entry device and approximately 44 vendors of OCR equipment. Only Scan-Data approached the problem of mixed data entry using key entry and OCR entry in combination with one basic set of hardware.

After extensive benchmarks of three OCR vendors, Scan-Data was chosen. During the study and benchmarks, the vendor expended a great deal of time and money to promote its product. The OCR hardware was rated tops in readability, reject handling, data formatting, space preservation and 35 other points that were considered relevant. In addition, the 2250/3 mixed-media system was available to complete the data entry keying requirements.

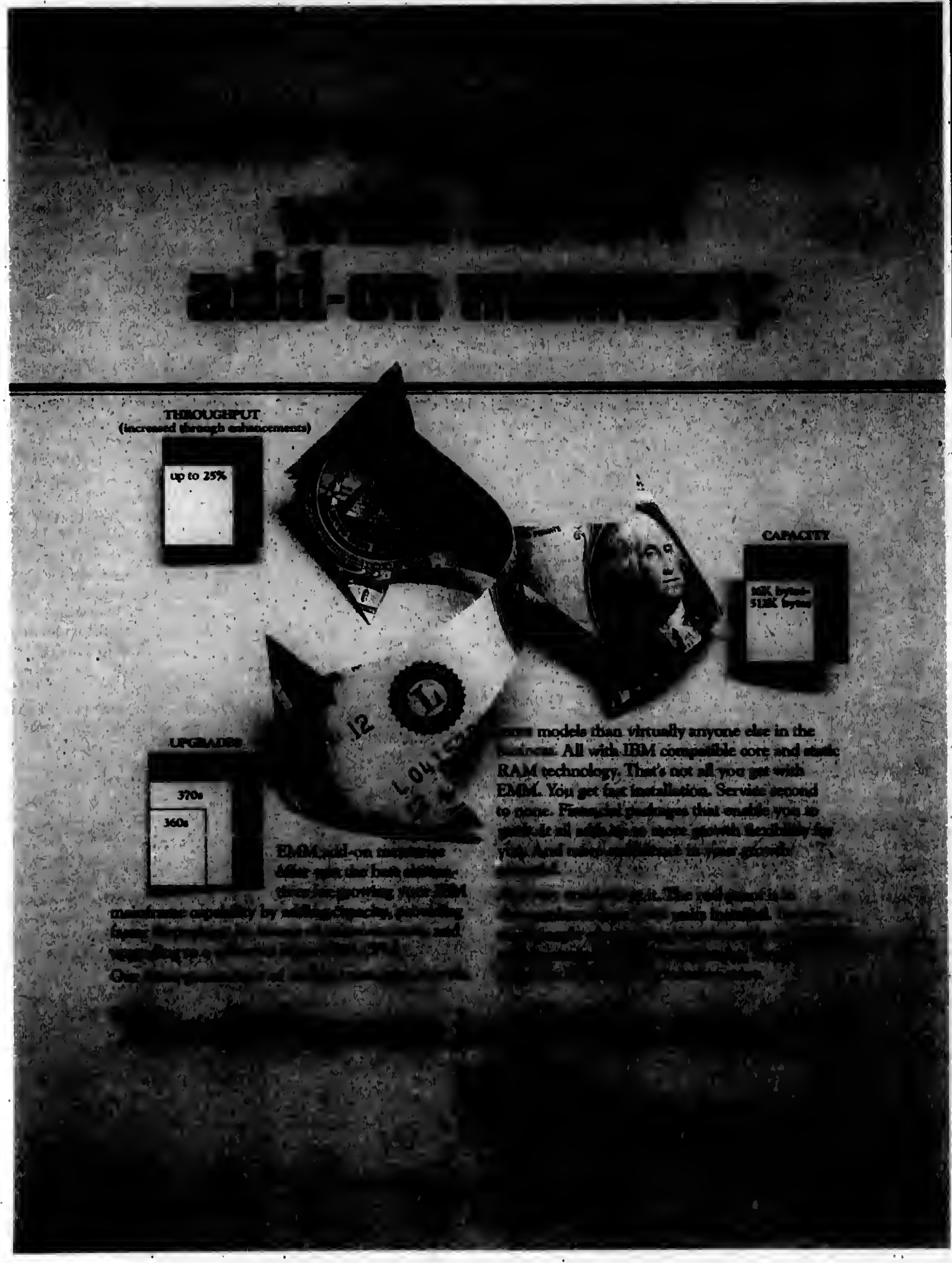
Contingency Clauses

Contingency clauses in the original contract required Scan-Data to assume full responsibility for the forms design, printing, equipment installation and programming for the initial application. In addition, a 30-day acceptance period was guaranteed with charges limited to the forms cost during this period. Scan-Data agreed to these terms provided Lee would follow a list of guidelines necessary for a successful installation.

By December 1974, Lee personnel had completed the OCR salesman training manuals for the 150 fashion salesmen. These manuals were used in successively held regional sales meetings introducing the January selling line and the new OCR system. A full day was spent in each meeting discussing the OCR system and the OCR forms, which were a radical departure from the manual order forms previously used.

The redesign of the order form played a big part in acceptance of the system by the salesman. The OCR forms require less writing. Salesmen noticed a tremendous time savings

(Continued on Page 44)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CW4248

RJE User Tracking Big Number of Small Parts

(Continued from Page 37)

The initial system at the installation consisted of one control unit and three stations with a keyboard, one of which has a card reader. A second coaxial loop and a fourth input station with keyboard and card reader are being added.

The equipment was installed quickly and easily. Two days were required to string the cable for the first loop, an additional day to provide the electrical outlets and another day to physically connect the original three stations to the loop and perform initial testing to ensure proper functioning.

The tracking system itself was also kept simple because of the urgent need for reporting. It was designed as a stand-alone system with no interface with the company's data bases and no attempt to put the system on-line.

Data is entered into stations situated on the factory floor by authorized personnel using a mode key to activate the entry stations. The key was deemed necessary because of the accessibility of the 5230/3 stations to all plant workers. After activating the device, the employee selects an appropriate action key, then in response to cues from the device enters a five-digit portion of the part number, a six-digit quantity and the locations the parts are passing from and moving to. The time of day is added automatically.

This information generates a punched card at the 5230/3 controller in the DP control room. The cards are removed as the hopper becomes full. Each morning the cards are batched into the hybrid tracking system, which updates the hybrid master file and prints a report showing the number of each type of part in each of 14 locations in the factory.

From the report, management can learn the quantity of any part number at any stage of development within the hybrid manufacturing department. The report can be used to determine the length of time needed to complete any specified number of circuits.

Minor Changes

The system has been operational for over a year and has proved very helpful to those using the tracking report; only a few minor changes have been made. The equipment has functioned well with no downtime other than the half-hour preventive maintenance provided by IBM when necessary.

The only problem to date has been with the input devices that have card readers being used by another project. The cards often get dirty in the factory environment, requiring occasional cleaning of the card readers on the floor. If more serious problems should ever develop, it would be simple to return to manual coding for future entry through keypunch or a repaired 5230/3 system.

The capacity for expansion exists, allowing additional loops and data entry stations, as well as possible integration with the company data bases and perhaps eventual on-line reporting. A pilot program for using the 5230/3 devices for labor reporting is also being developed.

Roche is a systems and procedures analyst with GTE Lenkurt.

On-Line Pest Control Firm Eliminates Paperwork Bugs

(Continued from Page 36)

into the office. The reaction was overwhelming. Every person wanted to know, "How soon can I have a tube?"

The goals of an on-line system — increased accuracy, better distribution of the workload, increased turnaround time, better utilization of personnel and less paper work — were found to be reachable. The additional cost of going on-line was approximately $2,900. Staff has not increased, and therefore the firm is saving approximately half the cost of operating in the batch environment.

There are a couple of additional benefits in being on-line. Each employee responsible for a certain area of work is now responsible for it from start to finish, so there is pride in getting the job done. Another benefit that is not talked about much is the ease of training new employees.

Increased accuracy was accomplished because the user departments with CRTs are responsible for their entire workload. The ability to recall a previous transaction to the screen has produced increased self-assurance that they have done the job.

Better distribution of the workload has been accomplished because it is no longer necessary to push all jobs through one data entry department. Being able to use multiple CRTs to do the same job and having many different jobs executed at one time has greatly reduced the stress in getting the total end-of-the-month processing done.

Better utilization of our existing personnel has been accomplished because training to do a new job is much easier using a CRT. All processes are now operator-prompted through the screen and each person's knowledge of the job does not have to be extensive. Simplicity of operation is a definite advantage.

Less paper work is a reality in an on-line environment. The coding sheets previously used for keypunching, with all of the codes for files maintenance or transaction type, have all been removed from the operation.

It is no longer necessary to recopy information. Data received, in whatever form, can now be easily taken to a CRT and entered. This capability eliminates the coding and keypunch errors and some of the training that was necessary for new employees. It is a goal that is easily accomplished in an on-line environment.

Since the addition of the on-line system, Lystads has decreased turnaround time from three to five days.

The additional equipment costs came about because of the addition of a Model 15D in the spring of 1977. In addition to the 15D, the firm has, over a period of time, added CRTs in user departments. The IBM 3/15D is considered a good choice because it is basically an on-line type of machine and has a lot of capacity for growth.

Using RPG-II as the only programming language, Lystads has, over the last year, implemented 150 on-line application programs that are all running today. To help in the development of programs, Lystads obtained the on-line source program maintenance for IBM's CCP Teleprocessing Interface.

At this point in time, on-line processing has been the best move this department has ever made. Lystads will continue to distribute its workload through the use of on-line CRTs in the user department.

Reyelts is DP manager for Lystads, Inc.

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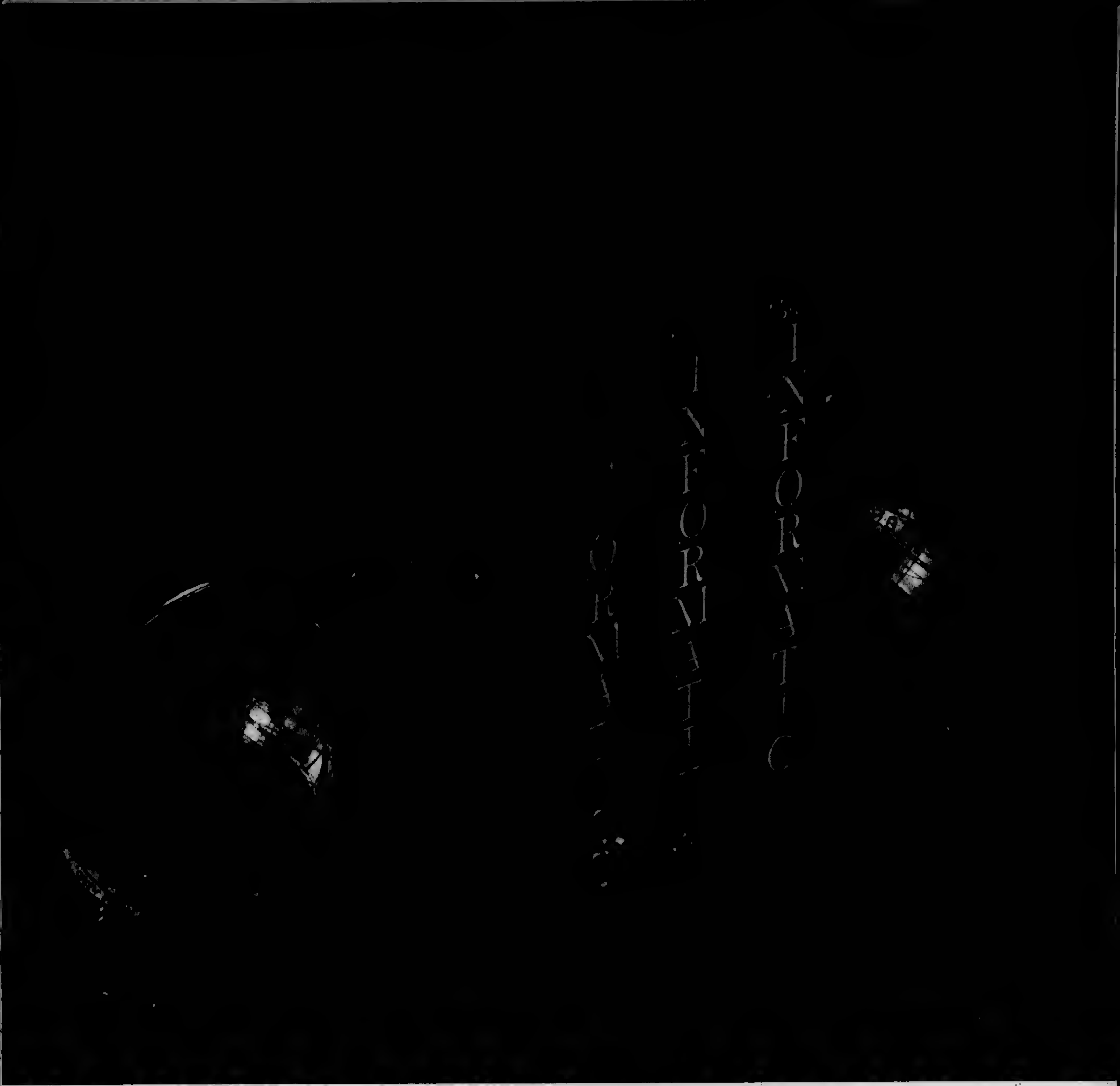

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Hotel's On-Line System Eases Check-In, Billing

Special to CW

NEW ORLEANS — When patrons of the Hyatt Regency Hotel here phone the reservations department, the recording of their reservation activates an automated system that requires no other entries to prepare for their arrival.

Konnie Morrow (standing), PBX manager at the Hyatt Regency, said the computerized display of guest room numbers permits seven operators to handle as many as 15,000 calls a day.

The housekeeping department is alerted, as is the PBX staff. At the front desk, a preprinted registration card is filed before guests arrive. Throughout their stay, all charges to their rooms are captured by on-line processing.

When guests check out, an accurate bill is printed for them in a matter of seconds. There is no waiting for the compilation of charges for phone calls, garage or the breakfast which was finished only minutes earlier.

All of this, and more, is the product of an integrated NCR Corp. software package called Host (for Hotel On-Line System Technique), Michael Garrard reported.

Now in charge of evaluating and coordinating front office and total systems at Hyatt corporate headquarters in Chicago, Garrard was DP manager at the Hyatt Regency New Orleans when the on-line system was implemented in August 1976.

Similar systems had been installed at two of the company's hotels in San Francisco: the 70-room Hyatt on Union Square and the 806-room Hyatt Regency at Embarcadero Center. But they shared a single remote processor until a conversion to individual in-house computers was made in December 1977.

At the larger, 1,200-room Hyatt Regency New Orleans, on-site processing, without any reliance upon external telephone lines, has been the mode from the beginning. At present, the computer configuration at the hotel includes two magnetic disk drives that each put 200 million bytes of information on-line to a 192K CPU.

Linked to the computer is a network of NCR data communications devices. Included are electronic sales terminals, thermal and matrix printers and CRT terminals. The system is on-line for about 21 hours a day, Garrard noted, while more than 40 reports for one kind or another are produced during the early morning hours.

System Operation

The information gathering begins in the reservations department, which has six of the CRT terminals with alphanumeric keyboards for data entry and inquiry. The record volume to date, according to reservations manager Gary Mulock, was 1,560 reservations in a single day. Since the hotel runs a double occupancy rate of 60% to 70%, the guest population routinely ranges from 1,900 to 2,200, he said.

The reservations department at the Hyatt Regency uses six CRT terminals to enter information directly into magnetic disk storage.

As reservations are received, the information is encoded directly on magnetic disk storage. Later, during the off-line period, registration cards for use the next day are printed at the rate of 1,200 line/min. The system also generates reservation confirmations ready for mailing. And among the additional jobs done at this time is production of the next day's room assignments for maids.

Subsequently, as the maids make their rounds, they use Touch-Tone phones in the rooms to report conditions directly to the computer with three digit codes. Thus, at any time, a CRT display can respond with up-to-the-minute accuracy as to the number and types of rooms occupied, those available for incoming guests, those that will be needed later in the day and those that are out of service.

For the PBX room, which is staffed by up to seven operators, the computer

(Continued on Page 48)

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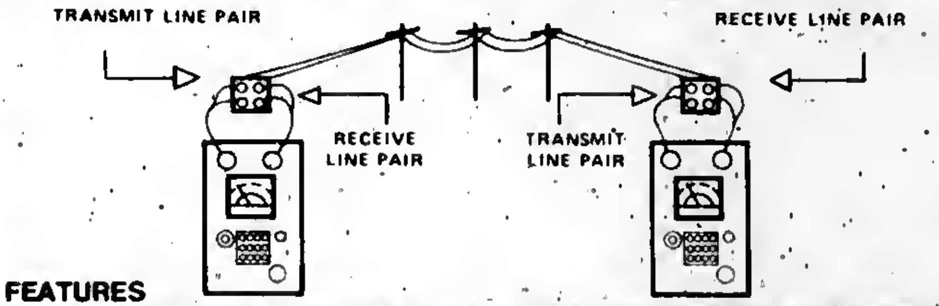

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Improved Response Gained

Decentralization Reduces Insurer's Entry Costs

Special to CW

CEDAR RAPIDS, Iowa — Life Investors Insurance Co. of America improved its response to agents and policyholders and reduced its operating costs by more than $5,000 per month after decentralizing its data entry operations.

In January 1974, the company installed two System 1302 key-to-disk data entry systems from Inforex, Inc. with a total of 25 keystations to replace four keypunch machines, two verifiers and four intelligent terminals, according to Assistant Vice-President Clair McGriff.

Since that time, applications for Life Investors' policies have increased approximately 20% per year. Despite the additional workload, the company processes those policies in half the time previously required, with 50% fewer errors, and has shortened claims processing time by as much as two days.

A year after installation of the Inforex equipment, Life Investors upgraded to three System 1303 controllers with a total of 44 keystations distributed among 16 departments on five floors in its headquarters building.

"We had 11 keypunch operators when our data entry was centralized, but they could not keep up with the increased workload," McGriff recalled. "We were spending approximately $1,500 per month for outside data entry services.

"Our data entry workload has doubled over the past three years, and if we had remained centralized, we would have needed twice as much equipment and would have had to add a third shift. We estimated our costs would have increased by about $6,000 per month for both people and equipment," he said.

Life Investors required a greater number of terminals when it decentralized, because of the number of departments with work to handle. The company replaced centralized keypunch machines that were consistently in use with decentralized keystations that are used only an hour or two each day. The equipment allowed Life Investors to save money even though it installed a greater number of machines.

Since the decision to decentralize, two departments hired one additional person each to handle its data entry work load. Seven keypunch operators were relieved and the need for outside data entry services was eliminated. "When you combine our savings in personnel and equipment costs, I'd say we are saving around $5,100 a month, including $200 in the cost of punch cards alone," McGriff said.

Decentralization Popular

In addition to that cost saving, decentralization of data entry has put responsibility back into user departments, "where it belongs," McGriff said.

"I think that if I tried to centralize data entry now, the users wouldn't let me. They like that feeling of control over their operations that decentralized data entry gives them," he added.

Decentralized data entry increases efficiency by allowing more data entry time in each department, according to McGriff. Formerly, source documents had to be delivered to the keypunch room for each department by 3 p.m. each day in order to be entered for processing by 5 p.m.

Data Entry Dimensions

"Now that each department is responsible for its own data preparation, it has until the end of each work day to enter source documents. Each department has picked up between an hour and a half to two hours of extra time each day," he noted.

Two departments, credit life and new business, have established centralized data entry facilities of their own, assigning clerks full time to data entry tasks. In other departments, work is entered as it is received. For departments too small to justify a keystation of their own, three keystations have been installed in the former keypunch room.

"We bill each department for the services we provide, and when data entry costs rise above $100 to $150 per month, we suggest the department install its own keystation," McGriff explained.

Paul Fisher, assistant vice-president of the benefits and new business departments at Life Investors, noted that decentralized data entry has reduced the number of steps involved in preparing data for the computer.

"We used to have to fill out coding sheets in pencil for each batch of source documents to be keypunched. The source documents and coding sheets were then routed to the data entry department.

"The time spent working on those code sheets was actually time spent on data entry, but now the coding sheets and the keypunching step have been eliminated. We key information directly from our source documents. That's one step to the computer, where

(Continued on Page 47)

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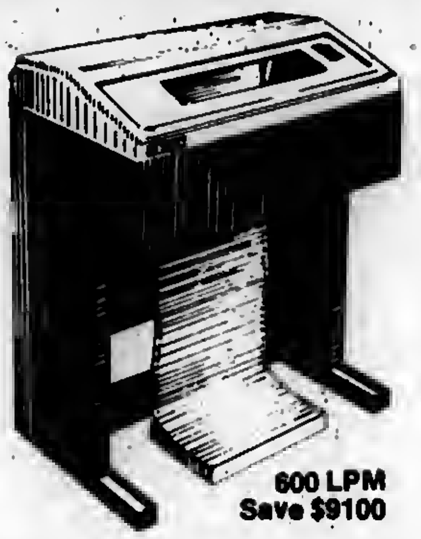

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Helps Keep Budget Low

Optical Scanner Scores High in School District

By Mike Ragsdale

Special to CW

CHATTANOOGA, Tenn. — The Hamilton County Department of Education here is solving its source data entry problems through the use of an optical mark scanner.

The school system has an enrollment of approximately 25,000 students but a very limited DP budget. Like many other educational DP shops, we deal with applications such as student attendance, bus reporting, grade reporting, student scheduling and student standardized testing.

Each one of these applications requires a high volume of input, fast turnaround time and very little room for inaccuracy. The only reason we are able to meet these requirements with a limited budget and one data entry clerk is that we utilize optical mark source data collection.

A National Computer Systems, Inc. Century 7010 optical mark scanner installed in August 1976 has helped us keep our budget to a minimum. If we were to remove the scanner today, it would take at least three data entry clerks to replace it. The scanner's cost is one-third that of three data entry clerks.

The scanner has minimized data manipulation and computer reruns. It is intelligent and has off-line editing capabilities, allowing us to correct the information before it reaches the mainframe.

The scanner has met the requirements for fast turnaround. The speed of the scanner is approximately 3,000 document/hour. Before installing the scanner, it took three days to key and verify the student attendance and bus reporting information. Now the information is ready for processing in two hours.

The scanner has also met the requirement for accuracy. With its capability of 16-level read, it can determine the difference between an erasure and a valid mark.

We are no longer faced with the problem of keypunch errors — we are able to record information the user submits. Further, the scanner has met the requirements for student standardized testing. Before the installation of the scanner, our testing department was paying a service bureau to score and grade our standardized tests. This service was expensive and sometimes took three months to send the results.

By utilizing the scanner's test scoring capability, we can process the same test for half the cost and produce the results in approximately two weeks.

Successful Utilization

We are now ending our second year of utilizing optical source data collection and have been very successful. We have found the scanner is not limited to educational applications, but only to the ingenuity of the user.

Presently, we are designing forms to collect data for our payroll, budgeting and accounting applications. We have plans to utilize our scanner for many other applications in the near future.

Ragsdale is DP manager for the Hamilton County Department of Education.

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Mixed-Media System Sews Up Orders

(Continued from Page 38)

when any of the several mutliple-store options were involved, other options allowed salesmen to build size scales with quantities for size scales frequently ordered. Instead of writing all the detail quantities by size, they could enter a scale number.

The reduced writing and the options were a trade for the extra time required to complete the OCR forms. Scan-Data quoted a 10% reduction in writing speed to satisfy the OCR handprint requirements. A series of reports were designed to inform the salesmen on a weekly bases of the acceptances and percentage of rejects of the forms by character. This was designed to assist salesmen while improving acceptability.

The salesmen refer to this as their report card. Sales managers received summary reports for their salesmen. Any salesman that consistently exceeded 2% rejects was called in for a discussion on improving the quality of the handprint.

By January 16, 1975, the 2250/1 OCR system was operational. This same day marked the official release of the January selling line. From January 16, 1975, to the present, no fashion orders received in the scanning section of data entry have been carried forward. The backlog was eliminated. Each morning when management reviews the activity reports for the previous day, all data is current.

Key-to-Disk System Installed

In February 1975, the 2250/2 key-to-disk system was installed. The initial configuration included six stations, 4.4 million bytes of disk storage, 88K bytes of CPU memory and a 9-track 1,600 bit/in. tape drive.

As on the OCR system, Scan-Data provided the initial application support and training.

In June 1975, the 150 Western, Work, Lady Lee and Ms. Lee salesmen began instruction in the OCR system. The same types of training methods were used for these salesmen as with the fashion group. Because of a difference in product mix, a different order form was developed. All the options presented to fashion salesmen were retained. In fact, several improvements were made, based on discussions with fashion salesmen.

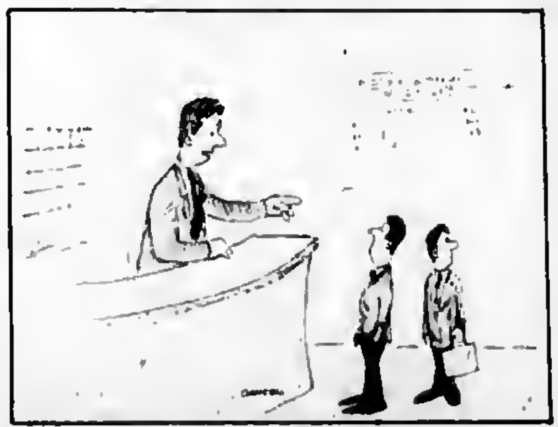
In September 1975, the software for the marriage of the OCR and key-to-disk systems became available. To prevent future growth problems with the system, the decision was made to leave the systems separate. At that time, only eight key stations were recommended for a mixed-media system, and a 10% degradation to the key-to-disk was quoted by Scan-Data to allow both systems to share a disk and tape. So officially, Lee has a mixed-media system that is really two separate systems.

In one year, the OCR system had eliminated the order backlog problem. The capacity of the OCR system allowed the data entry section to be reduced by 10 people and machines.

Continued use of the key-to-disk system permitted further reduction in personnel to the current staff of 15 operators and a supervisor.

In review, the features that made Scan-Data appear to be the best vendor in 1974 apply today. The OCR and key-to-disk systems continue to perform in a most satisfactory manner. The maintenance support in the greater Kansas City area is excellent.

Weaver is systems and programming manager for H.D. Lee Co., Inc.



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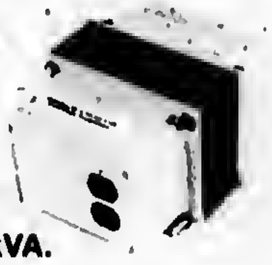

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INFORMER

April 24, 1978

HIGH-LEVEL COMMITTEE TO INVESTIGATE PROJECT X

Ballistic Printer and Dumb Terminal Hooked On Each Other

Page 20

★ ★ ★

Earth and Project X On Collision Course

Page 16

★ ★ ★

Inside!
Exclusive Photos of Secret Anaheim Headquarters, Home of Project X

Page 11

★ ★ ★

5 Warning Signs Of Project X

Page 9

★ ★ ★

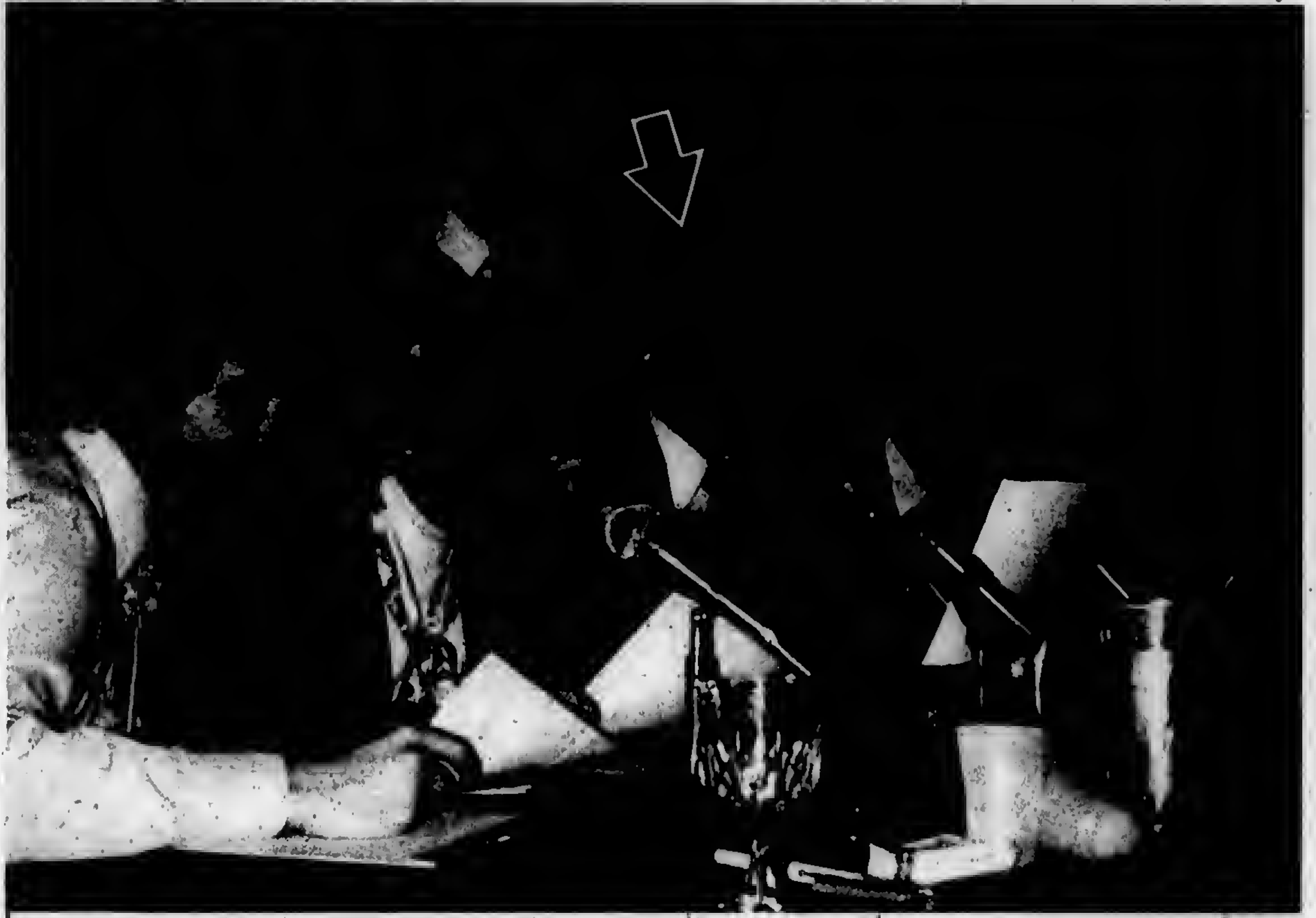
Think Dumb— Bumper Sticker Inside

Page 14

★ ★ ★

Peripherals Of the gods?

Page 8



High-level investigative committee, spearheaded by Bill Terry, seen here in the process of questioning key Project X engineer Garry Strohmeyer. Strohmeyer refused to yield under committee pressure. *INFORMER PHOTO*

Several high-ranking officers at Lear Siegler, Inc. HQ have reportedly initiated actions that would force a full-scale investigation of its own secrecy-cloaked Project X.

Just yesterday, INFORMER sources learned that, due to uncertain publicity regarding the Project, certain high-level committee members want to find out just what is going on behind Project X's barred doors.

Bill Terry, the committee spokesman, told the INFORMER in a rare interview that "...Even we don't know what they (the engineers involved in Project X) are doing, and we intend to find out—for our benefit and for the people's." Terry, when questioned more closely about just how much he *did* know concerning Project X, refused any further information, stating only "...if the committee action fails, the entire world will find out at the NCC (National Computer Conference)."

In the course of the interview, however, the INFORMER was able to confirm several rumors regarding Project X. Terry was unable to conceal the fact that Project X is busily developing devices that will stun the computer industry, and totally dominate the NCC. Slips by Terry included allusions to new, smart terminals, highly intelligent terminals, astounding new printers, and even a mind-numbing terminal controller. But Terry's mysterious insistence upon total secrecy at this late date left many cryptic hints unexplained—and many nagging questions unanswered.

Rumors of a cover-up on the part of Project X are still unconfirmed, but LSI's strange reluctance to spill the beans, so to speak, give impetus to the notion. Without concrete evidence, the INFORMER must resort to educated speculation, but a noted scientist insists that LSI is even attempting a revolutionary breakthrough that

(Please turn to page 6, column 3)

On-Line Agency Offers Libraries Unique Service

Special to CW

WESTWOOD, Mass. — Managing a diverse number of subscriptions to magazines can be one of the cost time-consuming and complicated tasks facing a library today. From the college library with as many as 30,000 magazine subscriptions to the business library with as few as 20, all libraries share common tasks — they must not only order and renew subscriptions, but also spend valuable professional time with related tasks such as address changes, discontinued or merged publications and breaks in service.

F.W. Faxon Co., an international library magazine subscription agency based here, has given over 18,000 customers a solution to problems with ordering and subscription control. The privately owned firm not only orders and renews subscriptions, but also offers a host of services covering all areas of serials librarianship from recordkeeping through budgeting.

All types of customers, including hospital, school and business libraries, avail themselves of Faxon's services. Faxon annually services over 1.3 million separate orders to 85,00 different magazines, journals, newspapers, newsletters and annuals that are published in more than 140 countries — and the firm is adding more than 100 new titles a week.

How does Faxon keep up with this kind of periodical explosion? With an automated computer system that it said is unique among library subscription agenices around the world. An IBM 370/158 with over 2M bytes of storage is the center of Faxon's DP operation, it is accessed more than 40,000 times daily.

Through on-line procedures, some 200 Faxon employees process and service the libraries' subscription lists, sending individual prepaid subscriptions to periodical publishers and one complete invoice to library customers. These employees use a network of 130 CRT terminals; 48 of which are PTS-100 programmable terminals from Raytheon Data Systems Co. of Norwood, Mass.

The 48 terminals communicate via IBM 3270 protocol to the host mainframe through two Raytheon PTS-1020 terminal control units. Raytheon Model 3301 line printer provides Faxon with 300 line/min capability for programmer on-line testing and hard-copy inquiry for file folders and microfilm copies of canceled checks and orders.

Supplement Terminals

According to N. Bernard Basch, vice-president for systems managment, the 96-year-old firm began automating its operation in 1958. "More than three years ago," Basch noted, "we decided to supplement our IBM terminal usage with Raytheon's PTS-100 terminals.

"We selected Raytheon terminals for a number of reasons — they offered good delivery and service capabilty and, most of all, the PTS-100 system offered us plug-to-plug compatiblity for our IBM 2260s and, later, our 3270s at a 40% cost reduction.

"Another benefit of the Raytheon terminals," Basch added, "is physical size. The smaller PTS-100 helps us maximize our working area, and that's an added benefit that can't be easily overlooked."

In addition to these benefits, Basch also explained, the PTS-100 required no user training and provided the firm with features not available with the IBM 3270.

"We had come to appreciate our 3270 terminals over the years," Basch said, "but here was an opportunity for us to reap the same rewards, plus additional benefits, at a substantial cost saving. Raytheon has been very responsive to our needs, providing us with very strong vendor support. We have been quite satisfied with our merger of the two systems."

Applications for the PTS-100 system include accounts payable, acounts receivable, cash receipts, order entry, subscription renewals, claims and adjustments, as well as maintenance of a customer and title file that contains rates and full bibliographic data.

Order Entry Procedure

Subscription orders are entered on the terminals and then verified by operators. A customer history file data base is the hub of Faxon operations; all service depends upon, reacts to or updates information on each customer's list of titles.

Complete and carefully controlled records of all subscription transactions are maintained on-line for at least three years.

A three-year history of all title activity on each itemized invoice will include such information as published prices, payments to publishers and check numbers.

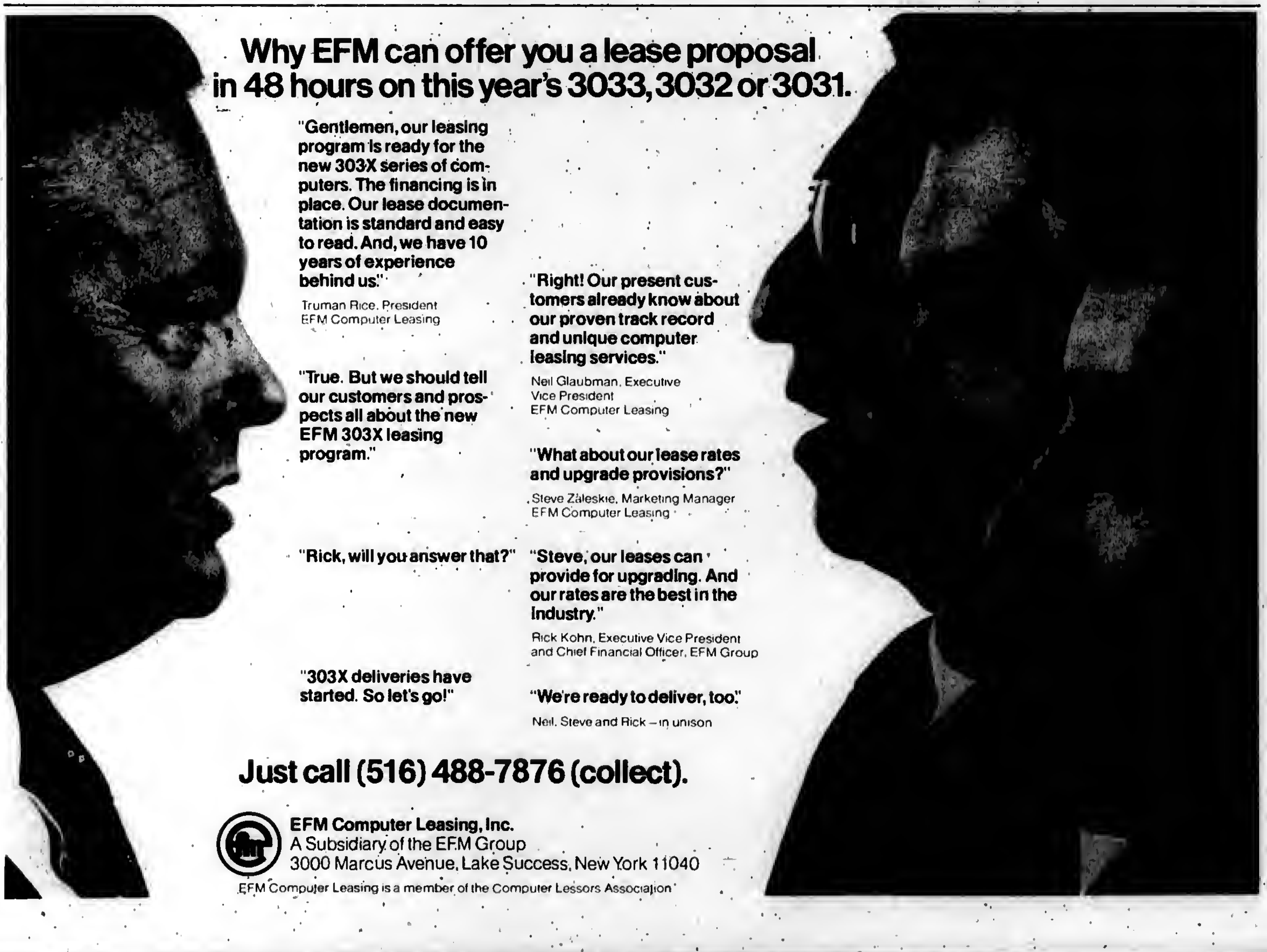
"We have in excess of eight million customer invoice lines for the past three and a half years ready to display in the event of a service inquiry," Basch noted. "Cancellations, adjustments, and claims can all be serviced through CRT keyboard instructions. Over 85,000 titles with complete bibliographic data, price information and publisher restrictions of sale, if any, are immediately available upon operator command.

"Transmitting at speeds of up to 9,600 bit/sec, the PTS-100 system gives us the kind of responsiveness we need to provide our customers with the best service available," he added.

The computer produces orders for subscriptions and writes out payment checks to publishers, which are automatically collated, stuffed and postage-metered. The system then produces a single invoice that details every aspect of the account to the customer, listing periodicals title-by-title, prices, quantity, length of subscription and the library's controlled data for each title.

"Our data base file provides us with the information we need to serve our customers. In fact, the more complex it gets for us, the more flexibility we can

(Continued on Page 48)



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Insurer Decentralizes, Cuts Data Entry Costs

(Continued from Page 43)

we used to have two," Fisher said.

Life Investors had anticipated that its data entry error rate would increase after decentralization. Instead, the error rate has dropped about 30% overall and approximately 50% in some departments.

"There are several reasons for that error reduction," McGriff said. "One is that the person who keys each source document is now more familiar with that document than our keypunch operators were. Each person keys about three or four different documents now, compared with more than 200 documents for our keypunch operators.

"A second reason for the error reduction is the display screen on each keystation. Keystation operators, unlike keypunch operators, can see what they are doing. Third, each operator now knows that he is directly responsible for the accuracy of the data he enters. He can no longer blame errors on someone else," he said.

The data entry error rate has dropped despite the fact that verification by rekeyboarding, necessary in keypunch operations, has been eliminated, McGriff pointed out. "Verification is practical when batches of documents are entered all at once, but now, source documents are typically keyed a few at a time in each department."

Input and Output

Life Investors uses its 1303 systems for output as well as input. For some jobs it loads the processed data file from tape back onto disk on the 1303 to allow operators to search for and display certain records.

"In the credit life department, for example, a computer edit run is loaded back into the system to become an error file," McGriff explained. "Keystation operators in that department can call up each incorrect record on the display screen, compare the displayed record against the appropriate source document and make the correction without having to rekey the entire record," he said.

In the stockholder department, Life Investors keeps track of the number of shares bought and sold each day. The equipment allows it to maintain a month-to-date record of those changes without the expense of an on-line system. A clerk can call up that record on the keystation display screen rather than search each day's records manually to respond to an inquiry, McGriff noted.

He said Inforex was selected over other vendors because its equipment is easy to program. It had taken Life Investors' applications programmers 2-1/2 months to develop new business programs for the intelligent terminals replaced by the Inforex keystations.

The supervisor of that department programmed the 1303 to do the same jobs in three days. More than 140 display screen formats were converted from the intelligent terminals to the Inforex keystations within three weeks by the department staff.

"All in all, decentralizing our data entry operations with the key-to-disk systems has allowed us to lower our operating cost significantly and to do our work faster and with better accuracy. That, in turn, allows us to be more responsive to our agents and our policyholders," McGriff said.

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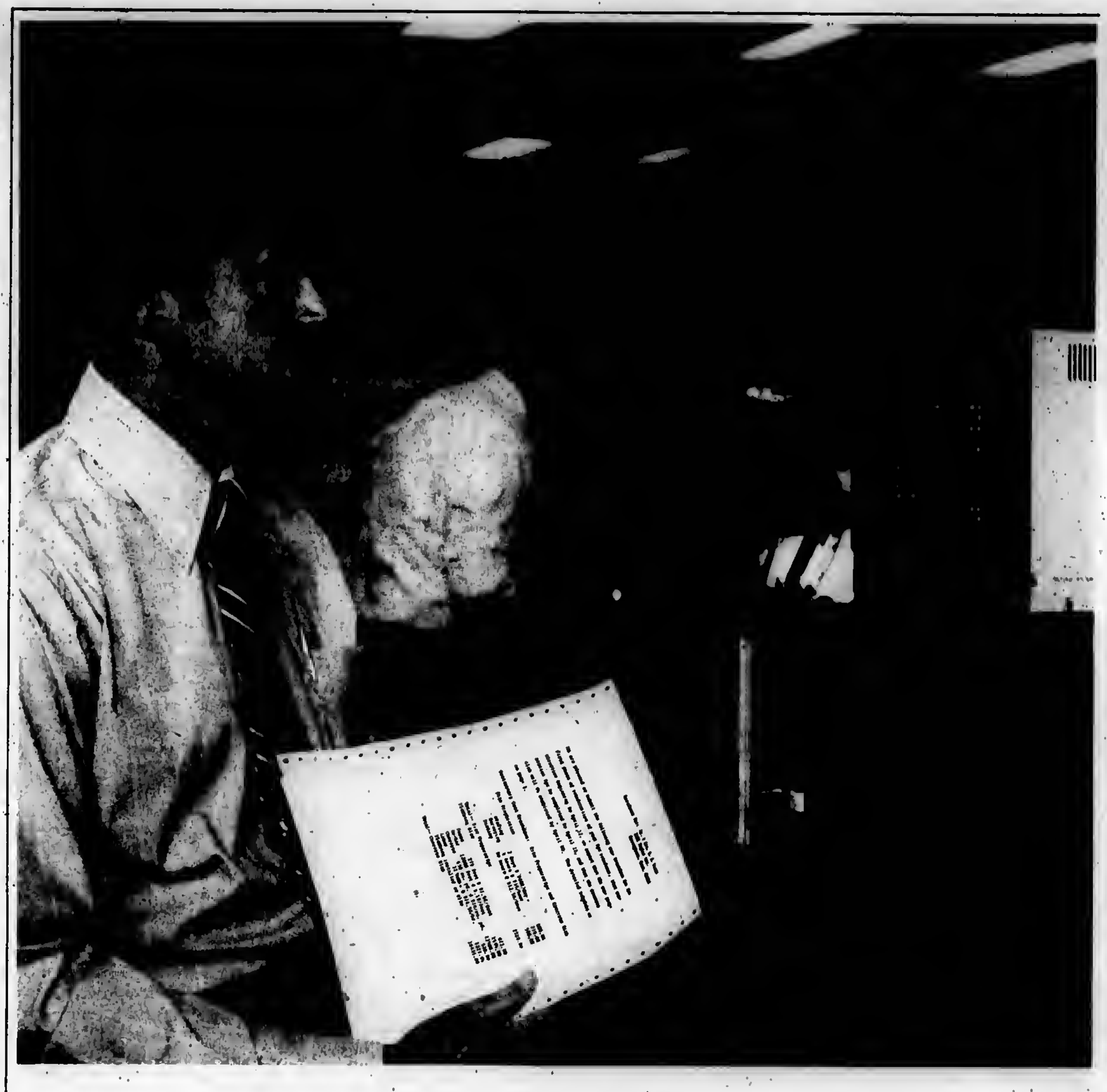

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PolyMorphic
Systems

New Orleans Hotel System Eases Guest Billing

(Continued from Page 42)

produces a printout of guests and room numbers each morning and any time during the day. But that is used only for backup, manager Konnie Morrow reported. She said the operators rely chiefly upon five CRT terminals.

"When someone calls for a guest, we index the first four letters of the last name," she explained, "and the display screen shows us a listing of five guests. If the person being called isn't there, the operator calls for a second display and, if necessary, a third."

On average, she continued, operators are able to give callers the desired room number in 5-10 seconds, a far superior response time to any previous method, she said.

"This is important," she commented, "because we handle 3,000 to 5,000 calls on an average day. And when the hotel is 100% full or when we have a citywide convention, the number has gone up to 15,000 a day."

Billing Procedures

In all the hotel's facilities, food and drink orders are prechecked on NCR 250 electronic sales terminals. Removable keyboard overlays provide prepricing for breakfast, lunch and dinner menus. This lets waiters and waitresses index a single key to trigger printing of both the item description and its price. Journal tapes and item counters in the terminals provide a detailed picture of the business done by each. This helps with menu planning and with staffing.

Except for room service, which uses the same machine for both procedures, transaction settlements are made on separate cashiers' terminals. These are on-line to the computer system, record room and city ledger charges on the magnetic files. Thus, at checkout time, there is no need for last-minute computations.

At the front desk, there is an additional terminal similar to those used in the food-and-beverage areas. This one is used to input miscellaneous charges and to make corrections and adjustments. When a clerk uses one of the on-line keyboard pads at the desk to index the room number of a departing guest; the bill is produced on a thermal printer.

Garrard noted that of the 12 front desk terminals, eight can be used for checkout and all 12 can be used for registration. "We can reconfigure them to take care of any situation in a matter of minutes.

"One day, for example, we had 900 guests checking out at the same time another 1,150 were checking in, so we used all of the terminals to relieve the jam. If we really get pressed, we can also use the six CRTs in reservations to take the load off the front desk," Garrard said.

The hotel is also prepared for guests who arrive without reservations and for those who wish to change their accommodations. In those cases, CRT entry at the desk directs the computer to produce a registration card on a matrix printer there.

When they register, guests are given color-coded "passports" that list the public rooms and guest services available. Cash customers get green booklets, those using credit cards receive blue ones and those with city ledger or VIP accounts get gold ones.

The latter two permit guests to fill in their credit card or charge account numbers and the address to which they want the bill sent. Then they may drop the passport and key into a special box in the lobby. Bills are mailed within 24 hours. The system is so popular, Garrard said, that it has been used by as many as 325 guests in a single day.

Impact Assessed

In summing up the impact of the on-line system, the hotel's former DP manager said "the single entry of the reservation information sets up everything that follows. You don't have to worry about late charges because there aren't any. And you simplify front-desk operations even while the automatic posting of room charges and taxes eliminates the need for a night auditing staff.

"The system provides for maximum efficiency and it minimizes paperwork with attendant savings in time and labor.

"Perhaps best of all," he concluded, "you have control of your hotel at any given time. The CRT screen can tell you how many rooms have been sold, how many remain in inventory and how many reservations you have yet to fulfill."

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On-Line Service Offering Unusual Library Service

(Continued from Page 46)

give our customers," Basch said.

"Each order and check sent to a publisher is electronically filed. After our bank records the transfer of funds, we further update our files to show this completed transaction. We then have proof of the publisher's acceptance of the order.

"Over 20,000 ship-to and charge-to addresses can be located either alphabetically or numerically in our customer service file," Basch noted, "which helps us verify customer billings and shipping instructions."

Order Control Device

"Once an order is entered into the order processing system, each department must complete its unit of work and release the order to the next workstation. This 'sign-off' or order control device allows location of an order for last-minute changes and assures us that all targeted completion dates will be accomplished," Basch explained.

In addition to its other services, Faxon will automatically try to obtain a common expiration date for all subscriptions; will consolidate billings, billing in whatever time sequence the customer selects; arrange for duplicate sets of periodicals to be bound; request sample copies for a library's consideration; update all records and contact publishers when address changes occur; provide three-year price studies for budgeting purposes; and supply punch cards or magnetic tape with all of the data shown on the invoice.

"By bringing data to the source from which it originates, we've increased our accuracy, as well as the quality of our service, and are processing twice as many orders daily. Our error rates have gone down substantially because of our ability to logically and visually check data as it is entered. That's a tremendous saving for us and for our customers," Basch noted.

In providing its many services, Faxon has enjoyed an impressive growth in annual dollar volume which has increased 150% in the past six years. Faxon has achieved this kind of success by controlling its operation costs, virtually eliminating all manual methods of operation, Basch said.

"Our customer services have become increasingly diversified, reflecting the professional standards necessary to meet the demands, requirements and expectations of the library community. Thanks to our automated operations, we're able to personalize our services to meet individual customer requirements."

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Fast, Accurate Technique

School District's Scanner Does Variety of Jobs

By Richard H. Wollaver
Special to CW

PHILADELPHIA — The school district's administrative DP center here supports a pupil population of 250,000 and a work force of 37,000. Data entry is naturally a significant part of the support task and scanners have been employed successfully to ease the problems associated with getting this wide variety of data into various files.

In past years, all data was converted by traditional keypunch machines. This situation has changed so that now we key everything on key-to-disk equipment. Using this method, accuracy and speed have both increased. But still unable to keep up with the ever-expanding workload, the school district began using scanners.

The first to be used were Opscan Systems, Inc. and IBM 1232 equipment. These systems were adequate, but still too slow and inaccurate. In 1972, the district placed a National Computer Systems, Inc. (NCS) Sentry 70 mark-sense scanner system on long-term lease. This system is capable of reading 6,000 sheets per hour and entries can be made on both sides of a sheet and read on one pass. Accuracy is very high and software permits new applications to be easily developed.

Data Entry Dimensions

This system replaced the old Opscan and IBM equipment and permitted us to do in-house scanning of the city-wide test program given each year to all pupils. Scanning is done in-house for all grades five through 12, with the K-4 test booklets still going out to a specialized vendor. The testing application was the one job that forced the district to the NCS and since then, numerous other applications have been developed.

We are presently handling all the payroll input for our per diem teacher work force, which involves some 5,000 employees every two weeks. Since this is a positive reporting system, the workload in data entry would be difficult to handle, but with the scanner we have no problem meeting time and accuracy requirements.

Business Applications

All employee expense reimbursements are also handled with the scanner and more than 1,000 of these are easily processed each month. Various other business applications have also been developed using the NCS system.

All high school grades for some 60,000 pupils are submitted on turnaround documents preslugged on our IBM 370 and scanned by the sentry 70. Accuracy levels are very high and we are able to meet our production deadlines with this process.

In 1976, an Opscan 37 character reader was also placed on rent in an attempt to further reduce the demands on the data entry group. While more difficult to implement because of the need for 10-pitch typewriters, this hardware is beginning to show good results. It is expected that 30,000 to 35,000 complicated personnel documents will be processed through this machine as well as all teacher certification updates.

All in all, the use of scanning has proven its worth. The data entry section has not expanded in five years; in fact, it has grown smaller. More can be done, and we expect further improvements.

Wollaven is DP director for the Philadelphia school district.

NCC '78 THE RECORD BREAKER

The 1978 National Computer Conference, June 5-8 in Anaheim, promises to be the largest and most diverse computer conference and exposition ever held. NCC '78 will combine the biggest with the best with a number of new NCC records expected... the largest exhibit of computer products and services ever held; total conference attendance of up to 40,000 computer specialists and information processing users; plus a Personal Computing Festival which will provide a unique national forum for this fast-growing field.

NCC '78 will be a rewarding learning experience for anyone with a need to know about the latest developments in computing and information processing. The conference exhibit program will be the largest single display of computer hardware, software, systems, and services ever staged. All exhibit space for NCC '78 is sold out, with more than 330 organizations reserving 1,382 booths — surpassing the previous record of 1,146 booths set at the '77 NCC in Dallas. More than ever, NCC will be an extraordinary showcase for the latest developments in computing with over 4,000 industry representatives on hand to demonstrate their latest products and services, provide technical and commercial data, and to help you find solutions to your specific needs.

The Personal Computing Festival will be the most exciting event of its type ever held. The Festival marks a first for NCC — a major conference-within-a-conference with its own program of approximately 30 sessions, commercial exhibits of consumer computer products and services, and a contest featuring "homebrew" microprocessor systems, devices, and applications. All Personal Computing Festival activities will be held in the Disneyland Hotel Convention Center, just a few minutes from the Anaheim Convention Center.

And there's much more. A technical and professional program of some 100 sessions will cover new frontiers in computer methodology, applications, systems, and societal concerns with emphasis on practical applications and current issues rather than on theoretical concepts. Special attention will be given to how the use of computers can help alleviate the national energy problem. In addition, a Professional Development Series of 15 seminars will feature topics critical to increasing professional skills and aiding in career development. Each seminar will be available at a separate, nominal fee.

Act now to make certain you're part of NCC '78 — the biggest computer show on earth. To preregister or to obtain more details, fill out and return the coupon today.

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Module Backs Microfilm Users

ROCHESTER, N.Y. — Eastman Kodak Co. has introduced an interface module for computer-assisted retrieval of information stored on microfilm that reportedly links IBM 3277 CRT terminals with Kodak's Recordak Microstar reader Model PR-1 and the models IC-5 and IC-5P image control keyboards.

The interface module permits parameters to be entered into the terminal and conveyed to the microfilm reader, according to a spokesman. The reader is linked to a host computer that scans the stored image index information and returns the location data to the terminal.

The interface is priced at $2,000 and will be available in the third quarter from Kodak, 343 State St., Rochester, N.Y. 14650.

'What Do I Do? I'm an Analyst — But They Won't Tell Me of What."

Computerworld Special Report

SOURCE DATA ENTRY

getting the job done

APRIL 24, 1978
Edited By
FRANK VAUGHAN

Recognition Sought

Dema Striving to Meet Data Entry Challenges

By Norman Bodek
Special to CW

GREENWICH, Conn.— If you have a professional involvement with the collection, management or entry of data, the Data Entry Management Association (Dema) may be of interest to you.

Dema's prime goal is to achieve proper recognition for the data entry operation within the business community. Members of the organization believe data entry management people are truly professionals and are entitled to all of the benefits derived from their profession..

Dema's current membership is comprised of more than 600 top data entry professionals from industry, government, education and service areas.

Data entry and collection encompasses 30% to 50% of the average DP budget, but probably receives only 2% of its deserved recognition. Dema hopes to balance the scale along with today's rapidly advancing technology.

The dichotomy between the "sophisticated" computer and the "factory" keypunch has disappeared. Today, data entry is no longer the keypunch. Instead it is:

- On-line interactive terminals.
- Minicomputer key-to-disk systems.
- Optical character recognition (OCR) and mixed-media systems (OCR plus key-to-disk).
- Tablets, pads, wands, magnetic card readers..
- Distributed networks.
- Key-to-diskette and key-to-tape systems.

Man Vs. Machine

Above all, data entry is responsible for the area of man vs. machine: the interfacing of people with machines, the management of people and the responsibility for the integrity of the data being captured.

People vs. machines. We do have a choice. We can use the machine as a tool, as a benefit for the development of man or we can become the instrument of the machine.

Like the machine, we can become impersonal, unloving, callous and totally objective. Unfortunately, too many computer installations have allowed the machine to dominate. People working in its environment seem to lose many of the human elements and become like the machine.

As management, we are concerned with properly utilizing the latest technological equipment to its fullest. We want to capture data accurately with proficiency.

Yet, while we recognize our obligation to be accurate and produce data at its lowest cost through higher productivity, we believe working hard is not a contradiction of our humanity. We can work hard and produce to our fullest while still developing the higher aspects of our humanistic selves.

Data entry is primarily the profession of managing people and is concerned with:

- Hiring and training.
- Supervision.
- Motivation, job enrichment and job development.
- Interviews and evaluations:
- Compensation.
- Cost control and budgeting.

The difference that existed a few

(Continued on Page S/20)

Persian Data Problem Solved

Right-Left Language Scanned 'by Number'

By Thomas Jaycox
Special to CW

TEHRAN, Iran — The data collection problem in the U.S. and other developed nations has, in recent years, been solved to a great degree by advanced technology and the introduction of optical character recognition (OCR), magnetic ink character recognition (Micr) and similar devices, but not so in a developing country such as Iran.

In Iran, where computers were first introduced 10 to 15 years ago, the ancient abacus still reigns supreme. For every computer or hand-held electronic calculator in use in the U.S. today there are at least 100 (if not 1,000) abaci functioning in Iran just as they have been for the past five centuries.

For the less than 100 computer installations that do exist, data collection is still the No. 1 problem.

Other problems relating to the study, the design development and the implementation of automated data processing systems in Iran have to do with the language of the country, which is Persian (Farsi). Farsi is an Arabic script type of language completely unlike our own or any other Roman/Latin-based language.

In addition, Farsi is written and read from right to left, just the opposite of English.

Of course, one way to solve this language problem is to develop systems to process English data only (and most systems developed in Iran do just that). But even though English is the second language of the country, how are such systems worthwhile when less than 3% of the population can speak or understand English?

For any automated DP system to serve the purpose for which it was intended, it must be able to process data in the language of the country, and if new problems and obstacles are presented, they will have to be overcome.

For the past 20 months, my colleagues and I (most of them, like myself, are from the U.S.) have been engaged in a project to automate the Imperial Iranian Gendarmerie. The Iranian Gendarmerie carries out in Iran many of the law enforcement functions performed in the U.S., by such arms of the law as the county sheriff, the state highway police, the Federal Border Guard Authority and the Treasury Department. It has responsibility for keeping the peace in the rural areas of the country, patrolling the countries highways, protecting its borders against illegal entry and apprehending smugglers.

The National Police, on the other hand, have responsibility for maintaining law and order in the urban areas (all cities of 5,000 population or more).

First Application

The first application for the Gendarmerie was the automation of traffic

(Continued on Page S/8)

Source Data Entry Seen as Step to DDP

By Gerald R. Doctor
Special to CW

Source data entry is becoming a first step into a distributed processing environment for many users. Although a move to source data entry — the utilization of data capture equipment right in the business environment — does not require a headlong plunge into distributed data processing (DDP), well-planned first steps will provide a solid foundation for future growth in that direction.

For computer users unable to move from centralized to distributed processing for various reasons, source data entry becomes an interim measure that allows them to reap the benefits of intelligent preprocessing of data and timeliness of the entry process.

Some significant benefits of DDP are more timely data, more valid data, improved management control over decision making and increased responsiveness to customers. Since data entry is such a large part of DDP systems, any source data entry system will partially achieve some of these benefits and begin to bridge the user into a more extensive structuring of processing operations.

The functional benefits of a fully distributed system — such as common data bases, compatible languages, unified communications protocols, load sharing and broad access to information — can be achieved via a growth process which involves source data entry as an initial step. For the potential source data entry user, this transition may not appear to be so easy. Let's look at some of the problems he faces today.

The traditional data entry process usually involves the following steps: data generation, transcription, capture, formatting, verification, editing and, finally, computation. This method of operation means the user is confronted with a series of discrete steps along the

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European Data Entry Methods Accent People

By Frank E. Taylor
Special to CW

MANCHESTER, England — Here in Europe, the relative costs of labor and equipment are still somewhat different from those in the U.S., and there is still considerable accent on techniques for any job that involves a balance between the use of labor and the investment of capital to produce a least-cost facility.

This is most certainly true in the data entry field, where there is almost certainly more accent on systems that use personnel as transducers between the process of data capture and its entry into a system. There is an increasing trend for such personnel to be line staff performing other functions — a point explored further in this article.

First, it is relevant to examine data entry in perspective.

In any processing system, means must be provided for the entry of data which satisfies the objectives and functions of the overall system, these relate in turn to the activities of the end users served. The data entry technique within any system must be capable of handling the volumes of data in the system, within a time scale determined by the end use of each data set entered. And of course, it must present accurate, correct data to the processing facilities. A further requirement is integrity — ensuring that all the data and no less or more than intended, is processed.

Here in Europe, there is probably less accent on security than in the U.S., and integrity is probably not attracting as much attention as it is across the Atlantic. However, more and more organizations are beginning to realize that the personal link in a data entry system is rather critical and should be quickly reviewed on a regular basis. Such reviews include examination of alternative entry methods. These will be explored in outline and then in relationship to the European scene.

Data Entry Methods

The means used for data entry subdivide naturally into two main classes: general-purpose techniques (almost always associated with a keyboard and some form of transducer that can be used to enter almost any kind of keyboard-compatible data and special purpose techniques (restricted to handling certain types or classes of data or data prepared in a certain way.

Examples are optical mark reading, optical character recognition and magnetic ink character recognition.

This class also extends to other specialized techniques such as point-of-sale (POS) terminals or production control systems that often use special-purpose equipment, such as optical mark readers or badge readers, in combination with a nonstandard keyboard.

Much of the equipment used here for special-purpose data entry is imported from the U.S., although European equipment is being manufactured for POS terminals and production control terminals.

However, in light of the fact that labor-intensive data entry methods are likely to be familiar in Europe for some years to come, a considerable amount of effort is going into the standardization of both coding and graphics.

New international alphabet standards are likely to be proposed by one or more of the European national-standards bodies in the next two to three years.

In some environments, conditions do not favor the use of personnel — for example, in systems where a 24-hour service is offered or in hostile environments. Process control computers for many years have been incapable of accepting information input directly from transducers via wide links.

'Data retention will probably increase in importance as it will reduce the need for general-purpose data entry involving keying, which is likely to become more and more expensive as staff costs rise. This may well be Europe's alternative to the specialized data entry methods that have gained favor in the U.S.'

Imminent extensions to this class of system include direct-wired devices that involve entry of data into processing systems at the time of its generation — for example, direct links between self-service devices such as gas pumps and computer-based accounting systems. While such devices have been familiar for a decade in the process control field, they are still relatively unfamiliar in European commerce.

Direct Data Entry

In line with the interest here in general-purpose data entry techniques, there has been considerable development of techniques that match user demands for improved service in terms of faster response and easier availability of information. Techniques that allow the migration of the data entry activity into the user environment and provide a flexible data input/-output terminal have been developed very rapidly here using CRTs.

These are the so-called direct data entry methods, which have been revolutionized by the incorporation of intelligence into, or close to CRT devices. Such intelligence allows data to be checked, validated and amended at the time of entry.

Direct data entry has advantages: several of the steps incurred within the data entry activity are eliminated, such as human verification and document batching. The advantages first appeared here four or five years ago in the form of packages available for certain manufacturers' mainframes.

While such packages were potentially very useful, the basic problem was that they occupied valuable channel capacity on an expensive mainframe. The emergence of minicomputers and microprocessors has led to the migration of the processing capability from such mainframes, to small computers located where the required processing capability is often found.

The key to the effective application of such devices is the design of user dialogue. Because of the labor/investment balance, user dialogues have probably been developed more intensively here in Europe than in the U.S., and it is perhaps relevant to review its development.

Three differing techniques for the design of dialogue have been used successfully to date — these techniques match differing system requirements and differing user skills. The first involves use of the "fill-in-the-blanks" technique, in which a carefully designed format on the screen allows the operator to fill blanks within that format, while at the same time checking that the keyed characters are valid. In many cases, characters are validated against a prestored record of field

(Continued on Page S/12)

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For Government Contractor

OCR Unit Captures Workers' Time Card Data

COLLEGE POINT, N.Y. – Optical character recognition (OCR) has now been extended to gathering production data from the plant floor at EDO Corp. here, where workers' time cards are actually OCR forms.

Employees print elapsed time and production information on the cards, which are then processed on an OCR reader that captures the data in a matter of seconds, compared with the 10 minutes previously required for keypunching and verifying, according to a spokesman.

The IBM 370/135 CPU at EDO Corp. will soon be upgraded to a Model 138.

"We've killed three birds with one stone," Charles F. Anderson Jr., vice-president of financial and administrative services, said. "We're getting bills out faster, which improves cash flow, and we've cut administrative costs. Equally important, we've generated a new awareness of the time card, the most basic of all production documents, that is effectively the employee's paycheck and the company's basis for charges to customers."

The OCR time card, made out by both salaried and hourly employees, has resulted in net savings of about $23,000 a year – including the cost of the new forms, which is less than the old cards. And that is just the beginning, since OCR processing has since been extended to three additional applications, with more planned, he explained.

Fast and accurate capture of production data is particularly important to EDO, because a major portion of its work is for the federal government.

The company dates back to 1925, when Earl Dodge Osborn used his initials to name his EDO Aircraft Corp., which built and tested seaplanes and aircraft floats in a plant adjacent to Flushing Bay.

Today, EDO is a $53-million-plus organization employing more than 1,600 people worldwide. The Government Products Division produces a range of equipment from various sonar systems to fuel-tank jettison release mechanisms.

If the OCR reader can't read a number, it stops and flashes that number on the 3277 screen. The operator then enters it through the keyboard.

The Edo-Aire Group makes products for the general aviation industry. The Commercial Products Group serves the offshore oil and gas industry, produces industrial ceramics, airborne television and fiber optic recording equipment, rotating components for the computer peripheral and instrumentation markets and fiber-reinforced composites for the aircraft and aerospace industries.

The firm's experience with automatic DP methods dates back about 35 years to punch card machines. Currently, EDO is using an IBM 370/135 with 256K bytes of memory.

The Management Information Systems Department serves all EDO divisions and groups, with the largest workload coming from the Government Products Division, whose main plant is here. More than 750 plant and office employees are involved.

Controls Needed

The major impetus for changing production data collection methods stemmed from the need to produce management reports faster and to get bills out faster at the end of the month. Time cards had been processed weekly, with the cards filled in by employees, then keypunched to enter the data into the computer. This was changed to a daily cycle that speeded the reports but not to a same-day basis. Controls were still not tight enought to suit management, particularly on cost-fixed contracts, and the keypunch workload was significantly increased.

EDO considered an on-line data collection sytem, but start-up costs were felt to be too high. More important, it would have meant a drastic change for the employees, many of whom have been with EDO 30 years or more.

"We decided on OCR because we felt it would be easier on the employees and would also get us the improvements we needed," Robert E. Schmand, manager of management information systems, said.

"We were aware of the potential difficulties, since the machine would have to read numbers hand-printed by hundreds of individuals – sometimes leaning on a shearing machine or other production equipment. But our people were used to writing information on cards, and our studies showed the technology had reached the point where we could make it work," he said.

Document design is critical in OCR processing, so Schmand and his staff worked closely with IBM and forms companies, designing a number of potential forms. The new time reporting form finally selected has space for the employee to enter four separate production steps, or charges. Most cards average 2-1/2 charges; if there are more than four, a second card is used.

There is space to enter a job number, actual and/or premium hours worked, department and class (direct or indirect

(Continued on Page S/26)

Robert E. Schmand (right), manager of management information systems at EDO, discusses work flow with operations manager Andrew J. Currie.

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Portable Data Entry Pleases Supermarket Chain

Special to CW

COMPTON, Calif. — Ralphs Grocery Co., a California supermarket chain, was one of the latest grocery chains to adopt an electronic ordering system using portable data entry terminals. But when it did, it went all out. The positive effects of that decision have been startling to even the most optimistic executives at Ralphs.

For years, Ralphs had relied on the mark-sense punch card system to do its ordering. Late in 1976 the Los Angeles based chain, which now has 101 stores, began testing MSI Data Corp.'s Source 2200 equipped with an optical wand scanner. Early in 1977, the company elected to switch over completely to electronic ordering and took delivery of 115 Source 2200s.

Within 12 months, the terminals have paid for themselves, cutting the costs of writing orders by 65%, according to Roger Borneman, Ralphs' vice-president for administration..

"We've had some problems," Borneman said, "but the new system has caused substantial expense savings."

It should be noted that Ralphs' electronic ordering system complements but isn't a part of the electronic cash register and scanning systems the chain is installing at its checkout stands.

Orders recorded by the MSI terminals are transmitted via standard telephone circuits to one of two MSI Model 3040 receivers at Ralphs headquarters' computer center here, and, after editing, are processed by the company's IBM 370/158.

When Ralphs decided to adopt electronic ordering, it had planned to use the shelf-tag scanning feature of the new system only for grocery and deli items and to key the orders for meat and produce. This approach was planned to retain the meat and produce order history that was a feature of the old mark-sense card order system.

Shortly after Ralphs began using MSI's terminals, the company decided to try combining the old and the new by adding a scannable bar code for meat and produce items to a new version of its order book. This worked well, Borneman said, and the system was further expanded to include what Ralphs calls "expense items" — uniforms, mailing supplies, forms, even the paper bags used to pack customers' purchases.

Labor Savings

"We had projected labor savings of 60% in the writing of grocery and deli orders alone," Borneman said. "When we expanded it to include meat, produce and other items, our labor savings reached 65%."

In converting to electronic ordering, Ralphs eliminated most of the cost of the courier service it had used to pick up mark-sense cards and some equipment and supplies used with the former ordering system. But of the total amount saved, 95% was in store labor, Borneman noted.

In disclosing that the MSI terminals had paid for themselves in less than a year, Borneman declined to quantify the total dollar savings realized through electronic ordering. But he did say the pay-out took into consideration all develoment costs, including systems and programming effort, as well as equipment costs.

Borneman was quick to add tht the labor savings was only a part of the benefits provided by electronic ordering.

"I don't think we realized the full impact of this when we made the decision to adopt this system," he asserted.

Fast Orders

With the old mark-sense card system, it took 48 hours to get an order delivered. Now, Borneman said, nearly all of Ralphs stores receive their grocery orders within 24 hours, and for many stores, the elapsed time for grocery orders is little more than 12 hours.

At the same time, electronic ordering with the equipment eliminates any doubt whether merchandise previously ordered is enroute or is already on the shelf when the clerk records a new grocery order.

The old system was susceptible to error because a clerk writing an order would assume that the order he sent in yesterday was "in the pipeline" and would base the new order on what he saw on the shelf plus what was supposed to be enroute. But if the clerk had ordered, say, two cases of peas yesterday and only one was shipped, there might not be any peas left on the shelf by tomorrow.

Now, with electronic ordering, "before the store orders again, most of the merchanside from the previous order is on the shelf," Borneman said. "When the clerk writes his new order,

(Continued on Page S/22)

How to jump into key-to-disk, without giving up your

options

Granted, key-to-disk equipment does good things for data preparation in high-volume applications.

However.

This is one big jump that is best accompanied by a little foot-dragging. Because, in your enthusiasm for the things key-to-disk can do, you may forget what it can't do: read and punch cards.

And the punched card is still very much alive. Particularly as a turn-around document. But the useful unit record is also a pain in the processor for most key-to-disk systems. Leaving you with an awkward I/O problem, and possibly some dissatisfied using departments, too.

But what can you do? Hire, and train, two staffs of operators? One for keypunch, the other for key-to-disk? Double up on equipment? Establish two different work-flows?

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Enhances Two-Way Communications

Firestone Breaks POS Data Collection Bottleneck

Special to CW

AKRON, Ohio — The Firestone Tire & Rubber Co. here is well on the way to unstopping a bottleneck in an otherwise sophisticated method of collecting and processing sales data from its domestic company-owned stores.

This should result in a substantial cost savings for collecting data in addition to speeding up processing and enhancing two-way communications between the main computer center and company stores, a spokesman said.

The company began installing NCR Corp. 250 point-of-sale (POS) terminals in its retail stores in November 1976. In addition to handling cash transactions, the terminals collect sales and unit information which is transmitted daily to a large scale computer center.

Prior to this, information was generated when store sales personnel wrote transaction tickets. Copies of tickets were mailed to the data center, where the information was processed with an optical character reading scanner.

The lag time as as high as a week and the method was subject to human errors, such as transposed information. Furthermore, a high percentage of the documents had to be reprocessed by hand when after-the-fact errors were detected.

The rejects went as high as 30,000 per day and created additional lag time before information could be processed.

Self-Checking Numerals

Under the new method, sales are rung up on the POS terminals where most of the errors are caught immediately. Self-checking numerals are built into product codes and account numbers. The terminal performs a simple mathematical check to determine if the input is entered correctly.

The computing ability of the terminal also allows automatic extension of the sales ticket and calculation of sales tax, both problems in the past.

Today, stores on the system no longer have to mail documents each day because each evening an NCR 725 minicomputer polls each location. The 725 has been programmed with opening and closing times of the stores and will continue polling until terminated at a specified time by operational personnel.

This means the minicomputer usually has the day's data collected by sometime between 12 p.m. and 1 a.m. The data is processed for various sales reports issued for headquarters and 30 district offices the next day.

Firestone began converting its stores a few districts at a time and plans a compete changeover by July of this year. Until then, its sales data is a mix of next day information from the terminals and data three to five days old that is collected through the console-to-computer buffer scanner method. For those stores reporting through the terminals, the error margin is a fraction of 1%.

One of the advantages of the POS terminals is that they help the stores detect errors at the point of origin instead of after the fact. Also the store managers can check daily activity at any time and should no longer have to spend as much time on the phone reporting to district offices.

Increased efficiency is expected in the handling of Firestone's million-plus revolving charge accounts at the retail level since the terminals will help eliminate entry of incorrect customer information and provide faster turnaround of data results and accounts receivable posting. When documents were mailed, charges made near the end of the billing cycle often missed the current month's billing. This added 30 days before a payment was due from the account.

Another savings is expected to come from inventory reduction because the faster turnaround of information should make it possible for Firestone's stores to participate in a realistic replenishment system.

Communications can be a two-way street, the Firestone spokesman noted. The firm is investigating equipping stores with a hard-copy printer so intracompany correspondence can be sent quickly to all offices. This will be resolved at a future date as to practicality.

Other uses, such as transmitting payroll information and automatic check transfer of store funds, are in the test stage, using information submitted on the terminals.

A key factor in the smooth conversion is a well-coordinated plan involving NCR, the terminal supplier and Firestone personnel, according to the spokesman.

District management personnel receive a double dose of training. If district management can be brought in on the implementation of the system on a intimate level, their enthusiasm can spread to the store level and help them understand the system, he noted.

As each district is converted, managers from the next district on the schedule are brought into the training sessions. NCR 250s are provided for an intensive two-day training session.

Managers are given about a day and a half of theory and a half-day of intensive skill building on the terminals using a store model developed for this program.

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When?
Where?
Why?

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WHAT Job cards, bar codes or key depression — all assigned by management — tell the computer exactly what he's doing.

WHEN An internal clock records when he started and when he finished.

WHERE The location of the terminal or variable key input tells the computer where he's working while travelling cards, bar codes or key depressions on the terminal input the amount of inventory being worked on or used.

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Persian Language Scanned Using Number Code

(Continued from Page S/2)

accident statistics because traffic is by far this country's single biggest problem. Another reason for tackling this first was because it is one of the very few reporting systems where information is collected on a prestructured, preprinted and prenumbered form.

This form is the traffic accident report, not unlike accident report forms found in the U.S., except, of course, that it is printed in Farsi and the information recorded on it is in Farsi.

Fortunately, Farsi numerals have a one-to-one correspondence to our own Arabic/Numerals (although written considerably different) and do read left to right in spite of the fact that all Farsi reads right to left. Therefore the best way to attack the data collection and processing problems in Iran is to "do it by the numbers.

Using numerics as a common denominator between the two languages, we designed a completely numeric record and then developed translation tables, first in English and then in Farsi, that would translate the codes on output reports to the respective language.

Time Factor

Everything to date has been done to produce English output reading left to right and then converted to produce Farsi output reading right to left. Our experience so far has revealed that it takes almost an equal amount of time to convert a program that has been written, compiled and checked out successfully to produce English output as it does to produce the same output in Farsi that reads from right to left.

Developing and implementing a system that collects, processes and outputs data in a foreign language such as Farsi for an application such as traffic accident statistics might be considered relatively easy when numerical codes can be readily assigned for answers to such questions as where the accident took place, what was the cause, what were the weather and road conditions, what types of cars were involved, who were the casualties, what was their sex and age and what was the type of accident.

Each of these questions can be equated to a single numeric code of 0 to 9 (with the exception of location, which may require from two to four digits). Of course, such numeric information as report number, date, day of week and time of day present no problem at all.

More serious problems are bound to arise when we move on to other applications where it will be virtually impossible to confine the record to numerics only. A criminal history record of an arrested smuggler, for instance, is going to require the accommodation of alphabetic information in the Farsi language.

Data Collection

At present the only means we have to collect Farsi data is by way of a keypunch with a Farsi character set keyboard. The keypunch, unlike Farsi typewriters, does not have a right t left carriage. Column 1 of the key punch card is the left most and not th right most column. This means that to collect Farsi data, it must be read backward because there is no other way to punch it, and Farsi CRT terminals right now are still in the test and checkout stages.

The problem can be alleviated by having the keypunch operator read the Farsi from right to left as is the custom but punch from left to right (as there is no other choice). Before the data can be processed, however, programs to store it on tape or disk must transpose each character in a field (e.g., a name field of 20 positions, column 1 becomes column 20, column 2 becomes column 19.

To add to this dilemma, consider the fact that a standard Farsi typewriter has a selection of 90 alpha, numeric and special characters while the keypunch has only 64 characters.

At present we are confined to using Honeywell Information Systems, Inc. 6000 series hardware that provides for no more than a 64-character set, accommodated by its 6-bit internal machine code. Therefore, in attempting to duplicate the 90-character selection of alpha, numeric and special characters available on the Farsi typewriter with a character set that numbers only 64 is not easy — something had to give.

In order to accommodate the 32-character Farsi alphabet, as well as those characters of the Farsi alphabet that change form depending on their placement in the word, all punctuation characters with the exception of the period, dash, slash and asterisk were sacrificed. In other cases, two characters were required to form a single Farsi character and certain, less significant Farsi characters were deleted altogether from the 64-character Farsi set.

This all, of course, leaves computer ouput in Farsi far short of what the standard Farsi typewriter is able to produce.

Also, considering the fact that a page of English text translated to Farsi may not require any more than a single page, the fact remains that one can not estimate data element field size based on English and expect that same estimate to hold true for Farsi.

The rule of thumb generally is to estimate in English, then add half again more for the Farsi translation. This, of course, makes for longer records and increased storage requirements, much of which may be unnecessary — but there's no other choice.

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Bowlers Spared Paperwork With Diskettes

By **Tim Scannell**
CW Staff

MILWAUKEE — Bowling is a sport requiring little more than a set of pins, a ball and a flat surface. The American Bowling Congress (ABC), however, in conjunction with the Women's International Bowling Congress (WIBC), has taken the sport a step further by using a data entry system to assist in handling the voluminous paperwork associated with bowling leagues and organized team activities.

The Local Bowling Association System (LBAS), implemented more than two years ago, is geared to the larger bowling association or group of smaller associations which use the individual membership processing plan, an ABC spokesman said. Specifically, the system is used to process membership cards, team rosters, accounting transmittals, sanction certificates and mailing labels.

It is also used, to a lesser degree, for keeping track of dues collection and an individual bowler's scoring record, the spokesman related.

System Configuration

The data entry configuration used by the ABC is an IBM 3741 attached to an IBM 3715 printer. Since adopting the system, the various associations around the country have succeeded in reducing the amount of clerical work, established reference files that are easily accessible and reusable year to year and have lowered the cost of yearbook preparation by producing camera ready copy instead of requiring typesetting, the spokesman explained.

The idea was originally proposed by IBM and it designed the basic system, according to William Burke, DP manager at ABC. "The individual associations pay for the machine themselves although, we have the programs all developed and help them get started," Burke noted.

Hesitation Over Cost

Although the computerized system has been readily accepted by the major bowling associations, the smaller organizations are hesitant because of the cost involved, Burke stated.

"They have to be well satisfied that its an economically justifiable move," Burke explained. "They have to vote on it themselves and adopt it voluntarily — we can't force it on them."

Any association with more than 20,000 members could justify such an expense, Burke pointed out, and the "system is so designed that smaller associations can group together and use the same machine."

Because the 3741 is a data entry machine, it can't do any actual "computing." At the end of a season, when preparing the yearbook, the entire diskette is either sent to a local service bureau or to ABC headquarters "where a computer is used and members are alphabetized and listed out . . . with their averages in the various leagues,"' Burke said.

In compiling their annual reports, it was discovered that 60% to 70% of the bowlers' averages are the same from one year to another. Working on the basis of this stability factor, IBM redesigned the system and added a second disk drive to the 3741.

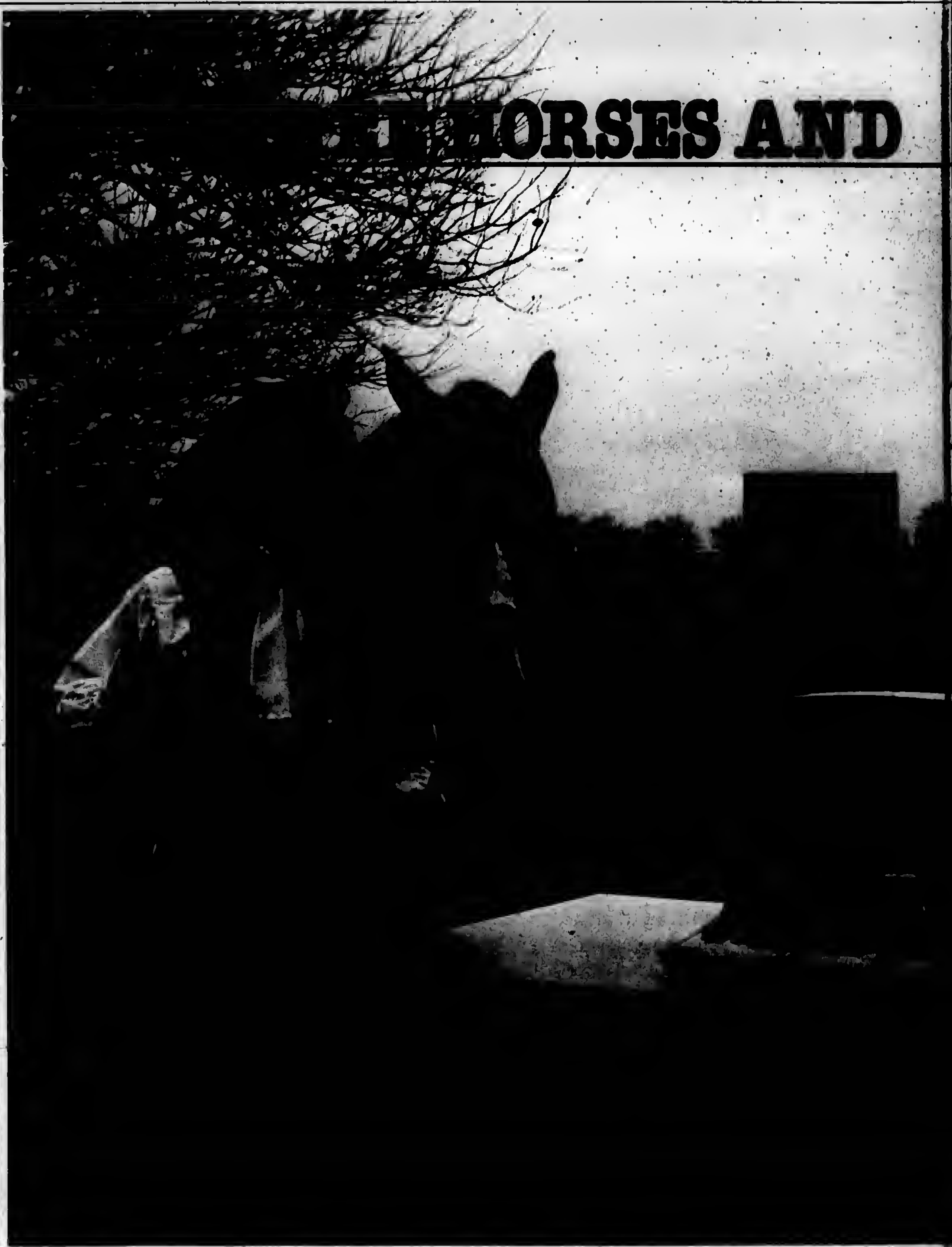
Time and Money Saved

Programs were then written, that allow the associations to "copy from the previous year's records," thereby saving time and money, Burke said.

"I guess you'd call it operating from a very kindergarten-type data base . . . but it's really functioning quite well," he remarked.

The LBAS, described as a "grass-roots type" of computerized recordkeeping, is currently being employed by the bowling associations in such cities as St. Louis; Denver; Albany, Syracuse and Buffalo, N.Y.; and Anaheim and San Diego, Calif., Burke said. Although the system is fairly new, the ABC is already looking for ways of developing it to parallel the growth of bowling in the future.

"The bowling community is expanding and I suppose in the future we can put an adapter on the 3741 and hook it up in an on-line type of thing," Burke commented. "At this point, however, there is no real need to convert to an on-line network."



Ends Administrative Overtime

Yale Saves Annual $25,000 With Key-to-Disk

NEW HAVEN, Conn. — Because of the control and flexibility its present system offers, Yale University's Administrative Data Systems (ADS) claims to save more than $25,000 a year in outside service bureau and in-house overtime charges for data entry.

Reid Kaplan, manager of user services for ADS, directs the data entry operation and is part of the management team responsible for "practically the only computer on camps that isn't devoted to scholarly work."

ADS' activities are as varied as the university itself, Kaplan explained, and include applications ranging from general ledger accounting to costing-out recipes, keeping track of admissions, maintaining an alumni file and monitoring a $500 million endowment fund, the third largest of any U.S. university.

To help manage the more than 130 competing activities in an orderly manner, the nearly 300-year old Ivy League college uses dual Data 100 Corp. Model 74 keybatch systems. An IBM Corp. 360/67 is used to process the data.

Before Yale installed the 16-keystation, 10-million-character key-to disk keybatch system in 1974, it used keypunch machines to put data into computer-readable form. Because of ADS' extraordinary data entry requirements, the overload was performed by an outside service bureau ($1,100/mo cost differential) and handled in-house on an overtime basis at a cost of $15,000/year.

Besides the physical limitations of the keypunches to handle the increasingly large volumes of data, ADS had no way to determine where the data was coming from or when it would come. "A university is not as simple as a manufacturing operation," Kaplan said. "We get money from a lot of sources that has to go a lot of places. What we needed," he noted, "was a machine that would allow us to have scientific management of our resources.

"With the Keybatch system, we not only got a system that could accommodate heavy loads," Kaplan said, "but one that would allow us to control the data instead of the data controlling us."

Operator Statistics

One of the system's most unique control mechanisms, Kaplan has discovered, is its operator statistics feature. Using this input/output batch control capability, Kaplan gets daily reports detailing the progress of each project by name, by forms type and by operator.

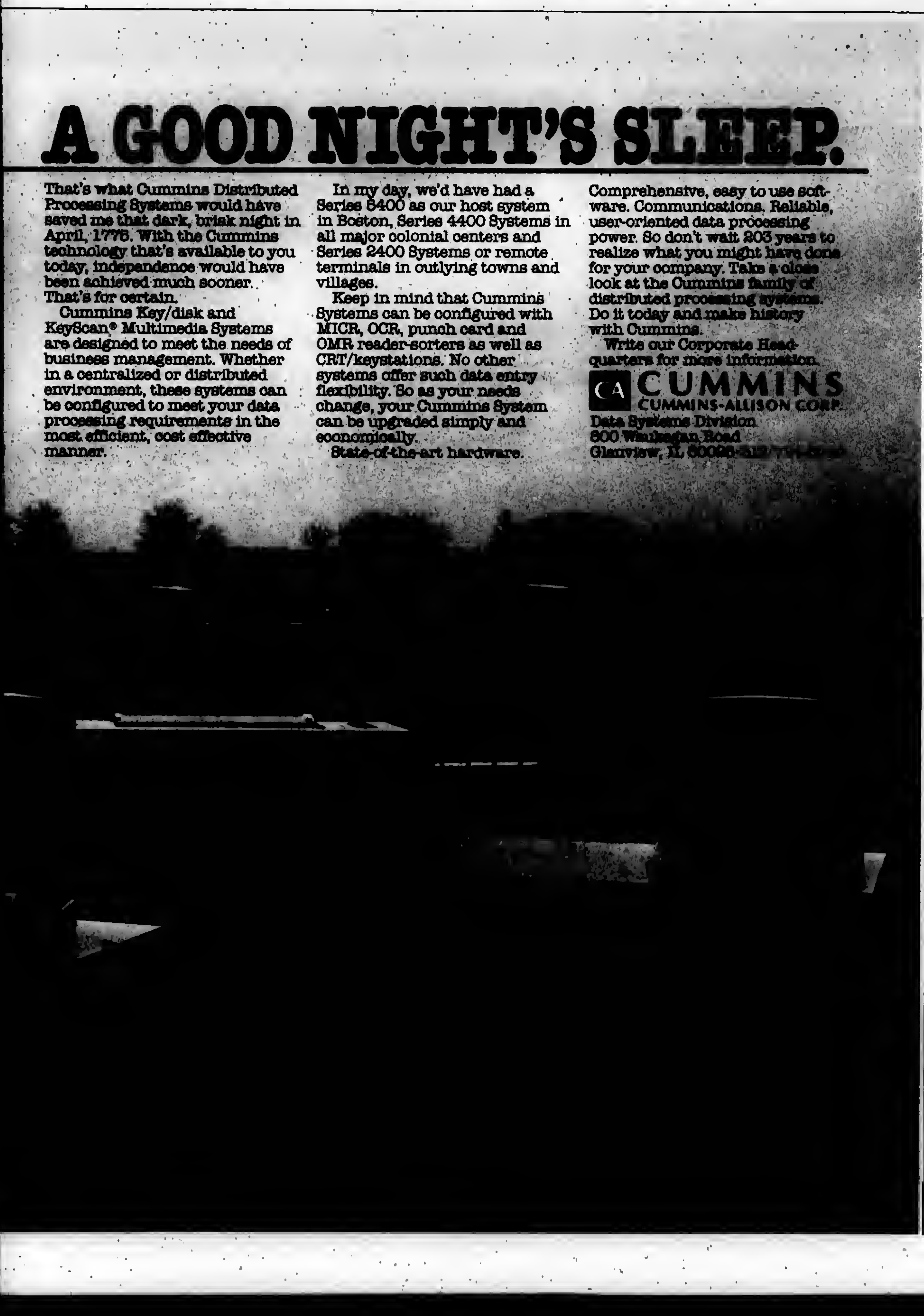
"We know, for instance," he noted, "that we usually do an average of 18 million keystrokes a month and that accounts payable, general accounting and the Office of Professional Services (an outpatient billing organization at the Medical School) will account for the greatest volume of work.

"We also know that The Campaign for Yale fund-raising projects will occasionally swell the monthly keystroke rate to 24 million and that December through March will bring a flood of admissions work. Therefore, we can staff ourselves accordingly."

Weekly reports generated by the system are geared towards operator productivity. These reports pinpoint activities such as keystrokes, accuracy and entry and verify error rates that help Kaplan gauge the individual performance of his 18 operators.

On the average, error rates stay well under .3% with indi-

(Continued on Page S/19)



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Personnel Emphasized in European Data Entry

(Continued from Page S/3)

widths and values.

The second technique involves rather more operator skill, but yields considerably greater operator efficiency in terms of the rate of input of data sets. This is the use of the so-called "shorthand dialogue," which involves the keying of a small number of characters.

These are expanded by the system into a considerably greater number of characters that return to the operator for visual verification. For example, the entry of the telephone number or Zip Code into a system can produce a response consisting of the complete name and address of the organization or individual concerned, after which succeeding dialogue can define the action to be taken.

The third method involves the selection of one item from many, using the so-called "menu selection" technique. Menu items are sometimes selected by depressing a single key or sometimes by using a light-sensitive pen (it is important to distinguish between light-sensitive pens that detect the illumination of part of a display screen and light-transmitting pens often associated with mobile optical mark readers).

Menu selection techniques are particularly powerful; if the operation of selecting one item from 10 is repeated six times, then the operator or user can rapidly "home in" to one item selected out of a million. This technique is therefore particularly suitable for selection-type applications in which one item must be chosen from several. All of the items required or available can be stored within the computer system prior to selection.

Large backing storage devices recently associated with today's minicomputers and intelligent terminals are opening up a considerable number of possibilities in this area.

Over here, some of the special-purpose data entry techniques very familiar in the U.S. have not been used quite so widely. In European terms, the basic technology required to read character patterns is still expensive.

Its application here has probably been restricted by virtue of the fact that it has been rendered obsolete for the input of day-to-day data by the direct data entry techniques described above.

However, OCR is of interest in one or two specialized cases. For example, one large UK company, faced with the problem of transferring its personnel records to a computer-based system, successfully read the typewritten forms previously used within the manual system using OCR techniques.

It should be noted that this was a one-time job and an OCR service bureau was used. Very few companies here find the installation of OCR equipment is justified, especially multifont equipment. While OCR can be useful at the time of system "take-on," it is rarely useful for ongoing data input.

A number of novel devices are emerging over here, that provide particular capabilities. An interesting UK device is the Datapad from Quest Automation, which recognizes handwritten information. Another interesting development in this area automates the handling of traditional documents and "paces" the operator through the fields on a form using an array of LEDs. It is claimed that key depression rates of 27,000 to 31,000 key depressions per hour can be achieved by skilled operators.

Intelligent Equipment

The provision of "intelligence," or processing power, and in some cases storage, within the user environment for data entry purposes has led to another trend — the migration of the processing of certain low-level user tasks into the intelligent equipment in the user environment.

Today, intelligent equipment often does a combination of data entry activities and minor user tasks such as the preparation of invoices, order copies and picking lists and dispatch notes. This is very much in line with a major trend toward the use of distributed systems that divide user task processing between the user location and a remote location.

Distributed systems are opening up many interesting and exciting possibilities in terms of expanding the application of computer-based systems and improving the cost-effectiveness of many of today's information/processing systems.

A final major factor that will almost certainly become important here in the future relates to the costs associated with data entry relative to those of data storage and data communications.

In summary, data retention will probably increase in importance as it will reduce the need for general-purpose data entry involving keying, which is likely to become more and more expensive as staff costs rise. This may well be Europe's alternative to the specialized data entry methods that have gained favor in the U.S. It appears we may make a direct transition from today's general-purpose data entry methods such as direct data entry to wired data methods and the retention and communication of data within systems that will progressively reduce personnel requirements and improve system performance.

Here, standards for open systems interconnection are vital.

Taylor is a telecommunications specialist with the UK's National Computing Centre.

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Scanner Helps School District in Bus Purchase

Special to CW

MESA, Ariz. — A school district here is using data obtained through optical mark reading to help guide the school board in making school bus purchases. In addition, the scanner performs such glamourless tasks as recording class attendance, scoring tests and obtaining student data for guidance counselors.

The system also raises about $15,000 a year by doing work for other school districts.

Built by National Computer Systems, Inc. of Minneapolis, the Sentry scanner reads two million scan forms a year, abstracting key information and feeding it to a computer. The computer either stores the information or outputs it on a high-speed printer for immediate use.

The scanner's tasks are limited only by the district's needs and DP Director Tom Rowe's imagination. Take the school bus study, for example. Drivers fill out scan forms showing mileage, gasoline and oil used, repairs and costs.

By comparing records, the district can figure out the best time to trade in old buses or budget ahead for anticipated repairs.

The district can also determine which school bus manufacturer's product has the best service records, taking that into account when making new purchases.

Potential Dropouts Identified

Another example is the district's program to quickly identify potential dropouts. Here Rowe uses the scanner to check grades, absences and behavior reports to pinpoint students on the verge of quitting school. Names are turned over to counselors and principals.

The scanner helps with other pupil problems. Teachers periodically fill out a special form focusing on behavior and emotional or physical problems such as stuttering, fighting or falling asleep in class. The scanner screens out these names and they are sent to school psychologists.

The bulk of the scanner's work is more prosiac, however — checking attendance, scoring tests, marking grades. Arizona law requires attendance reports from every class, so teachers fill out scan forms — 30,000 of them every week. Altogether the scanner handles more than a million of these attendance forms every year.

The next biggest workload is test reports. The scanner scores 500,000 proficiency tests a year plus 100,000 teacher-made tests. The scanner can count the number of right and wrong answers, show which quesions were missed and even print a letter grade.

Test results show pupils' progress; they also show the teacher where the class may be having particular difficulty with a lesson.

Once all the tests are scored, the scanner works on grade reports. The scanner/computer team prepares cards for each student and sends a class rank and honor-roll list to every school.

The scanner also helps prepare class schedules. Pupils fill out scan forms showing the classes they want for the coming semester. These forms are read by the scanner, and the computer sets up times and places for each class.

The scanner also handles athletic prowess tests. Results are sent to each parent showing the child's physical fitness. Results are stored in the computer memory along with information on each student's academic progress.

Growing Return

Besides handling two million scan forms a year, the scanner is also earning money. In addition to the work for the Mesa schools, Rowe rents scanner time to schools in nearby Tempe, Glendale, Peoria and Chandler. Altogether this generates around $15,000 in annual revenue, helping offset the scanner's $75,000 cost.

Rowe expects this return to grow. "After all," he said, "there's a lot more we can do. We predict maintenance for the bus fleet; no reason we can't predict maintenance for our schools' mechanical equipment as well.

"And we handle pupil records; we could also handle payroll records, mileage expenses and overtime costs.

"For us, those two million scan forms are just a start. We should double the amount in a few years, using the same scanning equipment.

"In fact, I see the time when the scanner will offset its costs each year," he said.

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See page 8 in the Special Report section for details.

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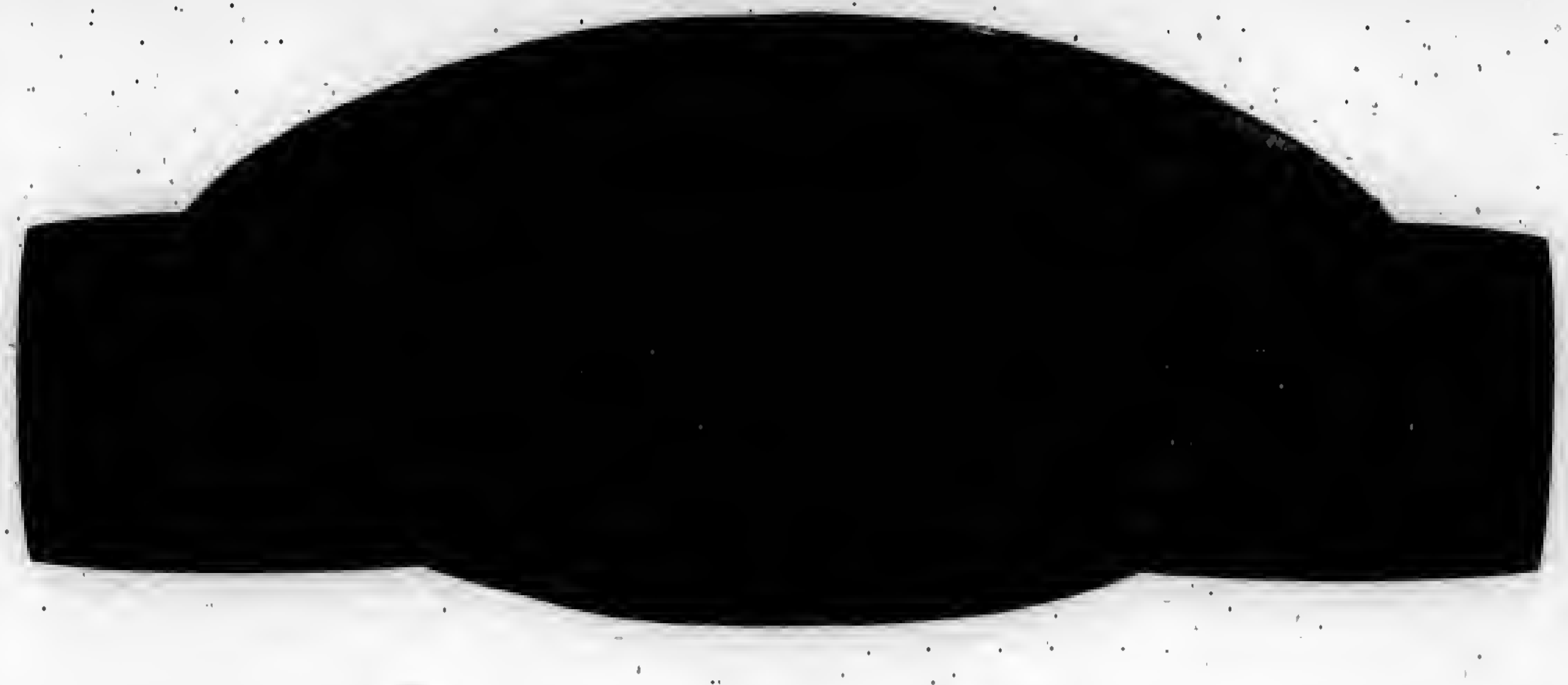

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Key-to-Disk Speeds Check Imprinter's Work

LAKEWOOD, Colo. — A large manufacturer of bank checks and other negotiable instruments here is using a key-to-disk system to speed up and improve its check imprinting operation.

The system, reportedly the first of its kind for a bank note printer, is already providing faster service for three reasons, according to Roland Thomas, DP manager for the Rocky Mountain Bank Note Co. (RMBN). First, he claimed the keyboards are arranged exactly to the operators' needs and are easily learned by new personnel.

Second, the equipment automatically provides the basic coding instructions required for individual bank imprints — coding the operators previously had to enter themselves. Finally, the system provides a magnetic tape each evening containing all of the day's work, and this is put on microfiche for customer use.

The firm has 12 plants throughout the western U.S. that use the Mohawk Data Sciences Corp. (MDS) system to handle up to 11,000 imprinting orders daily.

The MDS 2409-2 includes a disk unit with a capacity of 90,000 records of 125 char. each, which allows high-volume production work. The firm is now using 11 of 12 planned MDS 2491 keystations. The full system will not only speed typesetting, but will also make possible other simplifications and savings when complete.

Typing of names and addresses, for example, will also be signalled to RMBN's accounting system. An MDS 2481 tape drive is used to keep the permanent records for the accounting and billing departments.

"Further," Thomas said, "the new MDS equipment will be ready for, and compatible with, new equipment that may replace the typesetters and presses employed in the actual imprinting."

RMBN Data Entry Supervisor Helen Zajicek enters check orders.

Letterpress and Offset

Much of the equipment now used at check printing plants is a combination of old and new, Thomas explained. At the RMBN shop the actual imprinting is still primarily a letterpress operation — metal type, set by Linotype, is set in position and locked by hand in a standard form, which is then inked and pressed onto the blank check form. The check form is preprinted elsewhere in the plant on offset color printing presses.

The Linotypes were modified several years ago so they could be actuated by six-level paper tapes. The tapes include coded specifications for exact type face, size, spacing, margins and other details.

Although the modification is far faster than the old system of a Linotype operator adjusting the spacing while typing, it offers no easier way to proofread the text until the cast metal type is taken from the machine and run on a proofing press.

The text and all the coding information is displayed on the MDS 2400 CRT screen for easy sight verification. Corrections can easily be made at this point. Once the operator is satisfied that the correct message has been typed, it is ready for transfer to paper tape. There is follow-up proofing of the actual Linotype output, done on test sheets from a proofing press.

Although there are a number of additional steps after the typesetting and printing have been completed — collating, trimming, binding and mailing — RMBN can usually get imprinted checks into the mail within 24 hours after the order has arrived at its plant.

At RMBN, the keyboards are still being "operator designed" for maximum efficiency. Letter and coding keys are assigned to board positions that feel best to the majority of the operators.

Letter keys are presently in the same pattern found on electric typewriters, but additional symbols and special keys for the tape information are located at positions on the end of the board. The key repositioning is easily accomplished by minor changes in the software systems that program the 2400 system, according to James Biltz, systems analyst.

With key to paper-tape equipment that is being phased out, the tape is produced right on the machine by the operator. With the MDS equipment there will be no paper tape in the keyboarding room so the firm expects less noise and dust.

Instead, taped information is recorded on the MDS 2478 disk drive. One such unit holds the input from all the keyboards — another advantage over the lower storage capacity of tapes.

At a convenient time, the data stored on disk is transferred to a high-speed paper-tape punch (MDS 2468) that perforates at a 150 letter/sec rate. The output of several operators can be prepared at once and taken to the Linotype machines for further printing.

The taped data is not retained beyond its single use. Experience shows that customers change banks and addresses so frequently that it is simpler to start from scratch each time an account requests a new batch of personal checks.

While advanced photo composition and the offset process will play an increased role in future production systems, Thomas said that traditional linecasting and letterpress techniques will continue to serve as the mainstay of the industry.

"In the meantime," Thomas said, "there is much to be

(Continued on Page S/19)

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CRT Net Keeps Pace With Hospital's Growth

By Frank Barbee
Special to CW

LAKELAND, Fla. — A rapidly growing regional hospital usually has more problems than it needs, particularly when it comes to data processing and communications. Systems and procedures just never seem to keep pace.

Lakeland General Hospital, however, seems to have avoided many of the problems that could have arisen during the past few years as it developed an automated, integrated patient information system able to cover all of its departments.

When Lakeland began installing the system in 1973, it had about 520 beds. Since then, it has grown to 640 beds and has been certified for 900 beds.

During these five years of rapid growth, the hospital made very few changes in the basic system, and it has more than kept pace with its growth. It is on-line 24 hours a day to all departments — including the nursing floors, admitting, radiology, laboratories, pharmacy, dietary, medical records, emergency room and all other patient care activities.

For the past year, the hospital has been moving ahead into fully automated laboratory equipment so results can be transmitted directly to nursing stations as soon as they are known. Plans are also under way to install CRTs more than a half mile away in a medical group practice clinic so physicians can review lab results as soon as they are completed.

Lakeland has used a remote time-sharing computer service until 1973. The service was limited primarily to financial applications and had no real-time capabilities, and Lakeland saw it had little room to expand its communications and information processing capabilities to match its physical growth.

During a two-year study of future needs, conducted by the board of trustees and the administrative staff, the hospital set a number of specific objectives including:

- A "total" data processing capability.
- Improved patient care and services.
- More efficient use of equipment and facilities.
- Real-time transmission of all charges and requisitions.
- Reduction in lost charges.
- Patient billing, with pro-rated insurance, on demand.
- Cost containment and improved cash flow.
- Capacity to handle all new requirements as the hospital expanded.

The system Lakeland installed to meet those challenges was developed by National Data Communications, Inc. (NDC) of Dallas. It is a massive software data base encompassing more than 9,000 individual, but integrated, programs. Most are on-line, real-time applications, with some batch processing for the fiscal areas.

CRTs and Remote Printers

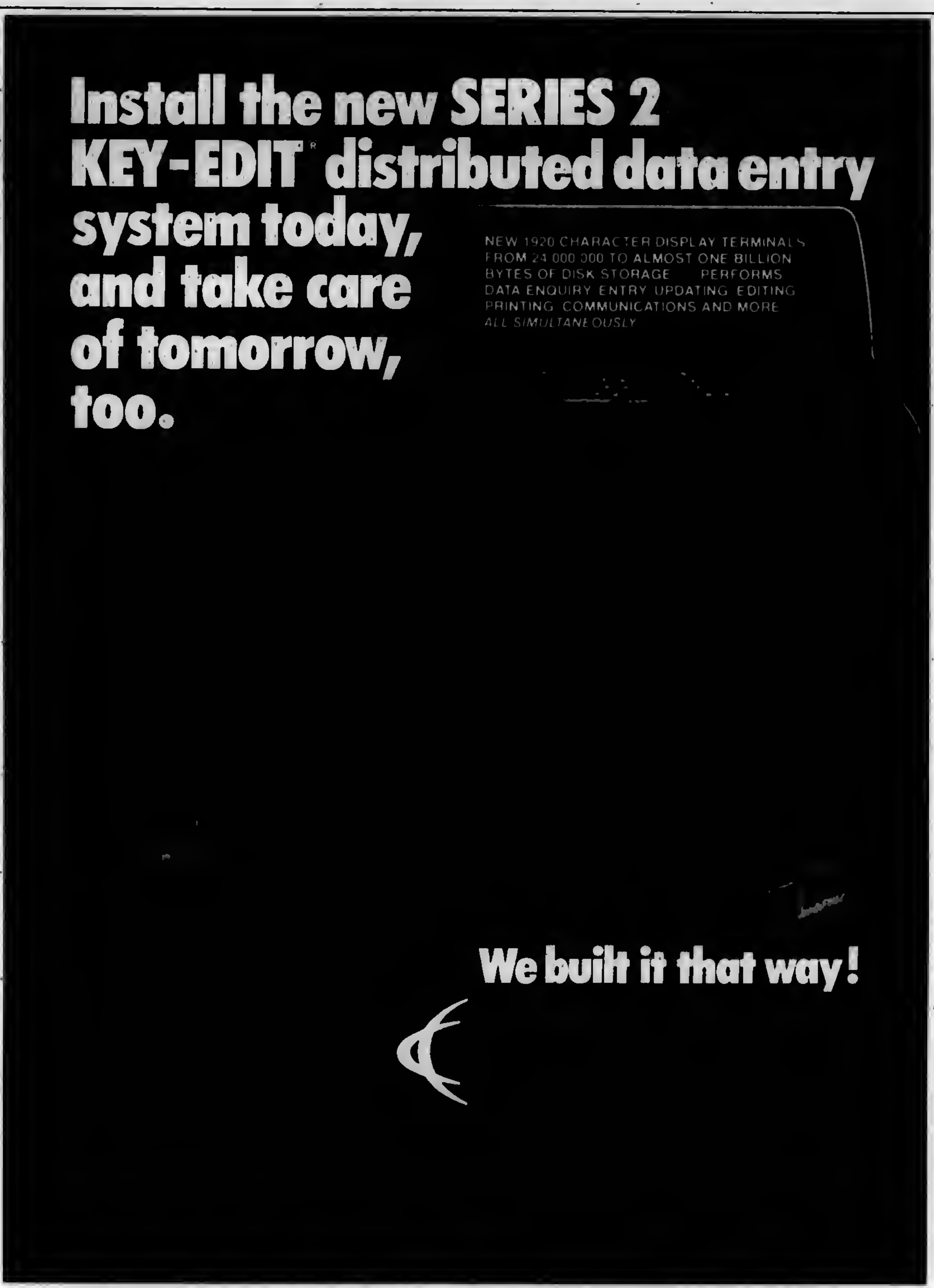
Basic to the system, which was tailored to the hospital's specific need by NDC, are the CRTs and remote printers the company designed for the hospital. Lakeland can install as many CRTs and remote printers as needed throughout the facility, giving all departments, wherever located, immediate real-time access to the data base.

The CRT has an information display screen bordered on the left with 20 "select" buttons. A full input keyboard is in front. Most tasks are initiated by pressing the select buttons, and the keyboard is used to enter such variable data as a patient's admitting information or narrative reports.

Individually coded badges are needed to access to the system. The Badges identify the individual and describe what categories of work he can do. The system lists those categories on the screen and permits the individual to do only those functions he is authorized to perform.

Upon entry of information into a terminal — for example, a doctor's order — the system automatically transmits the information to the departments that have a "need to know," and all patient billing information is generated and immediately posted to the patient's files and the general ledger. Hard-copy printouts are produced whenever they are needed when information is fed into the system, and the CRT screens

(Continued on Page S/29)



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Standardized Form a Plus

Data Entry Net Eases Air Force Acquisitions

By James R. Harbin
Special to CW

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Systems Command (AFSC) uses "source data automation" as the major input method for its Acquisition Management Information System (Amis). The system is being developed by the Amis program office here.

Within AFSC, the input method is defined as capturing data at its source in a format for processing on the computer.

Three Reasons

Source data automation was chosen for Amis for three reasons. First, it reduces the manual abstracting effort and saves manpower. Second, it results in more accurate contract documents because it permits validation and error correction prior to the distribution of contractual instruments. And finally, the technique allows timely entry of information into the data base.

There are many varieties of data entry and many ways to use its capabilities. Optical character readers, CRTs and communicating magnetic card typewriters were tested in light of contracting requirements.

The typewriters were chosen for several reasons. They provided the ability to simultaneously capture data and prepare hard copy. This was extremely important since hard copy could not be eliminated.

The magnetic cards also provided excellent document correction capabilities when errors were detected because a page-to-card relationship could be maintained.

This capability, coupled with a systems designed with a page-to-page validation correspondence, provides for easy correction of errors on each page and for the filing of cards, with the represented page.

In addition, the magnetic card typewriters posed no additional administrative workload, or overhead, in the form of posting to sheets, abstracting or changing machines to duplicate the hard copy. They were multipurpose in that they could also be used for the administrative office work and electronic mail.

Further, the user has control and is responsible for the validity of the data. The typewriters cause little disruption in offices involved in AFSC contracting since they are similar to common office equipment.

AFSC contract instruments demand a standard format on forms designed to be part of a legal contract. Forms were designed and presented to the Armed Services Procurement Regulation Committee for approval for use in the contract instruments. The committee approved 13 forms containing data elements describing the entire contracting process.

The forms were designed in such a manner that ease of use and readability were ensured.

System implementation was accomplished on a phased basis, beginning with organizations in Ohio, California, Massachusetts, Maryland, Florida, New York, New Mexico and Washington. After further development and testing, implementation will be expanded to activities in Texas, Pennsylvania, Arizona, Georgia, Colorado, Missouri and Utah as well. The diversity of locations provides quite a communications network to tie the typewriters to the Itel Corp. AS/5 located here. Communications is accomplished on dial-up lines at 134.5 bit/sec.

Training Conducted

The Amis program office conducted training at each installation on the use of the forms while the equipment vendor conducted training on equipment operation. (Approximately 2,200 functional personnel and operators were trained to use the forms.) After training, a test period was completed. Then the system was implemented.

What did the new system accomplish?

When writing a contract, the buyer fills in a special form

(Continued on Page S/18)

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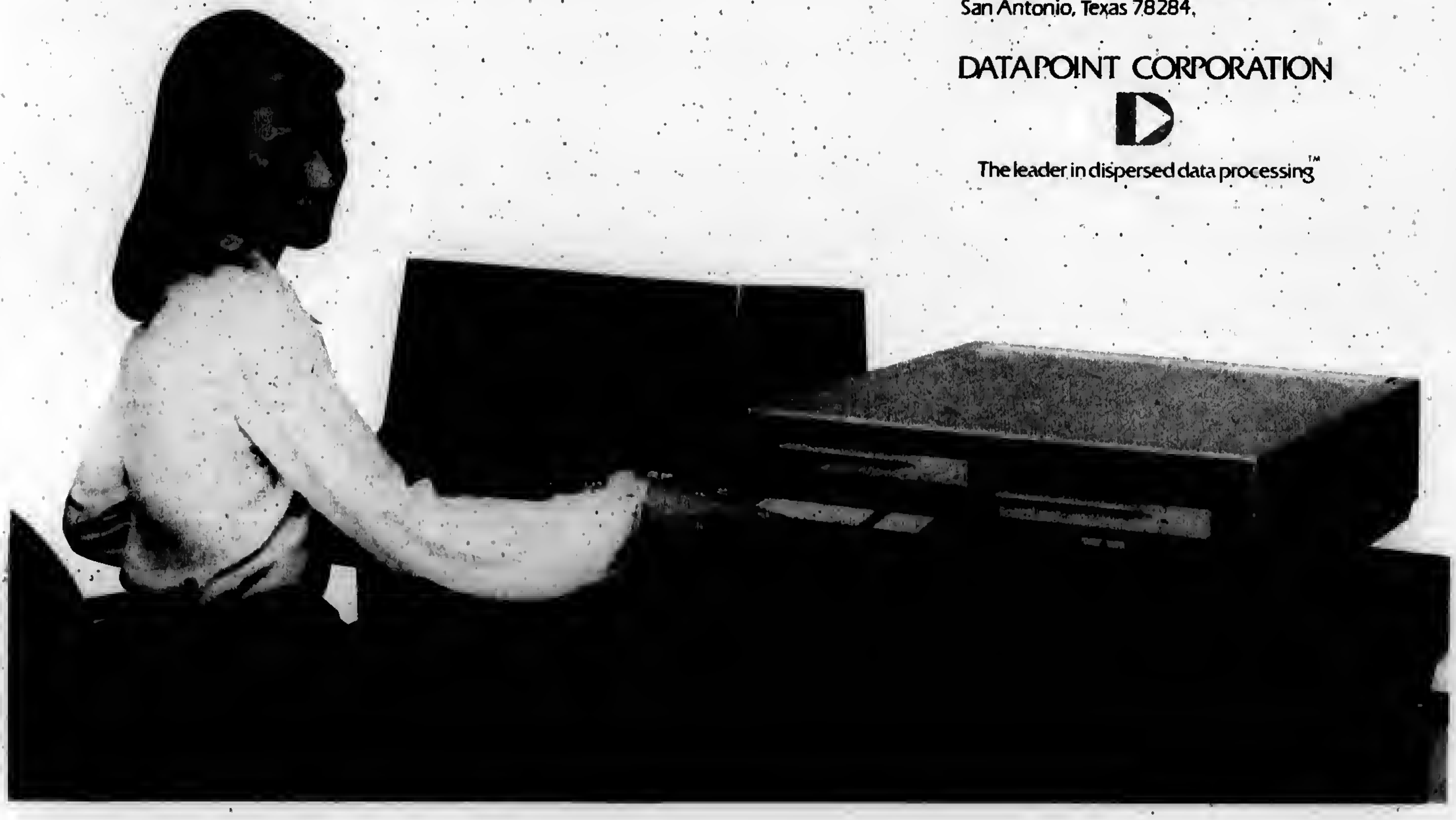

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Despite Several Problems

Multivendor Net Eases Air Force Acquisitions

(Continued from Page S/16)

rather than a draft sheet. The procurement clerk then types the form from the draft copy and at the same time records it on a magnetic card.

When all the forms for a contract instrument are typed, the procurement clerk then activates the communications feature of the typewriter and transmits the cards to the computer. The computer validates the submitted forms and provides an error listing to the clerk.

Error Analysis

The clerk then analyzes the errors, inserts the form and card into the typewriter and corrects both the form and the card simultaneously. A corrected form is then run off from the magnetic card, and the corrected magnetic card is transmitted to the computer for another validation cycle.

After all approvals, negotiation and signing of the contract instrument, a form is input to instruct the computer that the contract is ready to be distributed.

The system searches that contract instrument's records for any uncorrected errors and notifies the clerk so any remaining errors can be corrected before distribution. When the contract is distributed, the computer is notified and the data is transferred from a staging file to the contract data base where it is available for query, tracking, status reports and payment purposes.

The first Amis data entry installation was completed in June 1975. Since that time, 150,000 forms have been processed through 141 machines. The error rate has been reduced from at least one error on 30% of the forms to one or more errors on less than 2% of the forms.

The replacement of manual abstracting with the automated technique has eliminated 38 manpower spaces.

Teething Pains

These accomplishments were not without the usual problems. Long-line communications problems were experienced in several instances because of carrier loss, modems out of adjustment, natural causes and several "one-of-a-kind" mishaps.

The nature of the system required the participation of many different equipment vendors on a nationwide basis. When problems developed, the predictable, initial reaction was "it is someone else's fault" or "it's not in my region." Computer reliability problems during early development, including disk and facility problems, caused more than the normal amount of headaches and complaining by users. To the functional user, any malfunction, no matter what the cause, was "computer problems."

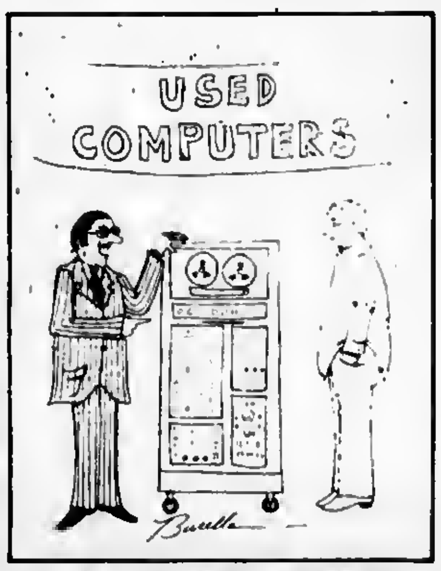
Classic Pattern

This implementation followed the classic pattern of DP implementation as far as people were concerned. When the announcement was made that the system was to be installed in an organization, people were elated.

But when use began, frustration took over as habits had to be broken.

Finally, however, as the problems were smoothed out, users accepted the new procedure.

Harbin is chief of the Program Control Office, Directorate of Procurement Data Systems for the AFSC.



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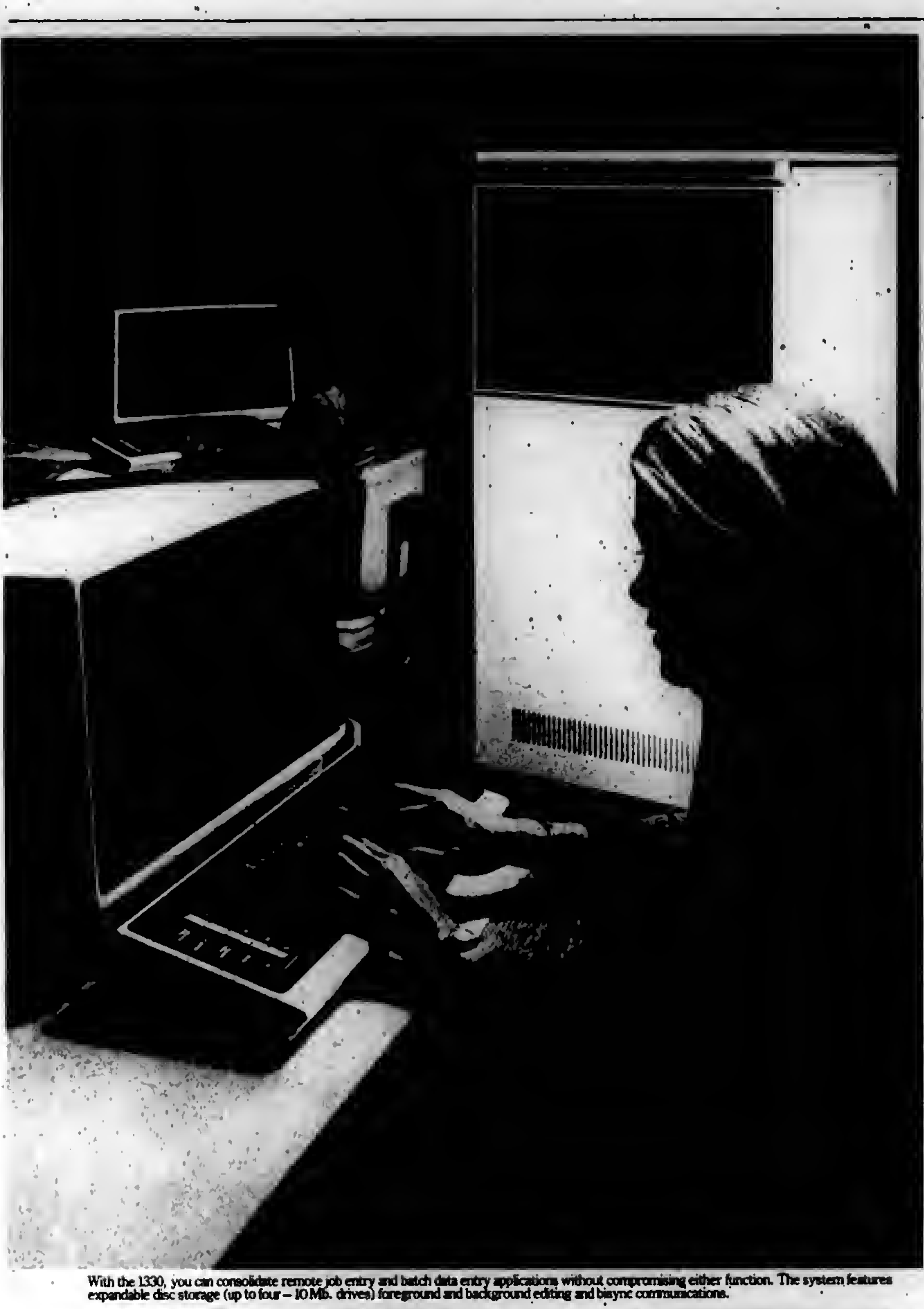

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The Inforex 3300 is a powerful pre-processing system that allows you to edit data at the point of entry, enabling you to offload your mainframe. Its sophisticated editing capabilities can also handle many of those applications which you haven't had time to put on your present mainframe.

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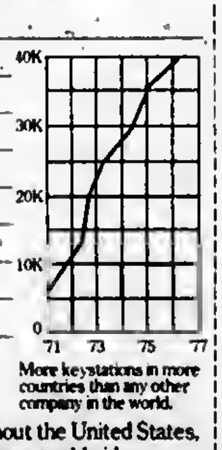

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Yale's Data Entry Graduates to Key-to-Disk

(Continued from Page S/11)

vidual operators consistently at .1% and .2%. As low as the error rates are, Kaplan pointed out that most of the errors are actually rectified, either by the operators correcting themselves on-the-spot or through the verify operation.

Forms Design

The statistics feature has also given Kaplan and his staff a better idea of what forms design is all about. An index is obtained that indicates how difficult it is to key from each form.

The degree of difficulty is a formula that factors the average keystrokes per hour for a given form compared to the average strokes for all forms compared to the average number of keystrokes for a form for the entire period of usage.

"Then we look at what makes a form easy," he explained. "Some items are self-evident like legible handwriting, the use of computer turnaround documents or the use of tables to minimize keying and therefore the risk of error. Others are more difficult. After we analyze all of the items that go into making up a good form, we try and incorporate them into all our forms.

"Of course, there are not only bad forms, there are bad forms for good reasons. By balancing those forms designed for users, you sometimes discover, that what is easy for the data entry operator is not always the best way to fill out the form," Kaplan noted.

Because of the system's ability to prompt operators and skip from field to field instead of the column-by-column coincidence typical of keypunch devices, ADS operators are also finding that bad forms aren't as bad as they used to be.

Kaplan has high praise for his data entry operators, whom he described as superior workers. With the Model 74 system, not only are error rates well under what they used to be, throughput is at least 25% to 30% greater than with keypunch machines. ADS operators now average 10,200 keystroke/hour with the fastest operator clipping along at a 14,000-plus keystroke average.

Kaplan said the system can pinpoint those operators who are not performing as well as they might. This allows him to offer them more training where they are weak and assign them tasks they perform particularly well.

In this way, the strengths of each individual can be utilized best. "Everyone benefits. The operator is happier and Yale gets more accomplished than it otherwise would. Knowing how you are doing and what to expect is the key to doing better," he said.

Unit Speeds Printer's Job

(Continued from Page S/14)

gained by streamlining the paper-tape punching side of the Linotype operation. Keyboard operation of the direct, key-to-paper-tape units is complicated, and the key positions have never been standardized for each make. The operator must learn the special layout of each machine. The operator also has to memorize a great deal of special coding information such as the type sizes used by each bank, type styles and other special requirements. This special data is kept in the MDS system's memory and will be automatically punched by the tapes without operator intervention."

By eliminating much of the operator's special memory work the MDS system is more easily learned. Helen Zajicek, supervisor of the RMBN tape punching department, says she expects she will be able to train operators in two to four weeks, a job that now takes six to 12 weeks.

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Dema Working to Meet Data Entry Challenges

(Continued from Page S/2)

years ago between the computer facility and the keypunch room has been radically altered. The key-to-disk system encompasses almost all computer activities:

- Data keying.
- Data verifications.
- All computer operations considerations with tape handling, disk control and others.
- Data entry programs.

Programming that involves editing, controlling and checking the accuracy of the data produced no longer needs to be done on the main computer system. Almost all of these activities can be done within the data entry environment. We can therefore be totally responsible for the integrity of the data we produce.

New Directions

The new directions of our profession are numerous. The challenges and opportunities multiply with the advance of technology.

Data entry is coming of age; and Dema is active in helping those involved in capturing data respond to the present and to help shape the future. During its short existence, Dema has taken many concrete steps to ensure its role as "change maker" in the DP industry. It is a tool for its members professional growth.

Dema's monthly newsletter provides an opportunity for members to exchange information, present new ideas, communicate problems and solutions and keep informed of the newest directions in data entry.

Dema is conducting its second equipment evaluating survey. Several new benefits are expected from this survey:

- Members will be able to communicate with other members in similar facilities to obtain first-hand knowledge of equipment and its utilization.
- Recommendations for beneficial changes should result in future equipment changes because those participating in the survey are the pragmatic authorities in the field.
- Future trends in data capture will be ascertained.
- A Dema salary survey is in preparation.

Dema's regional seminars and local meetings provide participants with an opportunity to exchange ideas while obtaining first-hand knowledge of how other facilities operate. Regional Seminars for 1978 were held in Houston in February and Washington, D.C., in March. The next Dema seminar is scheduled for the Hospitality Inn in Columbus, Ohio, on May 11-12.

The second annual Dema Conference will be held at the Sheraton Harbor Island Hotel, San Diego, Calif. Oct. 30-Nov. 1. Here data entry professionals will have an opportunity to share the most current and comprehensive body of knowledge in data entry through seminars, panel discussions, workshops, equipment exhibits and informal exchanges.

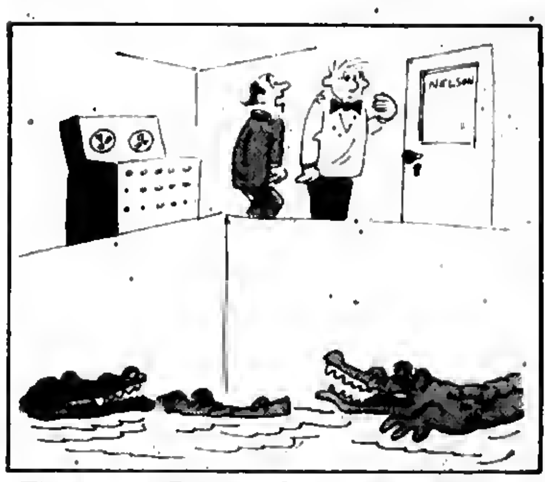
Concern for Education

Another primary concern of Dema is the continual education of its members and their staffs. We believe we can all grow from our willingness to share our best with each other. We exchange this information in our newsletter, our regional seminars and our annual meetings.

The future of our profession offers unlimited potential. Constant demands will be made on our abilities to keep pace with a rapidly changing technology. Within a few years, almost every person will in some way be directly interacting with computers.

We as data entry professionals will find ourselves facing new challenges to define, control and ensure that data flows accurately, responsively, timely and competitively. In addition, we will find many opportunities to assist people as human beings to work competently with these machines. We look forward to — and welcome — these challenges.

Bodek is executive director for Dema. Dema can be reached at 16E Weavers' Hill, Greenwich, Conn. 06830.



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Records Amalgamated

OCR Solves Huge British Data Entry Problem

Special to CW

NEWCASTLE-ON-TYNE, England — The UK's Department of Health and Social Security (DHSS) realized in 1972 it would soon face one of the most massive data entry problems ever encountered. As the central recordkeeper for the entire population of Great Britain, DHSS had to track 40 million persons enrolled in the British social security system and transfer the records for each person from a manual to an automatic system.

Just to keep up with current information, there was a daily data entry requirement of 5.5 million characters.

The new function was an amalgamation from several different agencies, each having some fragment of health and benefit records. Some of the required information was on handwritten cards, some in data bases and some records were incomplete. All records had to be updated and centralized.

Master records needed to be created so each person's payment into the system and his pension entitlements were up to date. This included salary deductions, sickness, unemployment, pension contributions and entitlement calculations.

Moreover, DHSS had a short timeframe in which to complete planning for a totally automated system. It had to be operational by 1976, and it had to be able to handle a new pension scheme scheduled to go into effect 18 months later — April 1978.

The DHSS first made a determination that any data entry by keying was impractical. The number of personnel and the amount of budget and space required for this type of entry made keying inconceivable.

Optical Alternative

Optical scanning systems were evaluated as an alternative. The chief criterion that had to be met by optical scanners was the ability to read mixed alphanumeric handprinting (from 1,400 to 1,600 clerks) at a throughput speed of more than 120 char/sec with at least a 94% recognition factor. In addition, accuracy had to reach 99.9% after optical character reader (OCR) reject characters were keyed.

DHSS eventually turned to an Information International, Inc. Grafix I Data Base Conversion System, which contained the previously developed Mixed Alphanumeric Handprint software package.

Documents for the system were microfilmed by standard 16mm rotary cameras with a resolution of 70 line pair/min. These were then scanned by the OCR, with rejects diverted to CRT terminals for clerical correction.

In April 1976 the system went "on-line, on-time and on-budget," according to James Torbet, the systems manager for the British government. Total price of the system ran between $2 million and $3 million.

First Task

The first task to be done on the Grafix I was to transfer the National Insurance benefit information, which had accumulated over many years, to the main computer. All told, there were 36 million accounts, with some of the data available as computer printouts and other documents available only on the clerical hand-printed record.

After slightly more than one year, this voluminous updating task was completed by a staff of only 25 persons.

At the same time, eight other forms were being read in an operational environment. These forms contained alphabetic numeric and totally mixed alphanumeric fields, including some hand-printed and some line-printed characters.

First Year Figures

By April 1977, after about a year of on-line operation, a total of 31 million items had been processed, each item containing 14 alphanumeric line-printed characters and up to 26 hand-printed characters. In addition, 1.7 million forms with up to 33 hand-printed characters covering the full alphabetic and numeric ranges and 250,000 forms containing mixed hand-print and line-print fields have also been read in a live environment.

A total of more than 1.25 billion characters were processed in just the first year of operation. That count has now exceeded two billion characters. Yet the system requires only a two-shift, five-day work week.

(Continued on Page S/25)

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See page 8 in the Special Report section for details.

Grocery Chain Pleased By Portable Data Entry

(Continued from Page S/5)

he's looking at a stocked shelf."

The ripple effect of electronic ordering quickly extended to another area of Ralphs' operations, Borneman continued.

"Our vice-president of warehousing and transportation has found he benefited greatly from the system.

"Before we went to electronic ordering with the MSI terminals, we were making over 27 deliveries per week per store.

"Now we've eliminated over 10% of those deliveries because of the improved system. The shorter lead time from ordering to delivery permitted a reduction in the number of deliveries each week, particularly to the smaller stores, with no reduction in response to customer demand," he said.

Like many large supermarket users of electronic ordering equipment, Ralphs compiles its orders in the early morning hours. At 6 a.m. the company's central computer at corporate headquarters in Compton beings the first of four polling cycles for certain stores and types of merchandise. Subsequent polls are conducted at 9 and 11 a.m. and 12:30 p.m. for other stores and products.

If the Compton MSI receiver fails to get a response from a store on the first try, it automatically polls that store twice more during that cycle. If a store doesn't transmit an order by the third try, the MSI receiver operator calls the store to make contact and complete the transmission. Only 45 minutes are allowed for each polling cycle. In little more than three hours, the orders must be ready to be sent to the appropriate Ralphs warehouse to be filled.

"There's little time for mistakes in this thing," Borneman asserted. "If nearly all the stores weren't on-line and ready to transmit at polling time, our operators would be swamped."

At present, approximately one of every 10 polls generates a problem call, according to Borneman. The cause of the problem could be any number of things. "The store might simply be late in getting the order ready or the person who did the ordering might not have hooked up the terminal properly.

One in Ten

"Out of every 10 problem calls, perhaps one involves a problem with the MSI terminal. And we're not sure all of these are really equipment problems. If a clerk wrote on the tape but didn't get anything on the tape, was it an equipment failure or an operator error? At this time we don't have a way of knowing," he said.

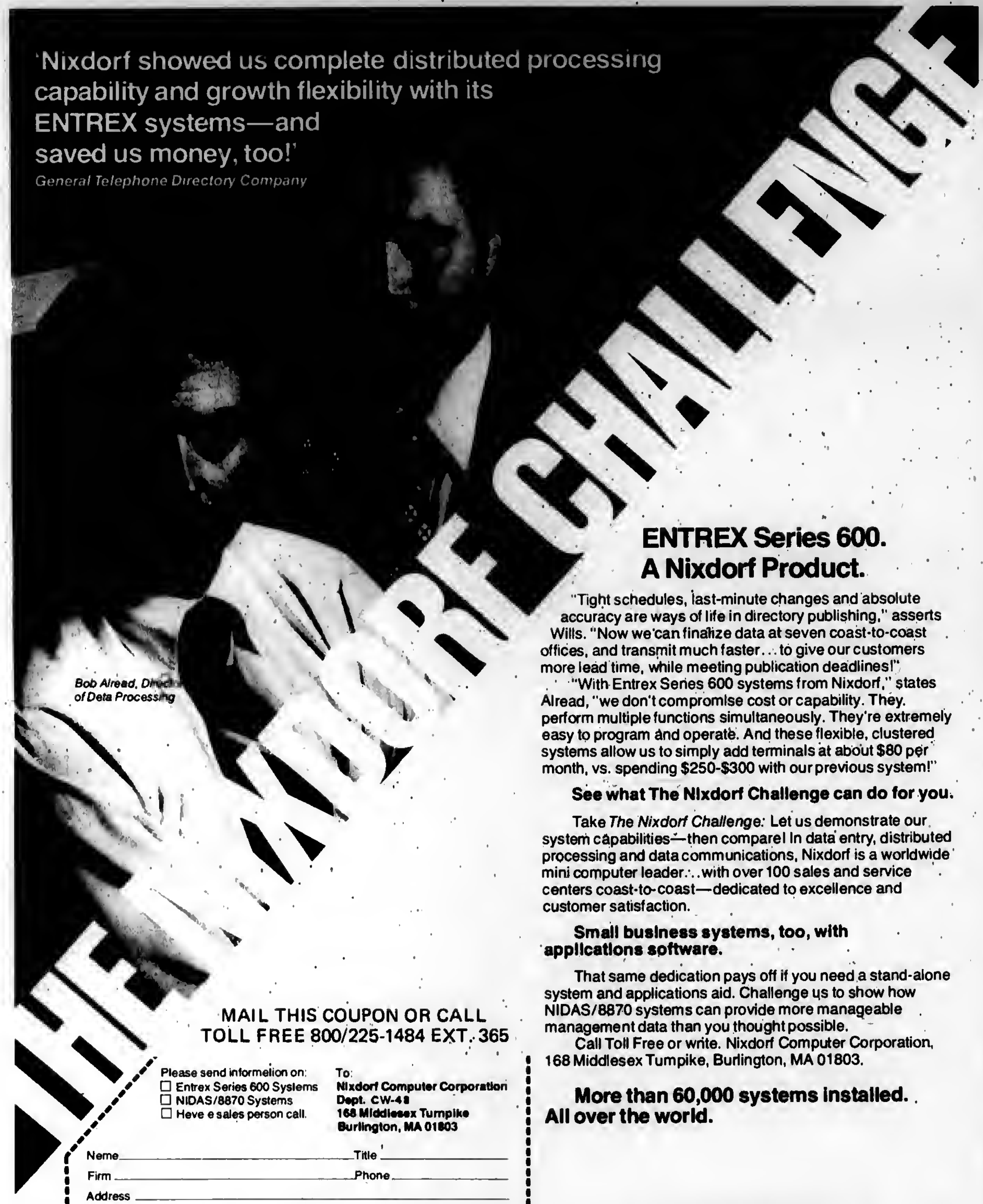
When a store is unable to transmit an order via its terminal, Ralphs' DP center generates a substitute order from the computer file of standing orders kept ready for such emergencies. The problem is usually resolved by a service call, and subsequent orders can be transmitted via the terminal, Borneman reported.

Of the 1,000 scheduled order transmissions from Ralphs stores each week, only a few failures can be ascribed to the terminal, Borneman reported.

"Right now we're running about 20 service calls a week," Borneman continued, "I think that's too high, but MSI says we use the terminals more than anyone esle."

Borneman said the MSI terminals are handled by up to 1,000 Ralphs store employees each week. The company is currently planning a refresher course in the use of the terminals and will select from each store one person who uses the MSI equipment. That person will be responsible for refresher training of others at the store in the correct use and care of the terminals.

Through this program, Ralphs hopes to reduce the number of service calls to 10 or even five a week, Borneman said.



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Source Data Entry Seen as Step Toward DDP

(Continued from Page S/2)

way from collection to processing to dissemination of data.

This presents some disadvantages: It is necessary to bring data to a central location; data entry is a dedicated function with its attendant costs for personnel, equipment and supplies; data must be recopied in various places giving rise to errors (cost, delays); and procedural rigidity , overwhelming paperwork and lack of timeliness of work processes can result.

Variety of Alternatives

Let us assume at this point that our user has reached the conclusion he must do something or collapse under a mountain of paperwork. In his search for a way out, he has been exposed to a variety of products that offer potential solutions to his predicament.

Vendors of intelligent terminals, key-to-disk systems, transaction terminals, CRTs, teleprinteres, media scanning equipment and interactive terminals have all shouted the benefits of their approach. How is the user to decide which alternative is best? Let's focus on some of the steps that he might take.

First, he must evaluate the current situation by:

- Ascertaining the speed, scope and volume of his present system.
- Determining where the problems are.
- Assessing whether he needs an entirely new approach, modification to the current one, an upgrade of installed equipment or additional personnel.

Secondly, he should assess geographical requirements by:

- Determining points of data origination, collection and dissemination.
- Assessing how data is ultimately processed.
- Determining how scattered each function is.

Next, he should consider timeliness as a factor by answering the following questions:

- During what times in the business cycle must data move?
- What should the response time at the terminal be (e.g., is the customer waiting on the phone?)?
- Is real-time access to the data base required?
- Does batched data require daily turnaround.?

Fourth, the user should estimate the following data volumes:

- Size of the data base (local storage requirements).
- Volume of data keyed daily (peak peiods?).
- Storage requirements if communications link goes down.
- Volume of data that must move between points.

The next step is considering the costs of:

- Equipment (purchase, maintenance, operation).
- Personnel.
- Supplies (paper, computer media).
- Overhead (space, utilities).

Sixth, an evaluation of possible new equipment should consider:

- The usefulness and capability of the units.
- Ease of installation and operation.
- Reliability and maintainability.
- Modular growth capability.
- All equipment-related costs.

Seventh, the user should determine growth requirements:

- Current system capacity.
- Where loads are expected to increase.
- Requirements for expandable, field-upgradable equipment.

Then vendors should be evaluated in the following areas:

- Compatible systems: Since source data entry is not the last step into DDP, the selected equipment must provide both data entry and remote processing potential and be capable of expansion to other functions as well. Once the equipment is installed, it should be able to grow in usefulness to support additional applications.
- Nationwide (worldwide) service and support organization: When the user may require expansion into remote areas, he must select a vendor capable of servicing outlying areas.
- Expertise in expected growth areas: Can the vendor move the user into extended usefulness and provide new fully supported products to help the user achieve his long-range goals? Few users can predict their DDP requirements very far into the future and the ability of the vendor to offer flexible growth alternatives is very important.

Selection Begins

Once these issues have been evaluated, the selection of a source data entry system can begin in earnest. Although resistance to procedural change is strong, costs and volumes are forcing users to move to more capable kinds of equipment.

In this migration, the user is looking for more than just replacement of current data entry equipment; he wants more efficiency, expanded capability, flexibility, growth and new methods to help him get a better handle on overall data processing costs.

Because source data entry means putting terminals into the business environment where daily transactions occur, the data entry function can become a by-product of clerical transactions. Therefore, data entry as a distinct function begins to fade into an integral part of the computational process.

However, data entry is not the only objective. Often, output is as impor-

(Continued on Page S/25)

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OCR Solves Problem in UK

(Continued from Page S/21)

After two years of operation, the throughput average remains about 5.5 million characters per day. This is total throughput, including loading film, reading, reject correction, new applications, testing, editing of data and writing magnetic tapes.

Additional Software

Only one piece of additional software has been acquired by the DHSS. This is a package for new forms generation.

The overall reject rate of the system is under .8%, meaning that 99.2% of all data, alphanumeric and mixed hand-printed and machine-printed data is recognized automatically. Rejects are converted at special on-line time-shared terminals without slowing the system.

Because of these low reject rates, it has not been necessary to establish feedback procedures which require constant evaluation and retraining of data entry clerks. Output from the Grafix I system is magnetic tape formatted for the DHSS' main computer system.

The DHSS has had a software package developed and soon plans to implement a magnetic tape-to-film-to-magnetic tape conversion on the Grafix I. The purpose is to store records in a format that can be retrieved digitally after an indefinite period.

The DHSS also plans to expand the system's use to reading books, similar to other Grafix I users. The concept is to convert library catalogs and other technical documents into a digital format for updating and republication.

Source Data Entry Viewed As Interim Step to DDP

(Continued from Page S/24)

tant as input for printed reports, visual data observation or various forms of feedback from an application program output system.

Multifunction System

By applying more intelligence in the data capture area, there is less dependence upon the remote host processor to accomplish the desired tasks. If the local intelligence is minicomputer-based, we have the potential for what is probably the most effective source data equipment of all — the multifunction terminal system.

Simply stated, a multifunction system is able to concurrently support several methods of data entry, plus local processing and communications in the same equipment. Typically these functions include:

- Remote batch.
- Keyboard entry.
- Transaction processing.
- Remote printing.
- Inquiry/response applications.
- Communications.
- Local processing.

Any intelligent terminal helps to address some of the problems mentioned earlier such as errors, inflexibility and untimeliness of the entry process. This is accomplished by reduced keystrokes, increased editing/validation, tighter error control and communications.

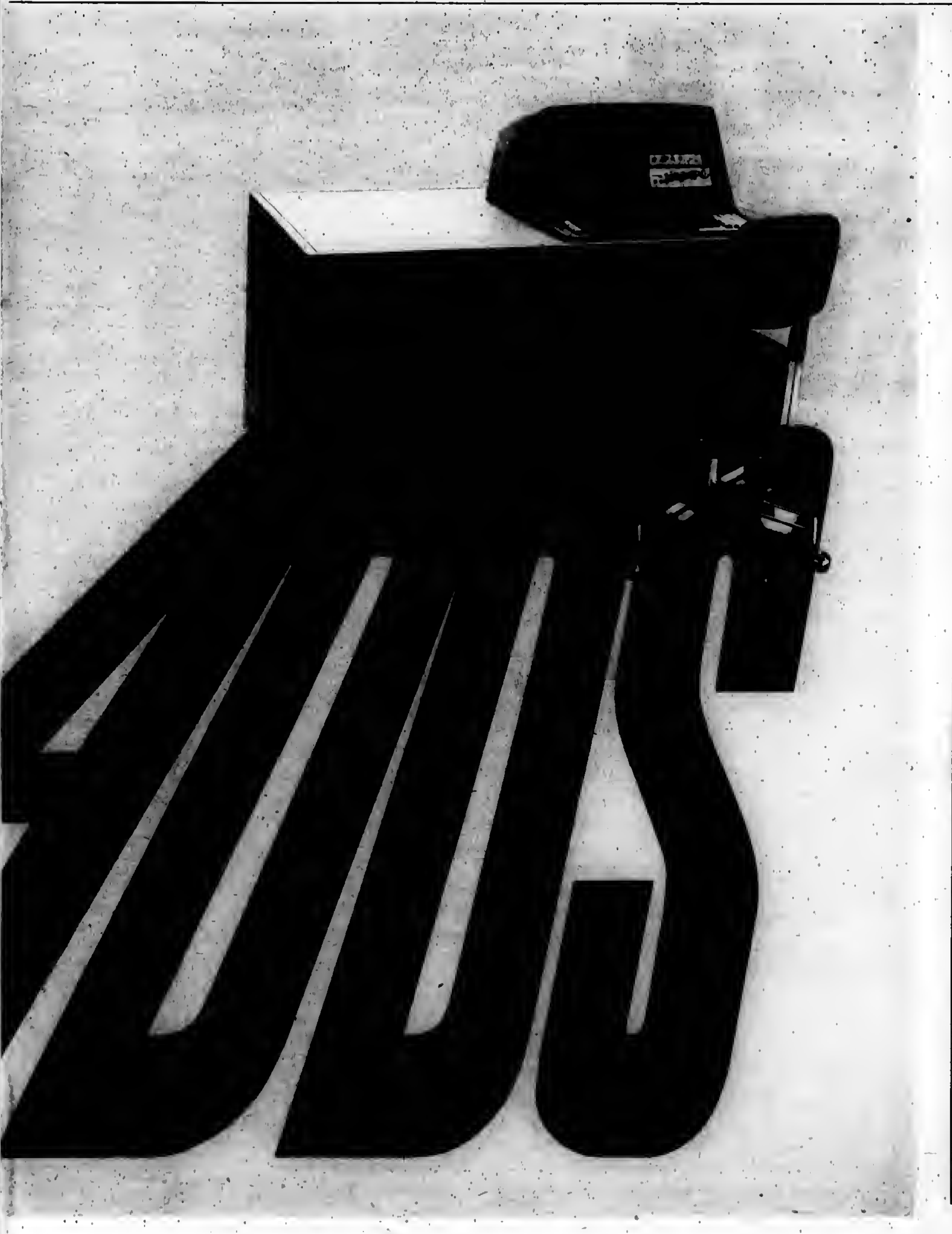
Beyond this, a multifunction system brings some of the following benefits:

- Equipment sharing.
- Compatible languages.
- Shared common data files and access methods.
- Local processing in higher level languages.
- Efficient utilization of communications facilities.
- Input from a variety of data entry terminals.

The adoption of a multifunction system allows a user to realize immediate benefits resulting from increased error control/accuracy, timeliness of data and cost savings as a result of equipment sharing. What may formerly have required several different kinds of equipment (for example, remote batch terminals, interactive transaction terminals and data entry stations) can now be accomplished in a shared minicomputer-based terminal system.

But the ultimate choice in selecting a source data entry system will depend upon careful evaluation of available equipment, proper assessment of the user's current situation and selection of a vendor who can grow with the user's requirements. The methodology suggested in this discussion should help the reader in his decision.

Doctor is a senior product manager for intelligent terminal systems at Honeywell Information Systems, Inc. in Waltham, Mass.



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OCR Unit Captures Employee Time Card Data

(Continued from Page S/4)

labor). There is also space for the employee to void an entry made in error, which is validated by initialing.

Preprinted control information on each card includes the date and the employee's name. At the top are preprinted numbers showing the employee exactly how each is to be written.

'The new forms gave us an opportunity to re-emphasize the importance of the time card, which too many people view as a necessary evil," Anderson said.

"We prepared a 10 minute film that began by stressing the importance of time card data, both to the employee and to the company. We reminded employees that their time cards serve as actual cost controls on each job EDO has in process and that from them we distribute costs to contracts and prepare bills," he noted.

The film also explained how information is entered, step by step. Immediately afterwards, each employee practiced printing on the new forms.

"We moved deliberately during the transition period," Schmand said. "Our IBM 3886 arrived in December 1974, and we began processing the new time forms in March of the following year. As anticipated, we had a fairly high reject rate at first, but this was gradually brought under control, especially with the arrival of the "video collect" feature four months later."

As the time forms are fed through the OCR reader, any number that cannot be read is flashed onto the screen of an IBM 3277 CRT terminal. A payroll section member seated at the CRT terminal enters the correct number on a keyboard, and the machine continues processing. The reject rate is now at a low 5%, and improving steadily. Whenever the 3886 cannot read a number, that fact is recorded. A report is issued each month identifying the employee and the number of errors incurred by week. This report provides trend data allowing segregation of the occasional error maker from the habitual error maker.

"With this information, we recover the actual source document and get back to each employee to show them what they are doing wrong," William L. McCaw, manager of personnel administration noted. "By and large, everyone cooperates fully and has accepted the new time card — and every time we have to go back to anyone we re-emphasize the importance of this document. The program is a solid success, especially when you consider we're scanning 750 time cards daily, each with about 50 characters — or more than 200,000 characters a week.

"Interestingly enough, a number of our problems have been with people at higher management levels, who are used to writing with flourishes," he continued. "We view this as a continual training program, and of course we train new employees in OCR handprinting as part of their indoctrination."

Source Traceability

Data read by the 3886 is transferred to magnetic tape and is then used to produce management reports the same day. As each card is processed, the system automatically applies a control number, providing infinite traceability back to the source card.

"There's no way of overstating the importance of such tight cost control," Anderson said. "Periodically, auditors from federal regulatory agencies step into our plant unannounced and make spot checks to ensure our charges are valid. They will ask to see various employees' badges and then verify the accuracy of charges shown on their paycards.

"Our new OCR time cards have been government audited a number of times and are fully accepted by the auditors," he said.

Swift processing of labor costs permits faster correlation with material and overhead costs — that in turn has led to faster billing.

"Government people tell me they are hit with a flood of bills the first week after the close of each month," Anderson said. "All they can do is move them through as fast as possible. Our bills beat the flood by about a day, and I've actually been thanked for this by the defense agencies. Even more important is the fact that we get paid faster, which of course helps our cash flow and reduces interest expenses considerably."

The time-card application alone has more than paid for the OCR reader. Since it is used just about two hours a day for this purpose, plenty of time is left for other work.

Another application is EDO's employee efficiency rating system. Every quarter, supervisors rate employees as part of a job performance review that serves as the basis for pay increases. The old system involved developing a total efficiency score for the quarter, then factoring in the number of years employed to determine a total status score. The necessary calculations were performed in the Personnel Department and required 80 hours work every quarter.

Now, the supervisor follows the same procedure but makes the entries on an OCR form. The data is entered into the system and passed against employee files in the computer to perform the calculations and print the final score. The Total system time required is two hours.

A third application is known as com-

(Continued on Page S/29)

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TEXAS INSTRUMENTS.

Wine Sellers' Portable Terminal Cuts Phone Bill

SYRACUSE, N.Y. — When the telephone company did away with unlimited Wats line service here in late 1975, it boosted the monthly telephone bill $1,000 for Wine Merchants, Ltd. The wine wholesaler had been using the service to receive twice-daily verbal order entries from its 45 field salesmen.

Today, Wine Merchants' sales force is recording order information on portable source data entry terminals and transmitting the data to headquarters in a single call lasting less than two minutes. The same job formerly took 20 minutes to do verbally on the Wats line.

Because of the portable terminals from Azurdata, Inc., the order clerk work force has reportedly been reduced about 75%, and the salesmen have been given more time to sell.

But perhaps most important to Wine Merchants, the accuracy of the order entry has been improved, the shipping process has been streamlined and jealously sought shelf space has been protected.

"If a store orders an out-of-stock item from us and we don't deliver it the very next day, we could lose shelf space," according to Don Spoerke, DP manager. "It will be filled with other products, and they may not be ours."

Once space is lost, it can be very difficult to regain it, Spoerke feels. And he believes that portable order entry terminals have helped the company keep it.

Before using such terminals, Wine Merchants' New York salesmen were required to call in their order twice daily to a warehouse and sales facility in either Albany, Buffalo or Syracuse, N.Y. There, the information was taped as it was received, manually transcribed and keypunched for use in the computer center located here. Data was transmitted here over telephone lines.

Each call was taped to provide an opportunity to check the order processed with the order placed. Each salesman would interrupt his sales effort each afternoon to make his first call and would make a second call (with his remaining orders) in the early evening. Each salesman spent an average of 20 minutes on the telephone with such calls each day.

When the telephone company pushed Wine Merchants to search for an alternate sales ordering method, Spoerke said he felt that it could use the opportunity to improve its order entry procedures, and it should have a "real-time system."

"I did not want to say goodbye to that salesman until I was certain that I had every order and the order was perfectly accurate," Spoerke said.

Alternatives Sought

Spoerke believed there was a better way to input data to his NCR Century-based computer operation.

"We first briefly looked into using a Touch-Tone telephone system that worked with an IBM System/7," he recalled. "While we found that we could cut keypunch costs, the savings we sought were not there. Telephone time was not reduced substantially, and the devices were relatively expensive."

Wine Merchants then looked at several portable data entry terminals. Its evaluation found only Azurdata's terminal was compatible with the NCR Ascii system, Spoerke said.

"We determined that we would need a terminal that was Ascii-compatible and with a code structure that would permit its use to transmit directly into our NCR machine," he pointed out.

When the search narrowed to two terminals, a preliminary entry system was established to test the direct entry concept and these terminal devices. "The entry system required the addition of a CRT screen, communications multiplexer and additional memory to the Century system to allow the online program to function in a partition in a real-time mode," Spoerke said. "Since software did not exist, we designed and wrote it ourselves.

"Our objective was to accept the input data with our mainframe, validate it, display it and correct it in a minimal amount of time," he added.

According to Spoerke, the terminal evaluation centered on packaging, power consumption and reliability.

The Azurdata terminal packaging was judged superior in weight and configuration. "It fit easily into a salesman's briefcase and was essentially self-contained," he recalled.

Environmental Testing

He said the tests also showed the Azurdata terminal's permanent integral battery used less power and was recharged in less time.

Spoerke made several calls to terminal users to check on device reliability. He was particularly impressed by a major firm that had done extensive environmental testing of both devices before selecting Azurdata.

"It had the capability of doing its own environmental testing. It had put both units through some pretty stringent environmental testing and found Azurdata terminals superior. Because our salesmen faced very harsh weather conditions here in New York State, we were concerned with reliability and felt that Azurdata should also be our choice."

In March 1977, the Azurdata Electronic Notebook Terminal (ENT) was introduced to Wine Merchants' salesmen. Since then, Wine Merchants has added the newer Scorepad terminal for data collection on a branch office basis.

The ENT version is a hand-held, battery-powered data acquisition device with solid-state function and control electronics, solid-state memory and an internal rechargeable battery pack. It has a data entry and function control keyboard, a segmented LED display and a built-in Bell 202-type modem that provides for transmission at 1,200 bit/sec in Ascii.

This terminal provides for keyed entry of product codes of up to seven digits and, on the same line, of five-digit quantity entries. Its standard memory is 4K characters and is optionally expandable to 12K characters.

The Scorepad provides all ENT capabilities with additional flexibility. The solid-state memory is expandable from 8K characters to 88K characters, and the terminal can be configured to read Plessey, Codabar or the Universal Product Code.

The microprocessor design of the scorepad allows selection of field lengths, check digiting and transmission of protocols to be made by keyboard entry of an option code.

Wine Merchant's route salesmen now make their calls armed with a portable Azurdata terminal and, as each order is taken, it is keyed into the terminal's memory. At a prescheduled time each evening the salesman calls directly to Syracuse, where a clerk takes the order at a keyboard-equipped CRT that is "live" to the central processor.

The clerk first keys in information necessary to initiate data transmission, including the salesman's location and sales number. The CPU then configures itself to receive the data and the salesman is told verbally to commence transmission.

"As the data is coming across the telephone lines, our software is validat-

(Continued on Page S/29)

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Network Helps Keep Pace With Hospital's Growth

(Continued from Page S/15)

can be used to call out the same information on demand.

The initial hardware complement in 1973 included 58 CRTs and 14 on-line remote printers, all of which operated from dual central processors having 48K words of main memory each, two strings of five 7.5-million word disk memories each for real-time applications, two disks for batch applications, four magnetic tape units, one 950 line/min printer, and two NDC-designed communications controllers.

The main additions that have been made since are 10 more CRTs and 14 more remote printers. to handle Lakeland's growth to 640 beds as well as the new departments and facilities. Main memory also has been upgraded to 64K words, and one more disk has been added to each of the two real-time strings.

It's difficult to document much of what was accomplished, because a lot of it had no precedent. What is known is that overall efficiency in ordering, charging patients, billing and so on is most impressive compared with previous practices.

All of the hospital's objectives have been met with an actual reduction of employees in our DP department, admitting and business office. The lab credits the system for its being able to perform a greater volume of tests each year without having to add to its payroll costs.

All of this has been accomplished at a cost of only $2.43/patient day.

Reaction from staff personnel also has been very favorable, and the system has been well accepted by all departments.

Confirming Lakeland's evaluation are comments received in mid-1976 when an independent outside audit by a major health insurance group reported: "Charge accounting, the supporting financial documents and the medical records documentation were the best we have seen in over 25 hospitals. It is an approach that tends to bolster our feelings that medical services can be properly ordered, carried out, charged for and, above all, documented."

Lakeland asserts that the net result is greatly improved patient care.

Barbee is DP manager at Lakeland General Hospital.

Phone Bill Cut By Terminal Use

(Continued from Page S/28)

ing the data to see that all products are correct. A customer check is made and a total case count is performed," Spoerke explained.

After the transmission is completed, the computer system performs its final verifications and displays the orders on the CRT screen. One line across the screen is used for each order received. The operator can visually and verbally check the accuracy in several ways and correct errors if necessary.

When this verification is successfully completed, the operator informs the computer and the order data is moved from temporary to permanent disk storage. It is then held while orders are similarly accumulated from other salesmen, and Wine Merchants is ready to begin the billing process.

Spoerke said the order entry process, from the time the phone rings until the CRT operator hangs up the phone, averages about a minute and a half. Where the firm used to employ four 30-hour-a-week keypunch operators as order clerks, it now has one.

The use of the terminals has extended the salesman's effective time in the field because he can make more calls, Spoerke added. The salesman no longer needs to stop in mid-afternoon, locate a phone, prepare a separate order report and read it over the telephone.

OCR Gathers Worker Data

(Continued from Page S/26)

puter cost transfer. EDO engineers use the Model 135 for scientific work, with time charged to a particular contract. An OCR card is prepared with the job number then computer time is captured and applied to the proper contract.

The fourth application is within the Management Information Systems Department, with Schmand's people filling in OCR forms to report work performed. The data is kept on magnetic disk and serves as the basis for billing DP work to the different EDO departments and subsidiaries. It also helps Schmand monitor the progress of new systems development, comparing actual against estimated costs.

The Model 135 includes four 3340 280-M byte disk units and a 1403 1,100-line/min printer. Among the wide range of applications performed are cost accounting, work in progress, purchase order status, specific job controls with progress summaries, weekly status reports by contract, manpower forecasts and contracts pricing or bids.

The latter application is planned for OCR processing. Right now, each operating department prepares its estimate on a contract. The various estimates go to a price estimating group to be summarized and then are keypunched.

Timing is critical on these contract bids, and as the final figures frequently come in late at night, it means holding keypunchers late. With OCR, it is anticipated these overtime costs will be eliminated even as the contract bids are produced faster.

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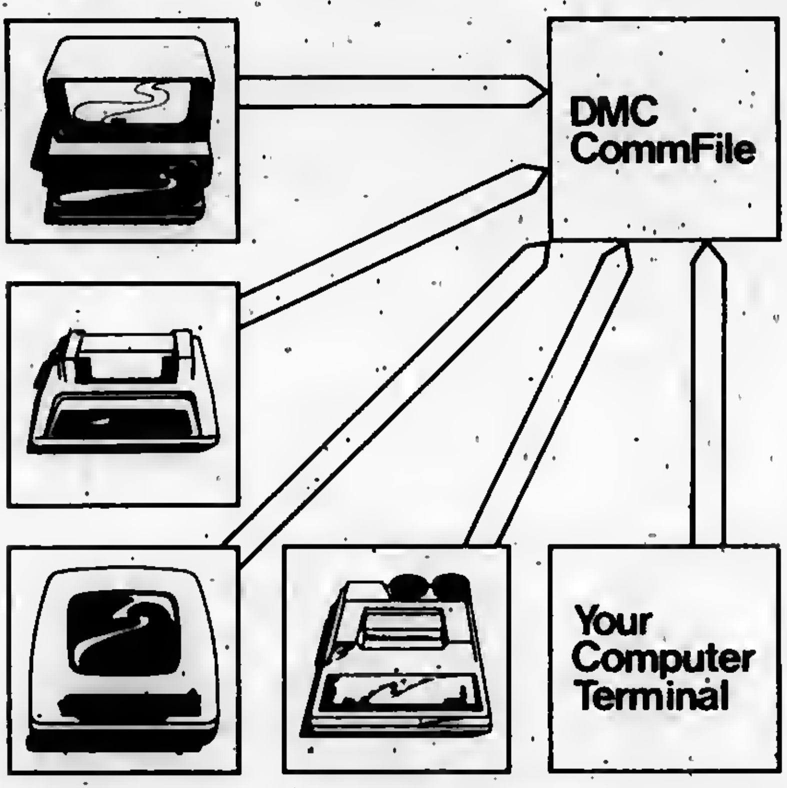

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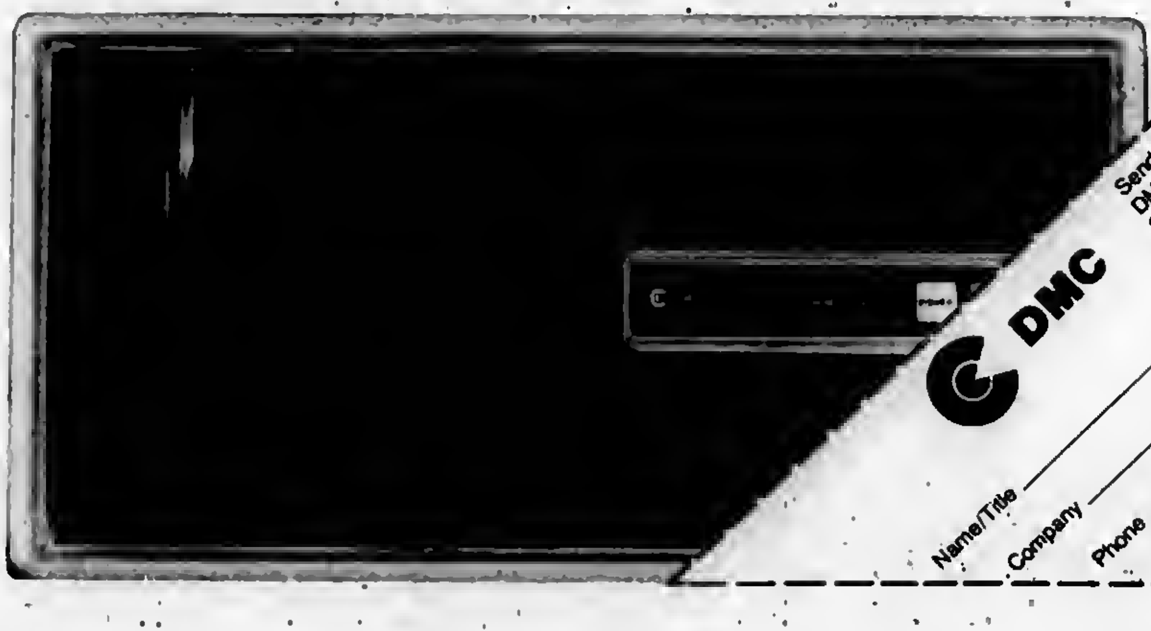
For full information, contact Tom Bowden at DMC.



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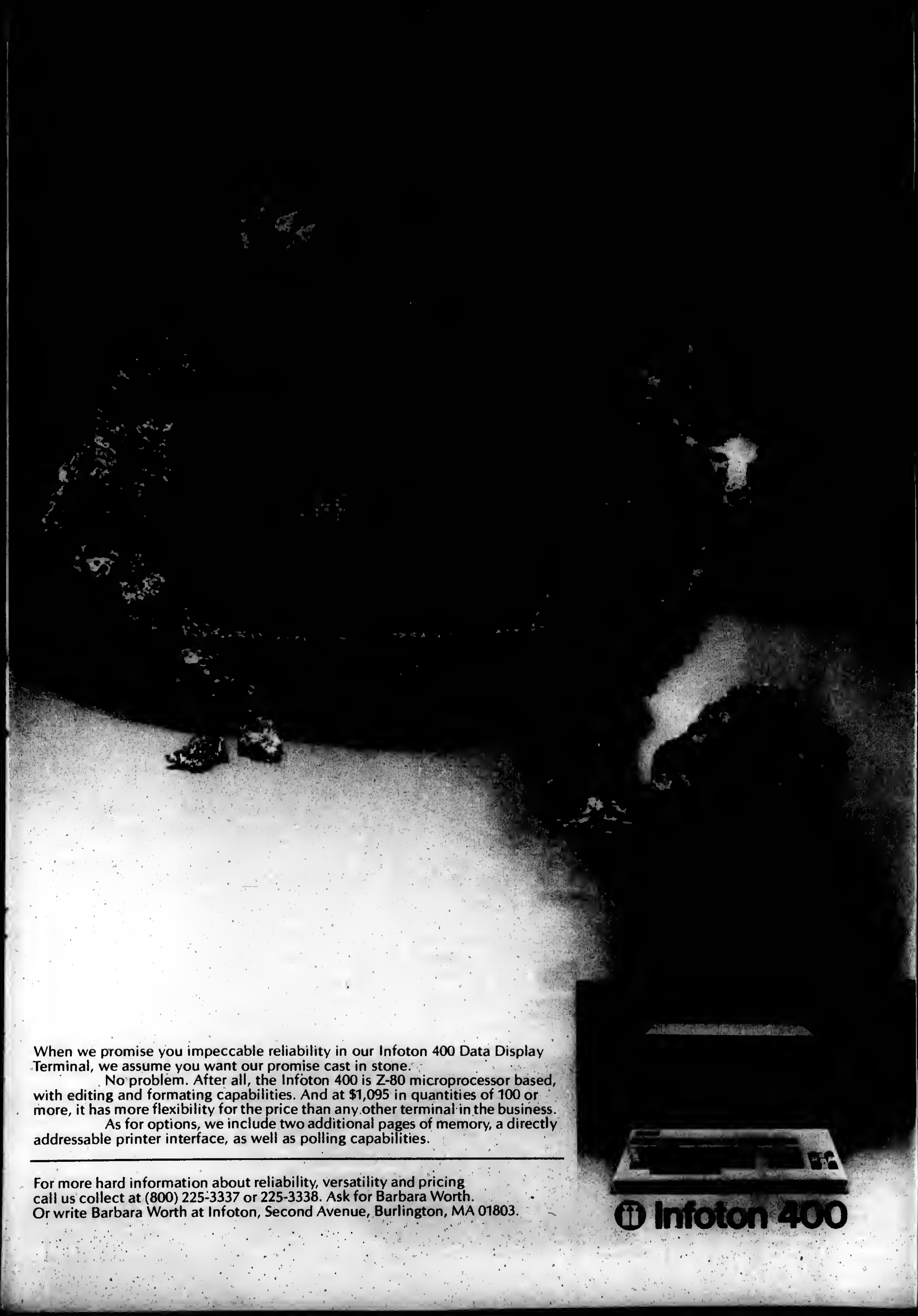

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Options Now Standard

CM Adds 'High-Performance' George

By Jeffry Beeler
CW Staff

LEBANON, Ohio — Expanded main memory, a reconfigured operating system, quadrupled printer output and other features that were previously available to Cincinnati Milacron, Inc. (CM) customers only on special order are now reportedly standard with a "high-performance" addition to the firm's George family of small business systems.

CM officials credited the enhancements with giving the latest George system, dubbed George HP, 80% to 100% greater throughput than the other five systems that round out the series.

Standard configurations of the previous family members include a 32K-byte main memory, a 30 line/min printer and a choice of operating systems that offer different combinations of software modules. Users can expand any of these configurations to accommodate a 64K-byte main memory, a 125 line/min printer and an improved operating system — but only for a $6,000 addition to a system's basic purchase price, according to a spokesman.

With the introduction of the latest George system, however, users can specify all these features without incurring additional hardware or software costs, he said. "What we have really done is to take what before would have been a very special-order unit, put it together in a standard configuration and then drop the price by nearly $6,000," he explained.

Besides a 64K-byte semiconductor main memory and a 125 line/min printer, a basic George HP configuration incorporates a CM Model 2200B CPU, two 630K-byte floppy disk drive units (with an option for two additional drives), an optional eight-channel multiplexer and an operating system dubbed SBS Special Configuration 9405.

All the software modules that constitute the operating system were available separately to users before CM announced the George HP. No previous George operating system, however, incorporated modules in exactly the same combination as the 9405 configuration, the spokesman noted.

For example, the system represents the first such CM package to include a printer driver and a sequential file processor, the spokesman said. With all previous George operating systems, those two software modules were disk-resident.

"Our latest operating system is really a high-performance version of its predeces-

(Continued on Page 52)

Firm Using Two Minicomputers To Seek North Sea Oil Reserves

ASHFORD, England — Two minicomputers, one oceangoing and the other land-based, are allowing a company that conducts underwater geological surveys to help oil companies tap the immense petroleum and natural gas reserves buried deep beneath the floor of the North Sea.

One of the minicomputers controls the navigational system aboard Sonarmarine Ltd.'s survey vessel the Criscilla. The other machine, operating at Sonarmarine's headquarters here, generates topographical maps of the North Sea bottom and its underlying geology.

In this function, the shipboard computer will aid its land-based counterpart while the drydocked Criscilla undergoes an overhaul this winter.

The two systems also help Sonarmarine decide the location of drill rigs and production platforms as well as plan pipeline routes and subsequent inspections for numerous international oil companies.

Officials at the sonar mapping service, a subsidiary of British Petroleum Corp., gave the two minicomputers part of the credit for the firm's ability to expand its staff from 20 to 60 in the year since the organization's founding. They also credited the machines with helping the firm win a highly competitive contract with Statoil, the Norwegian State Oil company, which in September hired Sonarmarine to undertake a major deep water pipeline survey.

No Downtime

In its eight months of operation, the shipboard minicomputer has reportedly experienced no downtime. "Sometimes it was switched on for as long as 14 days, 24 hours a day in all weather conditions," reported Sonarmarine's survey manager W.J.A. Payne.

"For flexibility, we do all our own software in-house, and I can say we have really stretched both these systems," he added.

In the oceangoing system, some of the hardware modules include a 32K-byte SPOC-16/45 processor from General Automation, Inc., twin floppy disk drive units, a 36-in. plotter and a teletypewriter. Operating in real-time, the configuration charts the

(Continued on Page 54)

DG Adds 50M-Byte Disk Drive Featuring 35 Msec Seek Time

WESTBORO, Mass. — Data General Corp. has extended its line of disk pack storage units with the introduction of a 50M-byte drive that reportedly seeks in 35 msec with 8.3 msec latency and a 806,000 byte/-sec data transfer rate.

Compatible with the company's two larger disk units, the 6067 series subsystems incorporate four disk packs, cables plus a controller and an adapter for up to four drives, DG officials said.

The Model 6067 attaches to a standard Nova or Eclipse data channel, while the Model 6067-H connects to an Eclipse M/600 through its 10M-byte/sec burst multiplexer channel, the spokesman added. Model 6067-A, meanwhile, is an add-on 50M-byte product.

Users can intermix as many as four 50M-, 96M- or 190M-byte disk storage drives on one controller, or two CPUs can share the units by using DG's Model 6062 dual-port option, they noted.

All three 50M-byte units accommodate DG's Advanced Operating System for Eclipse and Real-Time Operating System for Eclipses and Novas, according to the company. As a result, the drives support concurrent-batch and real-time operation, RJE80 and Hasp II communications software and various programming languages including RPG-II, Ansi 74, Cobol, Algol, PL/I and time-sharing business Basic.

All three products also reportedly operate with the company's interactive Cobol small business systems.

Each drive uses five recording surfaces and 815 cylinders and stores data in 512-byte sectors arranged in 120 sectors per cylinder, DG officials said. They also record 4,040 bit/in. with 370 track/in., the spokesman added.

Measuring 45- by 24- by 34-7/8 in., the 6067 series provides a 7-in. rack-mountable adapter with controllers and dual port options, each of which require two slots in a computer chassis or I/O expansion chassis, DG said.

The Model 6067 costs $21,800 compared with $14,800 for the Model 6067 and $19,800 for the Model 6067-H. The company is at Rt. 9, Westboro, Mass. 01581.

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Xylogics Disk Controller Aimed at Users of PDP-11/03

BURLINGTON, Mass.— Users of the Digital Equipment Corp. PDP-11/03 can reportedly access up to 40M bytes of disk storage with a single-board disk controller and subsystem introduced recently by Xylogics, Inc.

When used with 100 track/in. disk drives, the Wizard-1 subsystem becomes hardware-, software- and media-compatible with the DEC RK11/RK05 disk subsystems, according to a spokesman. As a result, the unit allows users to take advantage of all available DEC software without conversions, he explained.

Wizard-1 also reportedly supports all familiar 2.5M-, 5M- and 10M-byte disk drives in all possible removable and fixed media configurations. Users can attach up to four disk drives to the controller for a total capacity of 40M bytes, the company noted.

Printed Circuit Board

The product comes on a printed circuit board that attaches to any standard Q-bus backplane slot and includes a read-only memory bootstrap loader, on-line test capability and cable to the first disk drive, Xylogics officials said.

Wizard-1 costs $2,600 from the company at 42 Third Ave., Burlington, Mass. 01803.

'High-Performance' Model Expands CM George Series

(Continued from Page 51)

sors in the George series," according to the CM official, who attributed much of the improvement in the George HP's throughput to operating system enhancements.

More Applications Room

In addition to upgrading the operating system's performance, CM also boosted by about 16K bytes the amount of main memory available for writing applications programs, the spokesman noted.

With the other members of the George series, users could reserve only about 16K bytes as applications space. With the George HP system, however, almost 32K bytes of main memory are available for that purpose, the spokesman said.

CM has also improved the George HP over other members of the product line by providing a printer stand as standard equipment and by adding a 24-line by 80-character CRT terminal to the configuration, according to the spokesman. All previous George systems came with a CRT terminal that displayed just 12 lines of 80 characters, he noted.

Equiped with an RPG-II capability, the George HP provides a series of optional applications packages for financial jobs like accounts receivable, accounts payable, general ledger and payroll, the official said. The system also comes with a second optional series of software packages that allow users to perform industry-specific tasks like wholesale distribution and contract job costing.

Cycle, Fetch Times

The George HP's central processor cycles in 220 nsec and fetches a byte of data from main storage in an average of 1.1 microsec, CM said. It reportedly provides a 64K by 8-bit semiconductor control storage unit and requires 110 Vac at 60 Hz.

I/O channels in the system include a firmware-controlled direct memory channel and a direct memory access channel that transfers data at up to 96 kbyte/sec, the spokesman reported. In the serial I/O mode, the system is said to operate at 9,600 bit/sec.

With applications software for small retail firms, a standard George HP configuration costs $19,950. Excluding the applications, the system sells for $17,100 and is immediately available from CM at Mason Morrow Road, Lebanon, Ohio 45036.

Aviv Controller Fits DEC CPUs

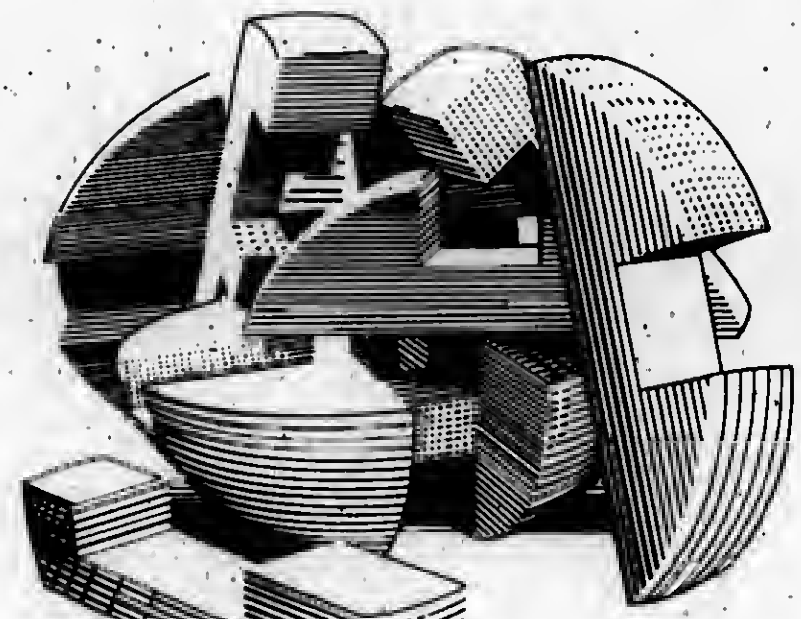
BEDFORD, Mass. — Aviv Corp. has introduced a disk controller compatible with Digital Equipment Corp. operating systems and media as well as with DEC's most recent RK11/RK05F diagnostics, according to an Aviv spokesman.

Designed to operate with DEC's PDP-11 Unibus CPUs, the DEC-803 controller reportedly consists of two hex boards and operates with various disk drive models including Diablo Systems, Inc.'s Model 31 and 44, Pertec Computer Corp.'s 3100 family and Control Data Corp.'s Hawk and Falcon.

IBM Compatibility

Besides storing 2.5M- to 20M-bytes/drive, the unit provides a 16-word data buffer and transfers up to 65K words in one operation, Aviv officials said. It also offers compatibility with either front-loading IBM 2315- or top-loading IBM 5440-type units and accepts 2,400 rpm disk drives, the spokesman added.

Model DFC-803 costs $3,000, and a complete system with controller, drive and cables is also available from Aviv at 300 Sweetwater Drive, Bedford, Mass. 01730.



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Cost Per Byte Drops

DEC Expands Memory Size With Disk Drive Additions

MAYNARD, Mass. — Digital Equipment Corp. has expanded its disk drive line with three units that the company claimed provide greater storage and a lower cost-per-byte than previous DEC products.

Designed to operate with CPUs ranging from microcomputers to medium-scale systems, the drives reportedly include the 5M-byte RL01, which DEC claimed is the lowest priced rigid disk on the minicomputer market, the 28M-byte RK07 drive and the 67M-byte RM02 drive.

Three Additional Drives

Equipped with a 5.2M-byte removable disk cartridge, the RL01 functions with microprocessor-based PDP-11/-03s and with all PDP-11s and PDP-8s, a spokesman said. The unit transfers data at 512 kbyte/sec, fits in a 19-in. rack or in DEC's corporate systems cabinets and comes with a universal 110/220 Vac 50-60 Hz power supply, he added.

A subsystem for the drive consists of the drive itself, a cartridge and a controller, which can accommodate up to three additional drives, DEC said.

The RK07, although equipped with a 28M-byte disk cartridge, is functionally identical to DEC's 1M-byte RK06 drive, the company explained. Transferring data at 538 kbyte/sec, it operates with the PDP-11/04, the PDP-11/34 through PDP-11/70 minicomputers and the VAX-11/780 system, DEC said.

Similar to RM03

The RM02, meanwhile, suits PDP-11 systems requiring large data bases and is functionally similar to the RM03 disk drive, which DEC recently announced for PDP-11/70, VAX-11/780 and Decsystem-2020 computers, according to one of the company's spokesmen.

Subsystems for the RK07 and RM02 consist of a disk drive, cartridge and controller, which can accept up to seven additional drives, DEC said.

In addition to its other features, the RL01 reportedly provides an embedded servo with position control information dispersed on each track.

The RL01 costs $3,800 by itself and $5,100 as part of a standard subsystem. The RK07 and RM02 costs $10,500 and $18,000, respectively, as individual modules, and $14,500 and $23,000 in subsystems. Deliveries of all three drive models will begin by late April from the company at 146 Main St., Maynard, Mass. 01754.

Unit Logs Without Controller

PALO ALTO, Calif. — The ability to both log data without a controller and to boost the storage capacity of systems that do need such a unit is now said to be available with a tape cartridge mass memory product announced here recently by Hewlett-Packard Co.

Available in single- and dual-drive configurations, the Model 9875 also transports data between HP desktop computers, according to a spokesman.

Both configurations provide data interchange and acquisition capabilities, and a built-in microprocessor makes possible a set of 23 commands, he said.

An IEEE 488-1975 interface bus allows the 9875 to store data in any HP 9800 series desktop computer and later read that data into any other CPU model in the series, the spokesman noted. The unit, which comes with tapes that hold as much as 225K bytes, stores data in HP's Standard Interchange Format.

A "listen-only" mode reportedly allows the 9875 to perform some data acquisition operations independently of an external controller. In the "programmable listen-only" mode, the product reads and executes tape commands.

The single- and dual-drive units cost $2,600 and $3,100, respectively. Optional HP desktop computer interfacing is available, HP said from 1501 Page Mill Road, Palo Alto, Calif. 94304.

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Dual-Density System Fits Univac V77

BLUE BELL, Pa. — Univac has introduced a dual-density magnetic tape system that operates at 75 in./sec and records data at 800- and 1,600 bit/in.

Designed for use with the company's V77 line of minicomputers, the Model 70-7104 consists of a microprogrammed controller and an IBM-compatible vacuum column tape drive, a Univac spokesman said. The 9-track system also comes with optional slave magnetic tape units for system expansion, he added.

At 1,600 bit/in., the system operates in the phase-encoded format and transfers 16-bit words between magnetic tape and the CPU at 60,000 word/sec, Univac said. An error correction feature reportedly corrects single-track dropouts automatically during phase-encoded reading operations.

At 800 bit/in., the system operates in the NRZI format and transfers data at 30,000 word/sec, Univac said.

System Applications

Designed for I/O operations using Vortex, Univac's real-time multitasking operating system, the 70-7104 rewinds at 200 in./sec and starts/stops in 5.3 msec, the firm explained. Other applications for the tape system include data processing for large mainframes, backup storage for disk memories and binary output for V77 programming languages like Fortran IV, RPG-II, Cobol, Basic and Macroassembler, the spokesman said.

During reading operations, the unit reads data as an 8-bit byte plus parity bit, Univac said. The controller reportedly checks parity for each byte and arranges sequential byte pairs into 16-bit data words.

During writing operations, the system transfers 16-bit words to the controller under binary interface control, the spokesman said. The controller then splits each word into two bytes, generates odd parity bits and transfers the bytes and parity bits to the tape unit.

Standard features with the system include automatic tape loading and input power of 115 Vac at 60 Hz, with optional power source of 230 Vac at 50 Hz available, Univac said.

The master unit costs $14,900 compared with $10,700 for the slave unit. Univac can be reached at P.O. Box 500, Blue Bell, Pa. 19422.

Add-On Swells PDP Memory

MINNEAPOLIS — A semiconductor add-on memory from Fabri-Tek, Inc. reportedly contains 32K by 18 bits of dynamic MOS memory on one card, which plugs into a Digital Equipment Corp. PDP-11 hex height card slot.

Designed to operate with PDP-11/04 and -11/34 minicomputers, the Add-In-11 allows users to expand their memories in 32K-word increments up to the maximum capacities of their computers, Fabri-Tek officials said. The unit provides its own on-board parity generation and checking circuits plus a control status register, which holds any detected parity error.

An Add-In-11 with 12-month warranty costs $2,450 from Fabri-Tek at 5901 S. City Road 18, Minneapolis, Minn. 55436.

Minis Seeking North Sea Oil

(Continued from Page 51)

Criscilla's course by sampling two navigational systems and an echo sounder, checking and filtering the accumulated data and the logging it onto a 9-track, 800 bit/in. magnetic tape unit.

In this way, the system computes and plots the vessel's position every 10 seconds. It also generates periodic pulses to mark the echo sounder and any other geophysical equipment operated by the ship's crew, Payne explained.

From the resulting information, the system can produce a record operators can use later to correlate the vessel's position in relation to the geophysical equipment sites, he added.

A CRT terminal with a 21-in. screen operates on the ship's bridge primarily for the benefit of the helmsman. When an operator enters the start and end coordinates of a required survey line into the computer, the CRT displays the ship's position relative to this "sail" line.

The CRT then presents this information in the form of arrows on either side of the desired central line. The system also uses the terminal to display historical data such as the vessel's previous position, Payne said.

After being checked and correlated, the data collected at sea goes to Sonarmarine's land-based minicomputer, a 64K-byte GA SPC-16/440, which uses the input to mechanically generate the main outline of each surveyed area, navigational plots, charts showing selected ocean depths and other geophysical information. If necessary, draftsmen can manually add further information to these charts before they go to a waiting client.

Controlled by eight map-drawing programs developed by Sonarmarine officials, the land-based system incorporates a 10M-byte disk drive unit, a 9-track, 800 bit/in. magnetic tape unit, a 326-in. drum printer, a 600-line/min printer, teletypewriter, 285 card/min card reader, paper-tape reader and two CRT terminals.

Company officials eventually plan to expand the original configuration to include two additional CRT terminals and an 80M-byte disk unit. With this additional hardware, the land-based system will oversee Sonarmarine's accounts and possibly its stock control.

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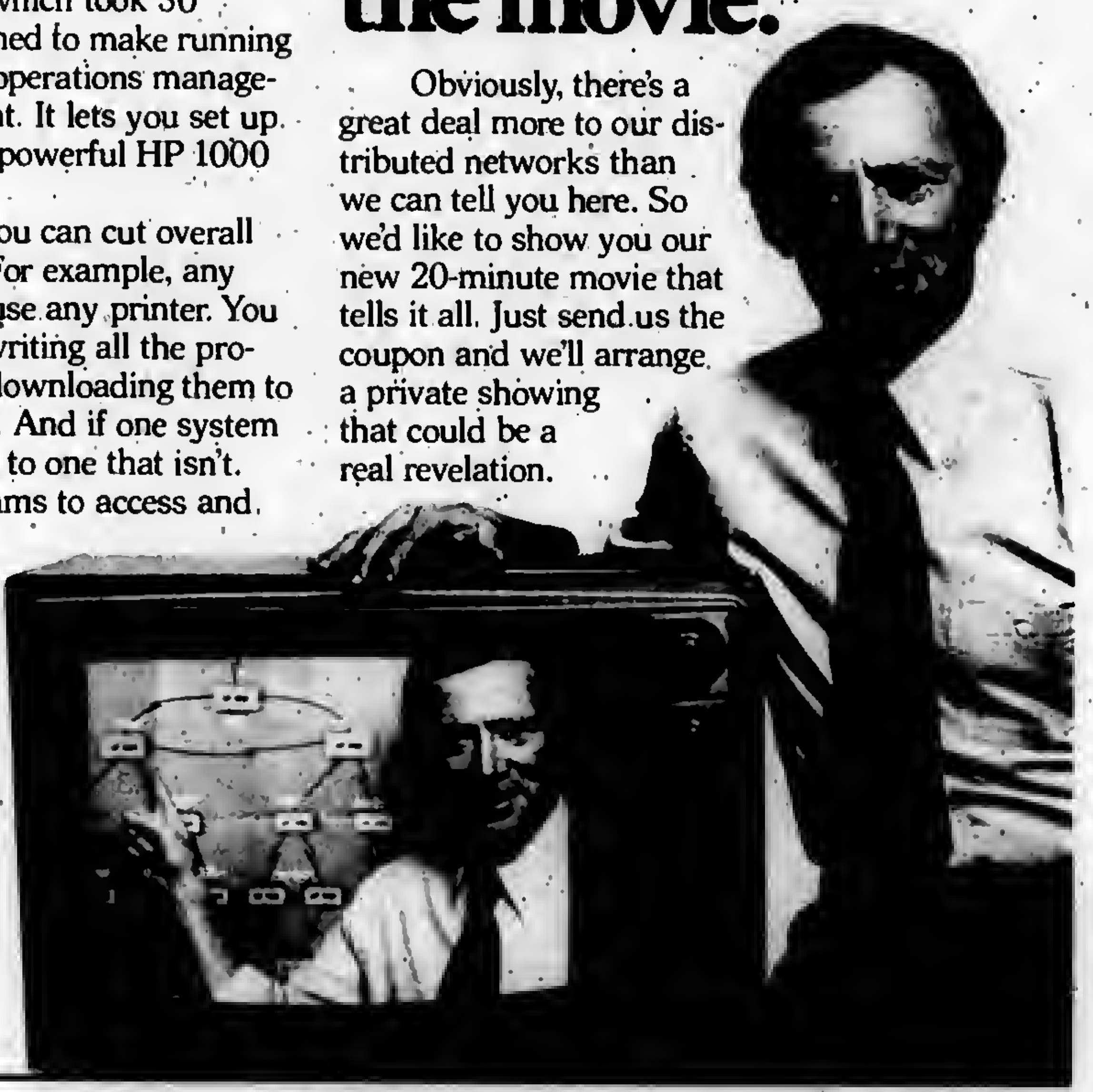

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THE “WAVES” IS HERE!

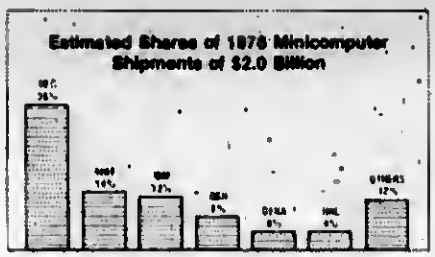
Charles P. Lecht's new book, *The Waves of Change*, is off the press and ready for shipment. It incorporates the serialized excerpts that appeared in *Computerworld* between April and October, 1977, with significant updating and revision, brand new material not previously published, and a host of informative illustrations.

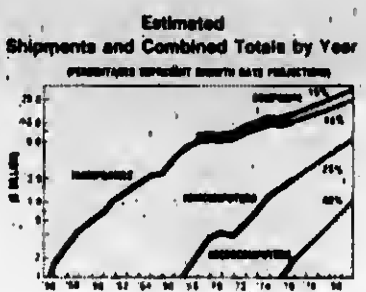
The Waves of Change presents a global view of the data processing industry, assessing the technological and economic currents by which it has been, is, and (in the author's extensively documented opinion) will be directed in future.

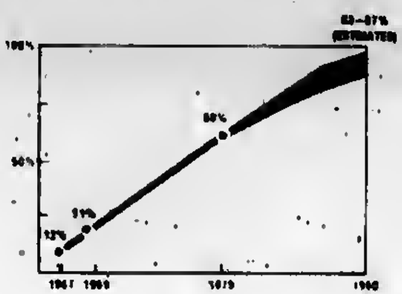
Furthermore, it accounts for the impact on developments in the DP field of the psychology of both users and vendors. Patterns of thought and perception, and the ways in which such patterns manifest themselves through judgments affecting the direction taken by technology and product planning strategies, are certainly at least as vital to our understanding of the state of the DP art as are the purely "technical" breakthroughs themselves.

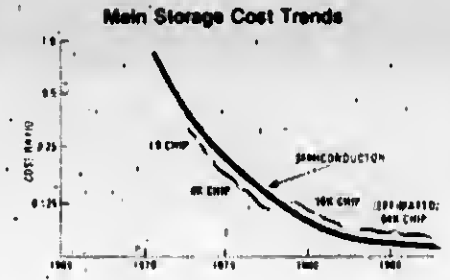
The Waves of Change addresses developments in the hardware and software realms —both single events and "trends"—at length. It explores the competitive positions of manufacturers, the middle- and long-term impact of the burgeoning mini/micro families, the problems faced by corporate management in assessing the role of hardware/software usage methodologies (and the value of specific systems) as these apply to their particular needs, and many other subjects of intense interest to all who are affected by DP.

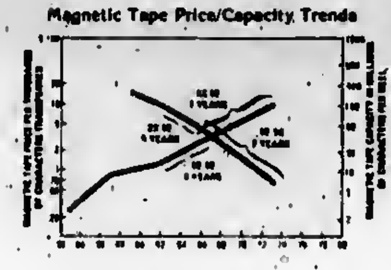
The Waves of Change is a series of wide-ranging essays united by a dual sense of purpose: to assist the reader in evaluating where we are (and why); and to provoke him to consider the implications of rapid change upon his ability to adapt and survive.

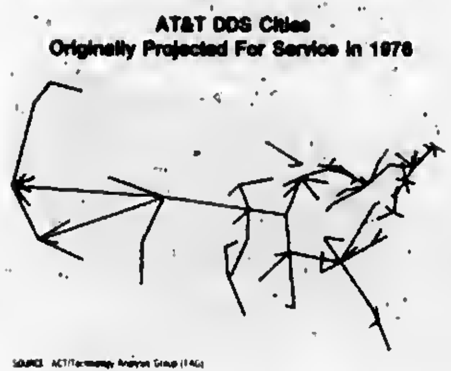


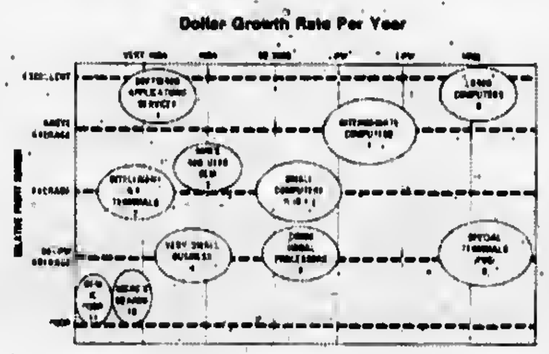


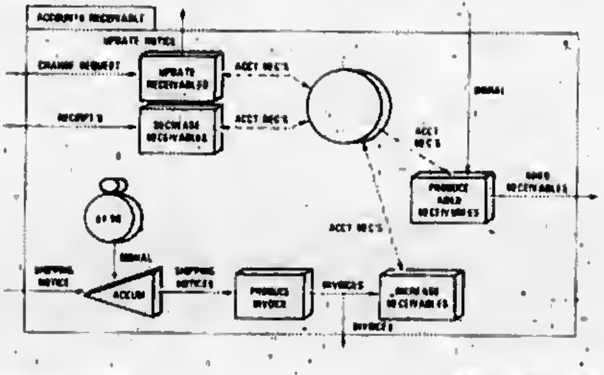


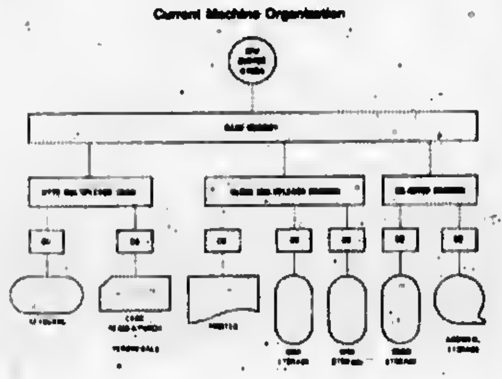


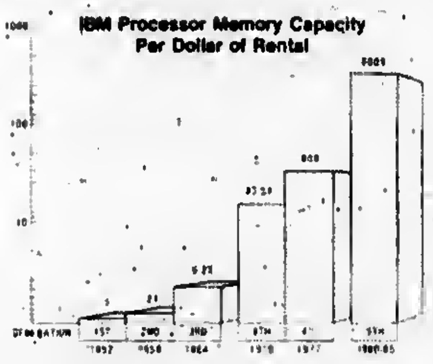


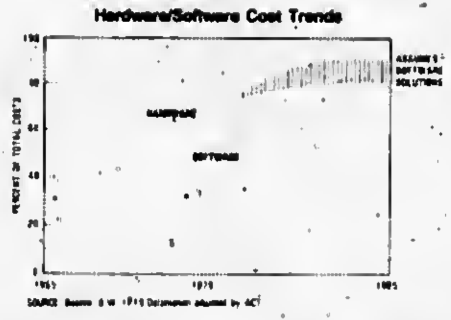


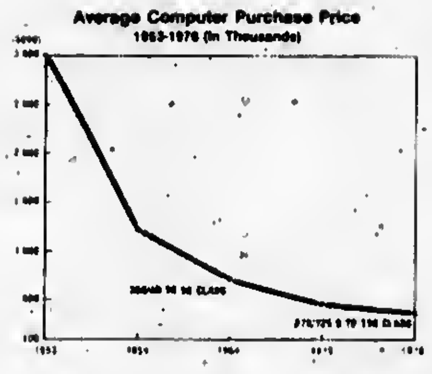


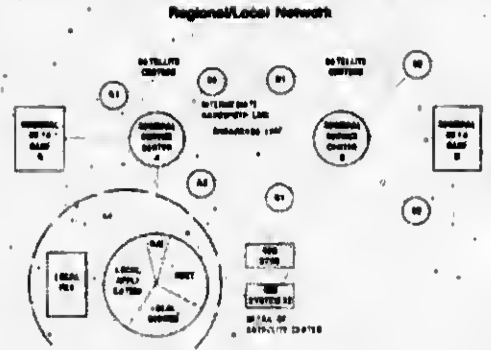


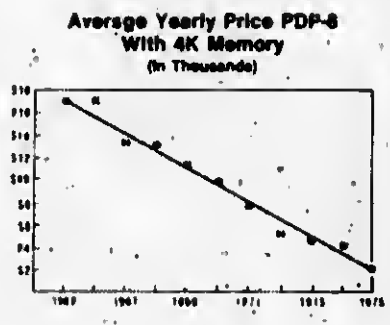


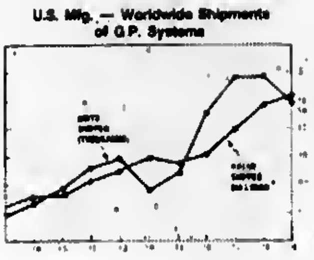


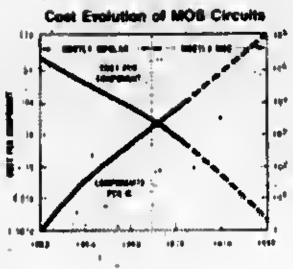


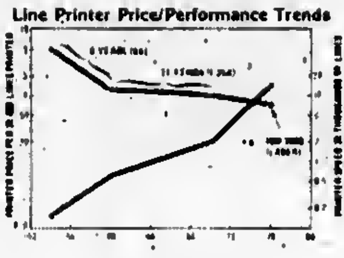


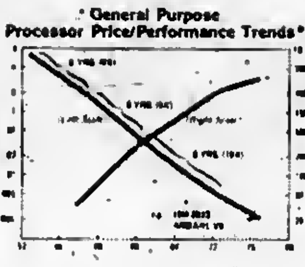


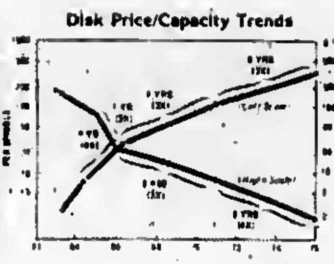


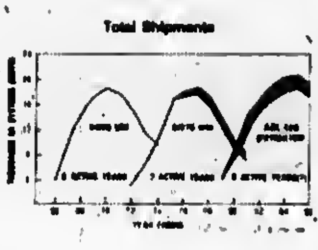












ABOUT THE AUTHOR

Charles Philip Lecht is founder, President and Chairman of the Board of Advanced Computer Techniques Corp. (ACT), a computer software and consulting firm.

Lecht holds a B.S. in mathematics from Seattle University and an M.S., also in mathematics, from Purdue. His involvement in the computer field extends back to 1951, making him an "old-timer" in a very young industry. He founded ACT in 1962. Since then the company has grown from a one-man show to an international complex employing some 400 persons.

Lecht is a noted speaker and author whose books, in addition to *The Waves of Change*, include three on computer languages and one on project management.

Lecht is a member of the **Young Presidents Organization, The Hudson Institute,** the **DPMA,** the **ACM** and the **New York Academy of Sciences.** Profiles of him have appeared in the *New Yorker* and *Datamation*. Recently, he has been asked by the CBEMA to argue its case against the proposed I/O interface standard before the Brooks Subcommittee of the U.S. House of Representatives.

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System/34 Users Surveyed

SAN JOSE, Calif. — System/34 users view adequacy of disk storage and program/data conversion as their chief systems concerns, according to a recent SBS Publishing, Inc. survey of almost 200 buyers of the IBM equipment.

SBS found that more than 27% of the 70 users responding had decided to switch to a System/34 after only three months of deliberation. The study, entitled "IBM System/34 — User Analysis," also showed that nearly half of the respondents (44.4%) considered no other hardware vendors but IBM.

Manufacturers proved to be the most likely user class to acquire an IBM canned software package, even though almost 85% of the respondents said they preferred to control their own software development, SBS Publishing found.

To form a picture of overall product trends, the survey also analyzed migration paths from the System/3 and System/32 and found that most System/34 users expressed satisfaction with their System/3s or System/32s.

In other findings, the publisher noted that some IBM followers would order almost any IBM product IBM announced and evaluate it later.

The survey costs $125 and is available immediately from SBS Publishing at 4320 Stevens Creek Blvd., Suite 190, San Jose, Calif. 95129.

Array Processor From DG Boasts 'Very High Speeds'

WESTBORO, Mass. — Data General Corp. has introduced an array processor the firm claims allows users to perform signal processing and transform processing at "very high speeds."

The AP/130, which DG claims is the first array processor offered by a minicomputer manufacturer, computes the fast Fourier transform of a 1,024-element complex number array 200 times faster than a scientific minicomputer, the company said. It also adds and subtracts ordered pairs of 32-pair floating-point numbers every 200 nsec and at the same time multiplies another pair of 32-bit floating-point operands every 400 nsec, company officials added.

Applications for the array processor reportedly include acoustic and radar signal processing, tomography, spectroscopy, seismic data processing, vibration analysis, speech analysis and processing, communications and generalized matrix computation.

A typical AP/130 hardware configuration consists of a 192K-byte Eclipse S/130, an array processor with 8K-byte bipolar memory, an S/130 floating-point instruction set or an optional character instruction set and standard DG peripherals, including a DG/DAC sensor I/O subsystem, which supports I/O configurations with more than 1,000 control and measurement points.

The array processor extends the S/130's instruction set with 46 high-level instructions and 110 operations on 32-bit floating point data, DG explained.

AP/130 hardware is supported by DG's Array Processor Software (APS), which users can access from two high-level languages, Fortran 5 and DG/L, the company said.

A typical entry-level AP/130 system for laboratory use consists of a 128K-byte CPU, real-time clock, 30 char./sec Dasher TP1 printer, 10M-byte cartridge disk subsystem, dual diskette units, Rdos, Fortran 5 and APS, a company spokesman explained. In the U.S., this configuration costs $60,000 with quantity and OEM discounts available.

DG is located at Rte. 9, Westboro, Mass. 01581.

MDB Interface Links PDP-11s

ORANGE, Calif. — A general-purpose interface introduced here by MDB Systems, Inc. allows users to transfer 16-bit data bidirectionally between two Digital Equipment Corp. PDP-11s or between a PDP-11 and a peripheral, according to the firm.

Model TA-528 reportedly comes with integral line drivers and receivers as well as with interrupt request and control logic, address selection, I/O buffer registers and a control/status register.

By linking two of the modules, users can permit a pair of PDP-11s to exchange data as far as 100 ft.

Model TA-528 costs $615 from MDB at 1995 N. Batavia St., Orange, Calif. 92665.

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Supermarket Mini Gets 25% Off Utility Bills

By Ann Dooley
CW Staff

NEW YORK — Shopwell Supermarkets, Inc. is cutting its utility bills and regulating refrigerator use with a minicomputer-based energy management system installed in its greater metropolitan area stores here, according to Jeff Victor, director of energy conservation.

Called the Supermarket Energy Management Program, the system is currently being tested in five of Shopwell's stores with good results, Victor said.

The system, which has cut utility bills by 25% in at least two stores, was developed in cooperation with IBM, he added.

The system runs on an IBM Series/1 minicomputer with 16K memory, an IBM 4953/A processor, a Model 4964 diskette unit and 32 digital input and output points. No preprogramming is required, so the system can be used in any store, Victor noted.

"Unlike office buildings, schools or factories, we have highly perishable products and correct temperatures must be maintained to protect them," vice-president Glen Rosengarten pointed out.

"But while refrigeration units keep the foods fresh, they also use between 42% and 48% of all the energy consumed in supermarkets. That's why the key to this program is the refrigeration compressor," he noted.

Control for 30 Processors

The system is programmed to increase refrigeration compressor efficiency by automatically maintaining product temperatures under changing conditions. It can control up to 30 compressors, each with a number of refrigeration compartments attached.

The energy system was designed to adjust the temperature by turning equipment off or on according to the rate of temperature change in each food compartments, Victor explained. Although the refrigeration compressors have their own regulating monitors, Shopwell wanted extra protection for the compressors to prevent them from running colder than necessary and wasting energy or warmer than necessary and running the risk of spoiling food.

The system is also programmed to alert store personnel to harmful conditions in the food cases, Rosengarten said. For example, if the temperature in a food case stayed too high, the Series/1 would alert the store manager to check the case to see if any equipment such as a compressor, thermostat or defroster is not working properly.

Rosengarten noted that the size of a store isn't as important for system operation as the number of devices to be controlled. The system has been just as successful in a 15,000 sq-ft store as in a 33,500 sq-ft store, he said.

The system can reduce the energy consumption of any supermarket mechanical device, according to Rosengarten, but stores should have at least a $3,500 monthly utility bill to make the system cost-effective.

Several years ago, Shopwell executives decided they needed a more aggressive energy management program, Rosengarten recalled. After looking at a number of energy saving programs, Shopwell chose the Series/1.

In addition to the automated system, Shopwell added insulation, sealed off unnecessary doors, reduced lighting wattage and fine-tuned all equipment, Victor said. Customers are not affected by any of these implementations. "The system simply makes for efficient use, not abuse of energy," he said.

Shopwell is planning to equip the system with extra energy saving such as a preventive maintenance program that will notify a store manager if equipment is about to break down. This function can be performed by monitoring equipment conditions to determine if the machinery is operating at top efficiency, Victor explained.

The system also has a fail-safe device so if it ever goes down, each compressor will immediately release control of all the machinery it had turned off.

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We're seeking skilled hardware design/development engineers with minicomputer, communications, or intelligent terminal design experience. Firmware or microprocessor design applications development is very desirable. Qualified candidates will have the opportunity to work on proposals for customers, or on design projects from conception through delivery. These positions offer an excellent opportunity to gain expertise in firmware and software as well as attractive growth potential.

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To meet these wide-ranging responsibilities, we're seeking professionals with 10–15 years experience and who, ideally, are recognized as an expert in their areas. Your technical background should be systems-oriented with particular knowledge of IBM. Communication or data base expertise is also desired. You also must have a sound awareness of markets and competitive situations and effective communication skills are critical.

If you fill these qualifications, we can offer you an outstanding environment to gain high-level exposure to a broad range of areas, and an excellent career path to even greater responsibilities within Honeywell S/MISD.

Interested applicants for the above positions should send their resume, complete with salary history and indicating position or positions of interest to Mr. Jerry Haynesworth, HONEYWELL S/MISD, 300 Concord Road, Billerica, Massachusetts 01821. An Equal Opportunity Employer M/F

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ST. LOUIS Gateway Computer Expo	April 25, 26, 27 Gateway Convention Center
CHICAGO Midwestern Computer Expo	May 2, 3, 4 McCormick Place.
NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

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COMPUTER 78

THE COMPUTER CARAVAN'S

The Computer Expo is produced by the Caravan Division of the Conference Company, 60 Austin St., Newton, MA 02160 (617) 964-4550

A Rather Foolish Situation

By Frank Vaughan
CW Staff

The prime season for microcomputing shows has begun, and the calendar is booked with exhibits through the summer and fall. However, before any micro fans make any definite travel plans, it might be wise to keep an eye on Chicago, where two shows are scheduled for consecutive weekends in October — a somewhat foolish situation.

Users encountered a similar situation last year, when micro shows were held in New York and Chicago on the same weekend. The conflict hurt both the shows and exhibitors and deprived users of the chance to attend both events.

The same thing is bound to happen this year. After all, what user — or exhibitor — can afford to travel to the same place two weekends in a row?

Analysis

The blame for this situation lands squarely on the shoulders of past and present employees of Benwill Publishers, Inc. Benwill sponsored the show in Chicago last year; after that unsuccessful event, the Benwill organization and some of its employees parted ways. Both groups then claimed the "rights" to the Chicago show.

So, again, both the hobbyist and exhibitor find themselves in the same leaky boat, faced with a conflict of such magnitude that it threatens to do serious damage to personal computing in the Chicago area.

The fact of the matter is that the exhibitors are caught between the rock and the hard place since exhibiting in both shows, with twice the expense, borders on fiscal irresponsibility. At the same time, skipping one of the shows and exhibiting at

(Continued on Page 62)

Olivetti Ties Together Micro, Calculator

NEW YORK — Olivetti Corp. has introduced a user-programmable microcomputer/calculator combination for DP novices that reportedly features a self-contained, 2.5-in. disk, 16-column alphanumeric printer and a 16-character LED display.

The Olivetti P6040, which the firm called a "personal minicomputer," was designed for students, loan officers and engineers.

The 8080-based unit prepares, executes and debugs programs, performs diagnostic checks on syntax and logic errors and monitors the workings of its own components, a spokesman claimed.

The read/record unit uses Olivetti's 2.5-in. Mylar "minidisk" that has 3K bytes of user space. It can interface peripherals with either parallel or RS-232C serial interfaces, the spokesman said.

The P6040's standard operating system can handle the logic required for the addition of variety of printing, plotting and instrumentation peripherals, the firm claimed.

The P6040's Mini Basic language is utilized through seven key programming verbs located on the keyboard. The system provides 26 user-defined function keys.

Applications available for the unit include mathematical and statistical programs; calculation of student aid eligibility; auto financing calculations; installment and commercial loans; and IRA and Keogh plans.

Olivetti said it provides user training and support for the P6040, which costs $2,300. The vendor is at 500 Park Ave., New York, N.Y. 10022.

Olivetti P6040

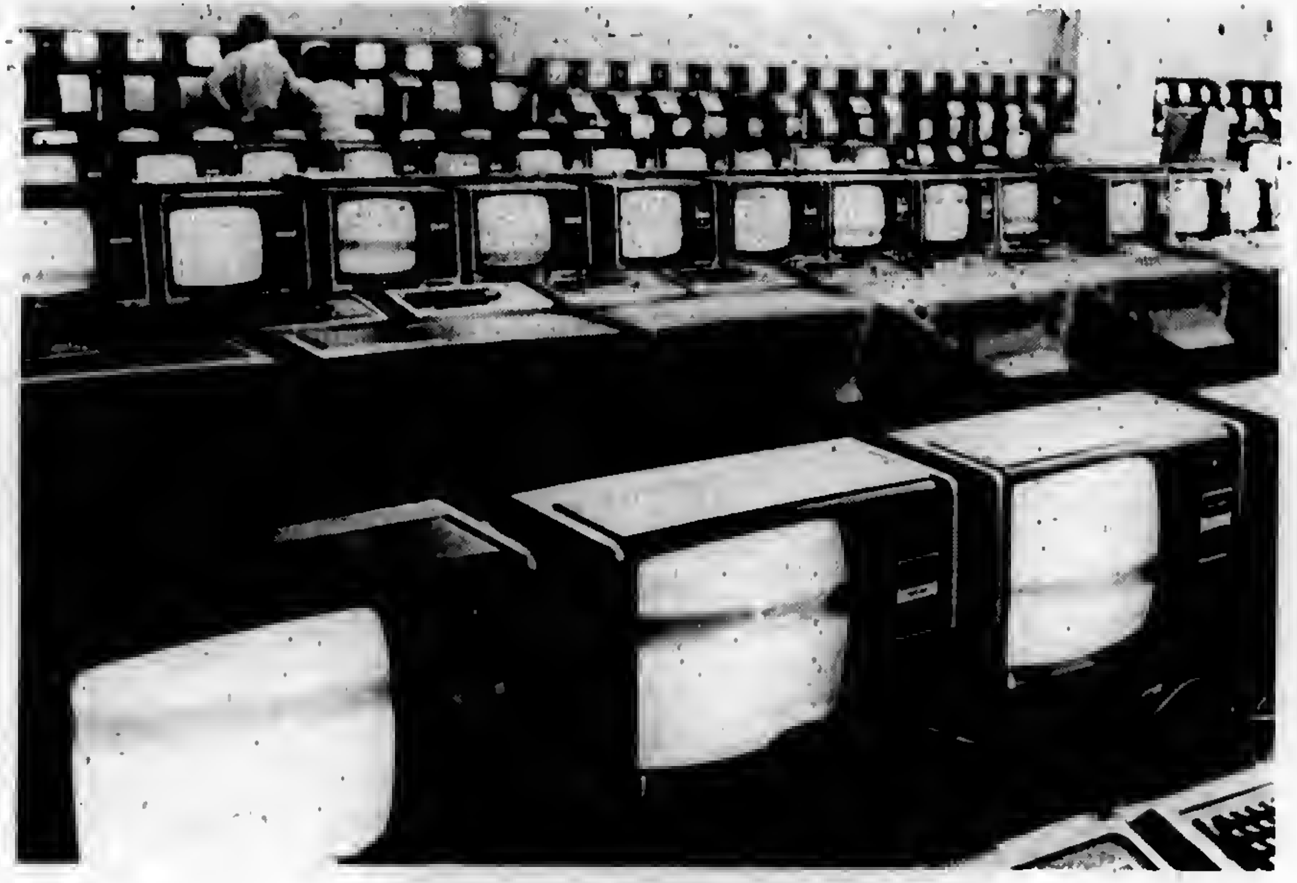
Two Floppies Boost Challenger Options

AURORA, Ohio — Ohio Scientific is offering two microprocessor-based floppy disk computer systems as part of its Challenger II product line.

Based on MOS Technology, Inc.'s 6502A microprocessor, each system features 16K of dynamic random-access memory (RAM), an 8-in. floppy disk drive and an interface, according to a spokesman.

The Model C2-8SK includes an RS-232C serial I/O port for use with an external terminal while the Model C2-8VS has a 32- by 64-character CRT board and keyboard.

The C2-8SK sells for $1,590 and the C2-8VS costs $2,090 from Ohio Scientific, 1333 S. Chillicothe Road, Aurora, Ohio 44202.



TV or Not TV?

Not TV. These Radio Shack TRS-80 microcomputer systems are receiving a final burn-in and quality assurance check before being shipped to customers.

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With Dual-Mode Capability

Motorola Extends Exorcisor Development Unit

INDIANAPOLIS — An extended version of the Exorcisor development system from Motorola Semiconductor Products, Inc. features a variety of compatible modules and a dual-mode capability.

The Exorcisor II has a dual memory map mode of operation which lowers the development time by allowing full use of the microprocessor addressing map, regardless of the unit and its system peripherals, according to a spokesman. Under the dual-mode operation, complete emulation and debugging of the user's system can be achieved since memory in the user's 65K-byte map need not be allocated to the developmental program, which resides in its own 65K-byte map, the spokesman said.

Optional modules for use with the system are provided with a jumpering arrangement for assigning memory and peripherals to either map in the dual-map mode or to any page in extended memory systems, the firm noted. A 20-pin connector on certain modules offers users the ability to implement priority interrupts, multipaged memory and I/O systems, parity error detection and power-down restart.

Modules include the MPU II, which provides computation and control capabilities as well as 1-, 1.5- and 2-MHz clock timing; and the Debug II, which allows the user to communicate with his system, load programs, monitor the execution of his program in real time and isolate and analyze hardware and software problems, the firm pointed out.

Additional system development and expansion capabilities are offered by two modules that handle both parallel and serial data. The MEX6821-1 PIA II provides 32 lines of parallel I/O capability, while the MEX6850-2 ACIA/SSDA II operates in either a synchronous or asynchronous serial mode.

Also available is a disk control module, a printer interface and several 8K to 64K static random-access memory (RAM) modules, the spokesman noted.

The basic system consists of the MPU II and Debug II modules, power supply and 14-slot chassis, the spokesman explained. A motherboard provides power and signal connections to the microprocessor control, data and address buses and an RS-232C port, which facilitates communication with peripherals.

The system also comes with 32K bytes of static or dynamic RAM and Macro Assembler/-Linking Loader and Text Editor programs on paper tape, cassette or diskette, the spokesman added.

The Exorcisor II costs $7,300 to $7,850, depending on configuration, from Motorola Semiconductor Products, Inc., P.O. Box 20912, Phoenix, Ariz. 85036.

Endorsements Could End Conflict

(Continued from Page 61)

the other Is a less than satisfactory solution because neither show organizer can make any firm estimate of attendance or of the number of vendors who will be exhibiting.

And let's not forget the hobbyist. What hobbyist is going to blow the money to visit two shows on consecutive weekends when neither can promise a top-notch exhibit area?

Perhaps the smart money will skip Chicago entirely this year and opt for Dallas on the last weekend of September. An interest in hobby microcomputing abounds in the Southwest, as the turnout at the personal computing portion of last year's National Computer Conference proved.

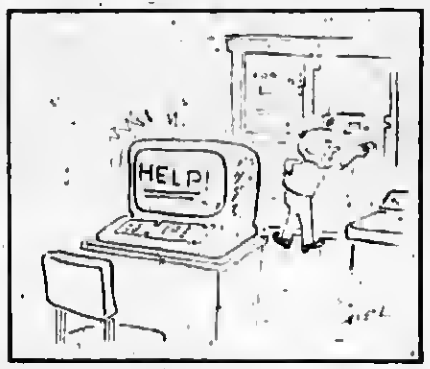
Several perennial show exhibitors have already indicated Dallas seems like the best bet because the power struggle for Chicago cannot do anyone (exhibitors, attendees or show sponsors) any good.

The solution? Obviously, the ideal solution would eliminate show conflicts, but that is probably unrealistic. A more real solution would be for some body, perhaps the Microcomputer Manufacturers Association, to begin a show endorsement program. The trade press is in no position to take over such an endorsement functions; almost every show has been backed (visibly or otherwise) by one or more of the publications serving the hobby.

The advantages of having such an endorsement program would be many. First, a governing body could set up certain requirements for endorsement — aisle widths, accessibility to the handicapped, maximum door prices, number of show hours and the like. This would ensure that certain minimum standards, for both the exhibitor and the attendee, would be met.

Further, such an endorsement — or lack of it — could mean vendor support for the good shows and a timely death for the shows set up solely to conflict with others.

Judging who is right and who is wrong in the Chicago situation will not be easy. But some order must be established on the show circuit, and an endorsement program could be one way to do it.



R

ROM (READ-ONLY MEMORY) — 1. A blank ROM can be considered to be a mosaic of undifferentiated cells. Many types of ROMs exist. A basic type of ROM is one programmed by a mask pattern as part of the final manufacturing stage. Proms are programmable ROMs. ROMs are relatively permanent although they can be erased with the aid of an ultraviolet irradiation instrument. Others can be electrically erased and are called Eproms. 2. Information is stored permanently or semi-permanently and is read out but not altered in operation.

S

SCRATCHPAD — A nickname for CPU memory. It pertains to information which the CPU holds temporarily. It is a memory containing subtotals, for example, for various unknowns that are needed for final results.

SEEK — Computer process for locating specific data in a random access store. Each memory location inspected is a seek and the number of seeks governs the total search time.

SHARED STORAGE — The ability to share main storage between two CPUs. This means either machine can insert information into storage and either machine can access the data and use it.

SKIP — Refers to an instruction to proceed to the next instruction; a blank instruction.

SLEWING RATE — Refers to the rate at which the output can be driven from limit to limit over the dynamic range.

SNA (SYSTEMS NETWORK ARCHITECTURE) — Refers to IBM's standardized relationship between its Virtual Telecommunication Access Method (Vtam) and the Network Control Program (NCP/VS).

SOURCE DECK — Stack of program cards ready to insert into compilers of some computers operated by punched cards.

SPOOLING — Refers to a procedure of temporarily storing data on disk or tape files until another aspect of processing is ready for the data (such as printing it).

STACK — 1. The stack is a reserved area of memory where the CPU automatically saves the program counter and the contents of working registers when a program interrupt occurs. The stack normally forces users to return from interrupts in the same order that interrupts occurred. 2. The stack is generally a block of successive memory locations that are accessible from one end on a last-in/first-out (Lifo) basis. The stack is coordinated with a stack pointer that keeps track of storage and retrieval of each byte or word of information in the stack.

LEARNER'S LEXICON

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COMPUTERWORLD

But IBM Gains Only 2.4%

Mainframers' Nets Hit Quarterly Highs

IBM was the only laggard in a group of four mainframers which recently reported first-quarter revenues and earnings.

The industry leader reported only a 2.6% rise in earnings compared with Burroughs Corp.'s 18%, Control Data Corp.'s 21% and NCR Corp.'s 42% increases over the comparable year-ago period.

And IBM would have posted its first earnings decline in more than three years if its earnings had not been buoyed by a foreign currency gain that amounted to $30 million during the quarter.

The first-quarter earnings set records at each of the four.

At IBM, worldwide earnings totaled $589 million compared with $573 million in the same period last year. The earnings equaled $4.01 a share on 147 million shares, the average number of shares outstanding during the period.

Earnings in the corresponding 1977 period were $3.82 a share on 150.2 million shares.

Revenues amounted to $4.4 billion compared with $4 billion for the year-ago three months.

"Outright purchases of DP equipment showed a modest gain over the first three months of 1977, but a substantial decrease from the record amount in last year's fourth quarter," Frank T. Cary, chairman said.

Revenues from rentals and services increased 8.8% over the first quarter of 1977, Cary pointed out, noting "the first quarter saw the initial shipments of the 3031, 3032 and 3033 processors announced last year, which will be installed in increasing quantities as 1978 progresses."

Burroughs Up 18%

At Burroughs, earnings were $33.5 million, an 18% increase over the 1977 first-quarter earnings of $28.4 million. Per-share earnings were 82 cents compared with 70 cents a year earlier.

Worldwide revenue for the first quarter was almost $505 million, a 14% increase over the $442.6 million in the 1977 first quarer. Rental and service revenue increased 13% over the year-ago period.

Incoming orders in the first quarter increased 15%, reflecting a continuation of the order levels recorded in the last three quarters of 1977, President Paul Mirabito said.

Control Data Corp.'s 21% increase in net earnings came on a 15.6% increase in revenues for the first quarter ending March 31 compared with the same period in 1977.

Earnings for the quarter were $15.7 million on revenues of $604.4 million compared with restated earnings of $13 million on revenues of $523 million for the same 1977 period. Earnings per share rose to 90 cents for the first quarter of 1978, an improvement of 20% over the 75 cents per share earned last year.

Data services revenues were up 18% in the first quarter, the firm noted.

CDC's earnings from computer operations in the first quarter totaled $4.4 million, up 20% over the same period in 1977, and earnings from financial services (Commercial Credit Co.) were $11.3 million, an increase of 21% compared with restated earnings one year ago.

NCR Up 42%

NCR's income increased 42% in the first quarter of 1978 came from record earnings of $22.9 million or 83 cents a share compared with $16 million or 60 cents a share in last year's first quarter.

The 1977 first-quarter net income and earnings per share figures represent a restatement of the previously reported $16.6 million or 61 cents a share, in accordance with the requirements of the Financial Accounting Standards Board Statement No. 13 which concerns accounting for leases. The effect of Statement No. 13 for the full 1977 will be to reduce previously reported net income by $1.1 million, the firm said.

First-quarter revenues also reached a new high for the period, rising from $515.3 million in last year's period to $559.1 million in the first three months of 1978, a gain of 9%.

Battle Against Software Tax Moving Ahead in Three States

By Marguerite Zientara
CW Staff

New Jersey, Rhode Island and California have recently made significant inroads in questioning and contesting software sales and use taxation and in changing the interpretation of such laws.

In New Jersey, the State Tax Commission recently published its proposed regulation interpreting the law that states that tangible personal property is taxable. This regulation, published April 6 in the *New Jersey Law Journal*, exempts most of the software industry in that state from sales and use tax.

According to Sanford Goldberg, an attorney with Roberts & Holland of New York and tax counsel in the case for the Association of Data Processing Service Organizations (Adapso), the State of New Jersey sent out assessments in 1976 attempting to tax various software operations. When Adapso heard about it, negotiations began, and these are just now bearing fruit in the form of the recently published regulation.

Written statements or arguments relevant to the proposed action may be submitted to the chief tax counselor by April 26. Soon after that date, Goldberg said, the director of the division of taxation will make a final decision on the regulation. If no objections are filed, or if the director does not agree with any filed objections, then the regulation will be adopted as the official interpretation of the State Tax Commission, Goldberg said.

The regulation specifies the criteria under which software is considered intangible personal property: "Preparation or selection of the customer's use requires an analysis of the program for the customer's requirements by the vendor; or the program requires adaptation, by the vendor, to be used in a specific environment, that is, a particular make and model of computer utilizing a specified output device."

The regulation states that the software may be in the form of systems programs, application programs, prewritten programs or custom programs. It further states that software, "whether placed on cards, tape, disk pack or other machine readable media, or entered into a computer directly," is exempt from tax.

It further specifies that "the person selling exempt software is required to pay the applicable sales or use tax on any tangible personal property transferred to the customer in connection with the exempt service. In addition, the hardware and supplies used to develop the exempt software are not eligible for any sales tax exemptions."

Rhode Island Case

In Rhode Island, Puritan Life Insurance Co. in September 1977 filed two petitions with the state tax administrator [CW, Sept. 12]. One petition sought to eliminate an administrative rule stating software should be taxed as tangible personal property. The second petition was for a hearing on its own tax assessment.

The petition for rulemaking procedure was dismissed in the state superior court because of the fact that Puritan's counsel would be allowed to present the issue before the state tax administrator in its assessment hearing, according to Gordon Cleary, an attorney with Hinckley, Allen, Salisbury & Parsons and one of Puritan's lawyers in the case.

The administrative hearing was held April 6 before a "hearing examiner," a representative of the tax administrator, according to

(Continued on Page 65)

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RCS Firms Reacting to Mini's Inroads: Survey

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — Remote computer services (RCS) vendors have begun revamping marketing strategies as the option of acquiring in-house mini-computers gains increasing acceptance among first-time DP users, according to a recent survey by SBS Publishing.

Both segments report that about 50% of the new DP clients are first-time users who are converting from manual or accounting machine methods, according to survey author, Herbert A. Seidman, who interviewed 30 users and 24 RCS and mini vendors.

A primary marketing concern of both sectors is capturing the new user rather than worrying about those switching from RCS to mini ownership or vice-versa. However, there does appear to be a greater migration from the RCS option to in-house capability as the monthly DP charges top $2,000, the survey found.

The small user, as defined in the report, generates billings of less than $5,000 per month.

Both RCS and minicomputer makers see the low end of the small business market (firms with billings of $2,000 or less per month) headed for the business-oriented "hobby shop" market. However, the vendors said they do not consider this loss critical because of the unprofitability of that sector, particularly to the mini maker who is currently experiencing a cost crunch for service related personnel and software development.

Cost Not Only Factor

A surprising finding of the survey was that users do not make RCS vs. in-house decisions based solely on cost.

Usually a firm will select the RCS option to minimize risk of financial loss or personal embarrassment because of lack of experience with DP solutions to business problems.

In House

For the growing number of new users choosing in-house capability, vendor confidence is a major selection factor. Confidence is spurred by trust in a manufacturer's name, successful demonstration prior to purchase commitment, recommendations from DP consultants or knowledge that a friend or a competitor is using a similar system, the survey found.

With the mini industry booming along at an estimated growth rate of 35% to 40%, the main concern of manufacturers is keeping up with the demand and supplying the associated service package.

On the other hand, the RCS sector is growing at 22.5%, although some firms report higher growth rates. In light of greater first-time selection of the mini option and "hobby shop" growth, the RCS sector faces competitive challenges calling for a revamping of strategies, the publisher suggested.

Strategic Trends

Even though SBS predicted no imminent crises for RCS vendors, it noted that several new strategic trends are beginning to emerge.

Most RCS vendors are now offering a small computer option to their existing and potential clients. This stand-alone feature allows clients to do routine processing on-site, but with the enhanced capability of RCS for specialized DP applications and storage of large volumes of data.

Another strategic innovation is specialization in specific industries, particularly manufacturing and distribution.

The complete report costs $750 and is available through SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

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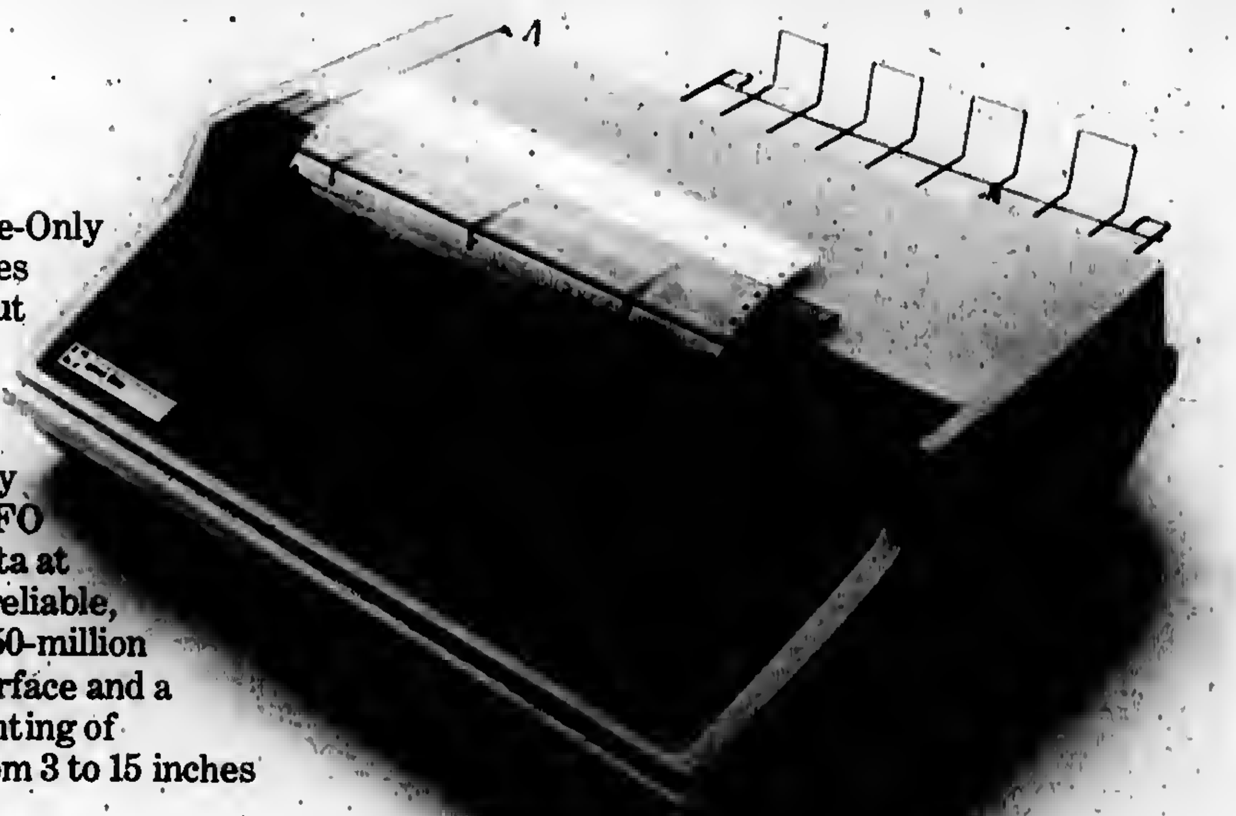

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Tennessee Bill Retains Tax On Commercial Software

NASHVILLE, Tenn. – The recently signed bill that excluded software from the definition of "tangible personal property" for purposes of taxation in Tennessee has caused some misguided jubilation in the industry. While software was removed from one definition in the law, it was added to another section of the bill, under the definition of a sale, according to Don Collins, assistant director of the State Sales and Use Tax Division.

The definition of a sale now includes ". . . such transfer of customized or packaged computer software which is defined to mean information and directions loaded into a computer which dictate different functions to be performed by the computer, whether contained on tapes, disks, cards or other device or material. For such purpose computer software shall be considered 'tangible personal property.' "

Along with that disappointing information comes a bit of good news for the industry in Tennessee. H.B. 2026 reads in part: ". . . the fabrication of software by a person for his own use or consumption shall not be considered a taxable sale."

The only effective change in Tennessee's sales and use taxation policy is that software fabricated in-house in a bank or other organization will not be taxable, but all commercialy purchased software will still be subject to tax, Collins said.

The previous law, which taxed all software as tangible personal property became effective July 1. Collins said that the state will not specifically conduct audits on organizations for the nine-month period between the effective dates of the previous and present laws, but that "if we're running on audit, we'll pick it up."

States Fighting Software Taxes

(Continued from Page 63)

Cleary. The hearing addressed the question of Puritan Life's own tax asessment as well as the validity of the rule itself.

The hearing examiner must now make findings of fact and recommend a disposition of the case to the tax administrator, who will then rule on the validity of the assessment and of the rule itself, Cleary said. A decision is expected by early June, he said.

According to William W. Fitzgerald Jr., in-house counsel for Puritan Life, "We feel we'll win it at some level. We may have to go to court to do it, but we're prepared to go further."

Robert Herin, one of the two expert witnesses in the case, called it "the finest hearing I've ever heard on this issue." He is optimistic about the outcome of the case, but noted, "You really can't cope with the arbitrary nature of the government. If you lay out a perfect case and government ignores it, well, you can't control that."

Action in California

Finally in California, the Sales Tax Action Group (Stag) has been granted a day-long public hearing before the State Board of Equalization to deal with the board's Regulation 1502, which dictates the taxation of software and services [CW, April 3]. The meeting is slated for May 4 in Sacramento.

Stag is an unincorporated association of representatives from approximately 150 DP companies based in California or with business activities in California. The organization is presently concerned with questioning and contesting both the validity of the regulation's provisions and the propriety of their enforcement.

Stag believes the Board of Equalization does not fully understand the workings of the DP industry and therefore is not in a position to impose equitable sales and use taxes on it. Stag further believes the board unfairly treats advisory services as fabrication labor so as to include the value of those services in the measure of sales and use tax of any incidental tangible by-product of those services.

Stag feels the board improperly taxes intangible computer programs through contrived logic and is inconsistent in its application of the regulation's provisions, resulting in selective, discriminatory and inequitable taxation.

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International News

Nigeria Seen as Large and 'Dashing' DP Market

By Bohdan O. Szuprowicz
Special to CW

With his recent visit to Nigeria, President Carter put that country into global focus as the most populous and apparently the wealthiest of all African states. Nigeria, which only a few years ago refused permission for a visit from then-Secretary of State Henry Kissinger and which deploys Soviet and Czechoslovak jets in its air force, clearly underwent some policy changes in inviting President Carter for an official state visit.

Whether Carter resorted to some form of "dash" to change the minds of the Nigerians about Americans remains to be seen.

"Dash" is an established African custom of tendering a gratuity before, rather than after, a service. Officially condemned by the Nigerian government, it is believed to be vital in doing business in much of Africa.

Yet it does not in itself cut any red tape as is often believed, but only parts it temporarily to snare its adherents still deeper into the practice.

Nevertheless, Nigeria is emerging as a rapidly growing African economy and computer manufacturers are eyeing it as a potentially large market. Their appetites are further whetted by Nigeria's oil, which is estimated to bring that country between $7.5 billion. to $10 billion in annual revenues.

Level of Computerization

Another factor is the low level of computerization of an economy where no more than 55 to 60 computers are in operation. Just in case you are wondering whether that's a lot for a developing country, there are an estimated 70 computers on the island of Jamaica, which has a population of only two million.

What is deceiving about Nigeria, however, is the fact that despite its large population, estimated at 67 million to 80 million, and its newfound wealth, it remains a very undeveloped area of the world. Literacy, for example, is estimated at only 25% of the total.

Although Nigeria has a labor force of more than 22 million, only about 1.3 million are actual wage earners; of these, only 560,000 work in modern enterprises.

Therefore, even a mere 60 computers in Nigeria already gives it a computerization rate of about 40 machines per million of nonagricultural labor force, which is considerably better than many other developing countries. It is at least twice as high as the rate for China and way ahead of India, where there are six times as many computers.

Limited Demand

Education and development of the basic social infrastructure has to come before Nigerian industries can come into existence on a more meaningful scale. There is a rather limited demand for computers in what remains predominantly a barter economy.

This is also reflected in the Third Nigerian National Development Plan 1976-1980, which allocates 22.2% of about $75 billion to the development of transportation systems alone, without which the country cannot be developed, let alone industrialized.

Installation Sites

As a result, computer installations in Nigeria are concentrated at the few universities and in several government departments such as the National Population Bureau, Nigerian Ports Authority and Ministry of Telecommunications, as well as in the private sector, represented by several banks and oil companies.

There is, however, already a nucleus of a computer service industry in Lagos, the capital of Nigeria, where Computer Services Ltd is operating an IBM 370/135 and is believed to be contemplating a time-sharing system. It would have to be local, however, because telephone communications in Nigeria are also in their infancy with only one telephone for every 500 people, and the long-distance network is in the development stages.

On the other hand, Nigeria is plunging into a satellite communications system and already operates 19 ground stations throughout the country.

Leading Suppliers

IBM Nigeria is the leader among suppliers of DP equipment so far, but Control Data Corp. made considerable inroads during the 1970s, and the largest computers in Nigeria are now CDC Cyber 72s, one of which is at the Ahman Bello University.

All the other universities at Lagos, Ibadan, Ife and Benin appear to remain loyal to IBM with IBM 370/135 models predominating.

Among minicomputer suppliers, Digital Equipment Corp. and Microdata Corp. are represented while NCR and Burroughs Corp. are making headway with their NCR 299 and NCR 399 and L5000 small business computers.

But potential investors in Nigeria's future should be aware of that country's fierce protectionism of its embryonic industries. It is unique among developing countries beause it can finance its own development without foreign aid.

However, it is still a shortage economy, experiencing rapid growth which results in an annual inflation rate of 25% to 30% and very stiff competition among suppliers of goods.

'Nigerianization' Mandate

In 1972 the Nigerian Enterprises Promotion Decree was promulgated by the government. It mandates various levels of "Nigerianization" in different businesses and industries. There are 22 types of enterprises, including advertising, casinos, lotteries, publishing and broadcasting reserved exclusively for 100% Nigerian ownership.

Another 33 categories require a minimum of 40% Nigerian participation and include equipment manufacturing firms involving local component production.

The computerization prospects for Nigeria are clearly bright although perhaps some distance in the future. But foreign computer equipment and services suppliers have a dashing competition on their hands because Nigeria has the money and wants to go first class while retaining control.

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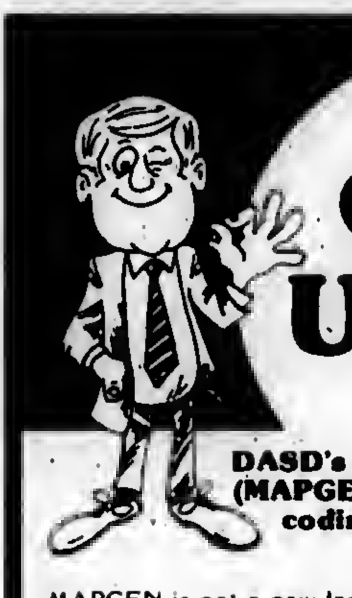

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In Purchasing Stock or Assets

Buyers of DP Firms Face Critical Tax Choices

By Brian J. McGowan
Special to CW

This is the first of two articles on the income tax consequences of purchasing or selling a firm in the DP industry. This article covers the consequences from the buyer's point of view, and the second article will cover the seller's viewpoint. Neither part is meant to be an exhaustive treatise but rather a general summary of the provisions of the Internal Revenue Code affecting acquisitions.

The buyer of a DP/software corporation has virtually only two choices when contemplating an acquisition. He can either buy all the assets of the corporation or he can buy the stock of the company and then retain the corporation or liquidate it.

Assuming there are no compelling legal reasons for purchasing either assets or stock, the buyer will normally select the route that will maximize his postacquisition tax deductions and hence his return on investment. This is the name of the game!

In determining which route will accomplish this, the buyer must consider several items including the tax basis of the assets of the target corporation, the existence of net operating losses and the extent of any hidden tax liabilities such as the recapture of depreciation and investment tax credit.

Stock Purchase

To understand these considerations, let's first look at a purchase of stock. From the federal tax point of view, a purchase of stock is the simplest of all methods of acquisition — and in many cases may be the only way the seller is willing to go.

The buyer can acquire the stock by using cash, a method that produces an immediate tax event to the seller, or can give the seller a tax deferral by acquiring the corporation in a stock-for-stock exchange. In either event, the tax basis of assets of the acquired company is left undisturbed by the acquisition.

The tax basis of the assets is extremely important since it determines the amount of depreciation and amortization to which the buyer is entitled.

For example, suppose the buyer was contemplating paying $5 million for the stock of a software company whose assets had a $10 million tax basis. A stock purchase would leave the $10 million basis intact. If assets were purchased, the buyer would generally have a tax basis equal to the consideration paid.

One other observation about a stock purchase is necessary. Recall that we said that a buyer could use stock (assuming a corporate buyer) to purchase a new company. While using stock as the medium for consideration usually permits the seller to postpone his gain, the Internal Revenue Service (IRS) recoups some of its lost revenue at the buyer's expense. It does this by insisting that the buyer's basis in his new stock is equal to the seller's basis.

In our industry, especially in closely held corporations, the basis of the stock of the original owners can amount to peanuts. The upshot of this is that those lingering tax liabilities facing the seller have now become a burden of the buyer and must be faced should he ever decide to sell.

Let's turn our attention to the purchase of assets of a software firm. A buyer will lean toward the taxable purchase of assets when he expects to pay more for the company than the tax basis of its assets.

By buying assets (other than in a merger or reorganization) he hopes to spread the consideration paid over the acquired assets and hence increase their tax basis and thus his depreciation and amortization deductions.

Assume the opposite of the example cited above. Assume that a buyer is willing to pay $10 million for a software company whose assets have a tax basis of $5 million. By buying assets directly, a buyer would hope to obtain $10 million tax basis in the assets and thus increase his tax shelter by $5 million.

There is however, one admonition I would like to offer. That is, a buyer must be careful to demonstrate that the purchase price of the assets is less than their fair market value. If it is not, to the extent of any excess, the buyer has purchased goodwill, which is not deductible for tax purposes.

In our industry the asset that usually has the greatest value is software. But in most cases, the development costs for software were deducted for tax purposes, so they have no tax basis. An asset purchase will, therefore, be in most instances more desirable than a stock purchase.

Buyer Dilemma

But however anxious a buyer is though to purchase assets, a seller is often unwilling to sell anything but the stock of his company. Clearly a dilemma exists.

Fortunately, Congress foresaw this dilemma and installed Section 334(b)(2) in the Internal Revenue Code. This code section permits a buyer to purchase the stock of a company, to liquidate the corporation and then, in liquidation, increase the tax basis of the assets.

In effect, although the buyer was forced to buy stock, he enjoys all the benefits of an asset purchase. But be careful — remember the old adage that all that glitters is not gold!

While the Code permits this tactic, one problem arises. That is, in liquidating the company and in stepping up the basis of the assets for tax purposes, certain dormant tax costs are abruptly awakened. These include the recapture of investment tax credit, the recapture of depreciation and the possible recapture of certain items previously deducted by the seller.

These costs are both real and quantifiable. Clearly, the purchase price paid by the buyer for the stock should reflect their existence.

A former IRS agent, McGowan is now chief financial officer for Sun Information Services Co.

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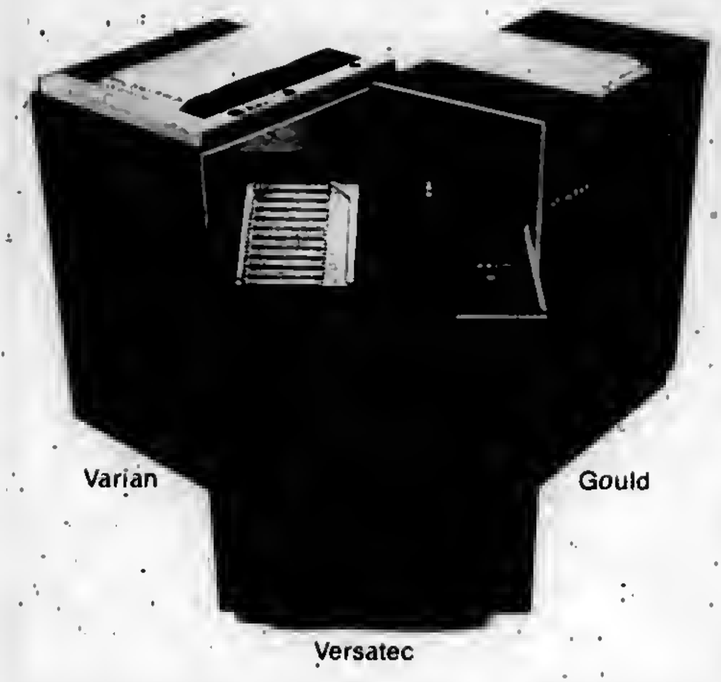

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Growth Deterrents Reported in Facsimile Mart

SAN JOSE, Calif. — The lack of low-cost facsimile transmission techniques and the failure to recognize differences between market segments are two major deterrents to the growth of the facsimile industry, according to a study recently released by Creative Strategies, Inc. (CSI).

Facsimile's present market niche is primarily limited to the transmission of documents that must be received quickly and must retain some form of graphic structure.

However, as low-cost transmission techniques — network and digital switching and satellite communications — are developed and become operational by 1980, CSI estimated the transmission cost for a one-page document will be less than the cost of first-class mail.

At that time, the industry is expected to grow at more than 20% annually compared with the present rate of 17%.

Two-Segment Market

While the transmission cost factor is a serious problem, CSI also pointed out that most competitors fail to discern that the business sector, a major portion of the present market, really consists of two distinct segments — the convenience system and the operational system — each with distinct needs and different marketing requirements.

The convenience segment consists of low-volume users — those transmitting four to five messages per week, usually limited to priority documents. These users are less concerned with the cost of a particular message than they are with the cost of equipment, so they tend to avoid automatic features. Their systems are contained in the office environment.

The operational segment, in contrast; is a high-volume, planned communications sytem, extremely sensitive to message costs. These users are willing to invest in expensive equipment featuring high transmission speeds and automatic features.

The study indicated that prices must drop well below $200/mo for a 1 page/min facsimile system to open up the operational market.

Competition Growing

Competition for facsimile is already growing. Some strong Japanese companies are entering the market. Panafax, a joint venture of Matsushita Communications Industrial Co. and Visual, Sciences, Inc. is expected to produce a two-minute facsimile unit that will be offered to less than $70/mo.

In the long term, CSI estimated IBM will be the most formidable new entrant with its Satellite Business Systems transmission capability.

The report costs $695 and is available from Creative Strategies, Inc. Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Contracts

Beehive International has received a $1.3 million contract from Kienzle Apparate, GmbH of W. Germany for additional terminals.

Newsweek Magazine has signed a contract with United Computing Systems that will optimize its weekly shipping routes.

The Egyptian Electricity Authority has selected Control Data Corp. as prime contractor on a $37 million computer-based system to monitor and control Egypt's major electric power network.

System Integration Associates of Philadelphia has received a $500,000 contract from Digital Applications, Inc. for microcomputer system components. The firm will use the system components in pharmacy prescription processing and in the acceptance and processing of cash register tapes.

Computing Devices Co. of Ottawa, a division of Control Data Corp.'s aerospace operations, has won a $950,000 contract for airborne projected map display systems. The award was made jointly by the U.S. Air Force and the Navy.

The Kennedy Co. has been awarded a $400,000 contract for its Series 9000 tape transports and its Model 9219 formatters by Tab Products Co., Palo Alto, Calif.

Integrated Software Systems Corp. (Issco) has been awarded a contract from American Management Systems, Inc.(AMS) of Arlington, Va. Under the terms of the agreement, AMS will lease Disspla, a proprietary software system, from Issco for use on the AMS time-sharing service, Amshare.

General Telephone & Electronics Corp. has received a $4 million contract to provide its GTE Financial System One to all locations of Piper, Jaffray & Hopwood, Inc., a major brokerage firm headquartered in Minneapolis, Minn.

Nixdorf Computer AG of Paderborn, W. Germany, has signed a $3 million contract with Cipher Data Products for tape drives.

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- SVS
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- TSO
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Must have 8 years experience in systems analysis; expert knowledge of current ADP hardware/software; qualified in development of data base retrieval systems, application of operations research techniques, use of logic tables, complex systems design, and telecommunications; proof of involvement on development of a major automated system; strong background in ADP logistics application; familiarity with RPG II, COBOL, and assembly languages; knowledge of IBM 370 and System 3; BS degree in computer science or related field is mandatory.

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Must have 5 years experience in ADP programming; knowledge of current ADP software development techniques; programming for telecommunications/teleprocessing; programming proficiency in COBOL, Assembly language, and RPG II; experience with IBM 370 and System 3,

SENIOR EDP PROGRAMMER:

Must have 8 years experience in ADP programming; knowledge of current ADP hardware/software techniques; programming for telecommunications applications; proficiency in COBOL, RPG, and assembler; proof of involvement with major systems programming effort; knowledge of IBM 370 and System 3; ability to plan and manage large scale projects; BS degree in computer science or math mandatory.

SENIOR SOFTWARE SYSTEM PROGRAMMER:

Must have 6 years experience in DP with 3 years extensive experience in programming, file structures, data base design and management, data communications design concepts, communications systems programming, communications access methods, line control techniques, advanced coding techniques, DOS/VS operating system programming, and IBM 370 and System 3 hardware architecture; familiarity with COBOL, RPG II, POWER/VS; expertise in JCL, DOS/VS, CICS, and assembly languages; BS degree in computer science or math is desirable.

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SYSTEM DEVELOPMENT CORPORATION
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GEOGRAPHIC PREFERENCE: Please put a number in the box with each location, using the code below:
1 = Preferred 2 = Will consider under special conditions 3 = Will not consider

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- ☐ Hampton, Virginia
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- ☐ Milwaukee, Wisconsin
- ☐ New Orleans, Louisiana area
- ☐ Raleigh, North Carolina
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LANGUAGES: Please rate your skills using the scale below:

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____ APL
____ Assembly
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____ CDC 6000
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ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed $20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

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ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

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If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with online systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

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ADR knows that its products can only be as good as the service we give our customers. If you like dealing with people, enjoy an occasional trip, and have strong communication skills, you might consider a support position at ADR. To qualify, you should have a strong technical background in IBM computers and operating systems, and a college degree. As our product line continues to expand, our product support needs will grow as well. You could be a part of that growth!

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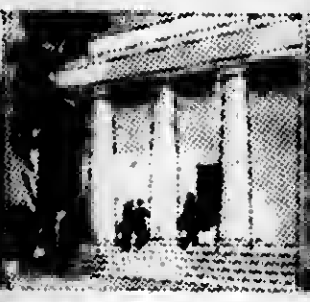

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Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

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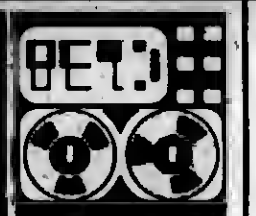

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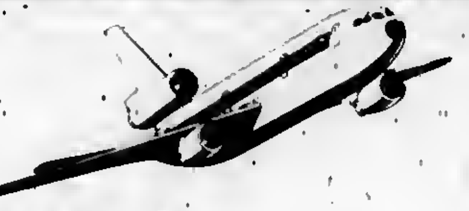

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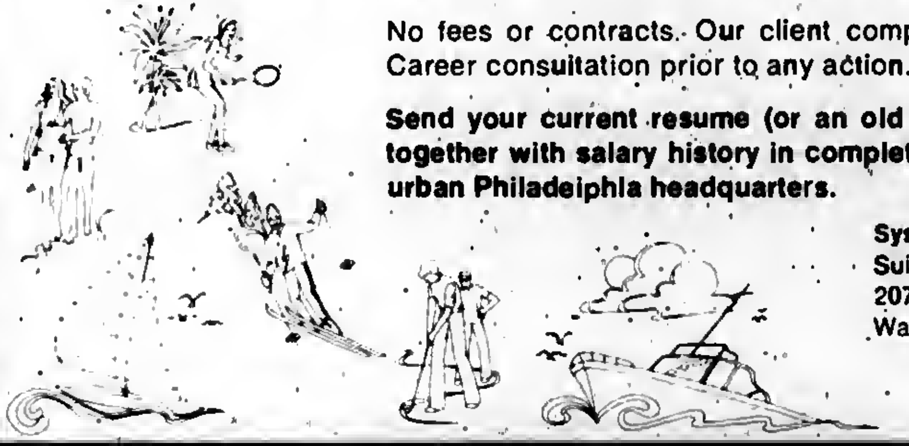

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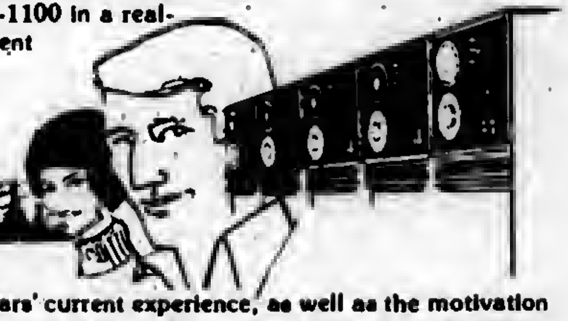

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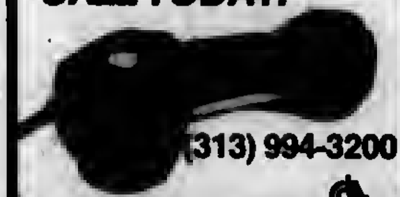

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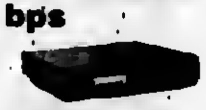
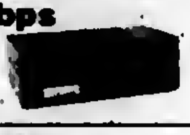
2400 bps 	**MODEM 2200/24** Half or full duplex operation over dial or dedicated facilities.	$1780 $60/mo.*	**$725** **$29/mo.***
3600 bps 	**MODEM 3300/36** Dial or dedicated operation with reverse channel. Optional auto-answer on dial-up.	$3620 $85/mo.*	**$950** **$38/mo.***
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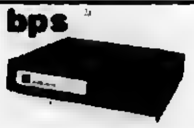
9600 bps 	**MODEM 5500/96** Dedicated line with optional multiport operation for up to four 2400 bps channels.	$7990 $185/mo.*	**$2995** **$120/mo.***

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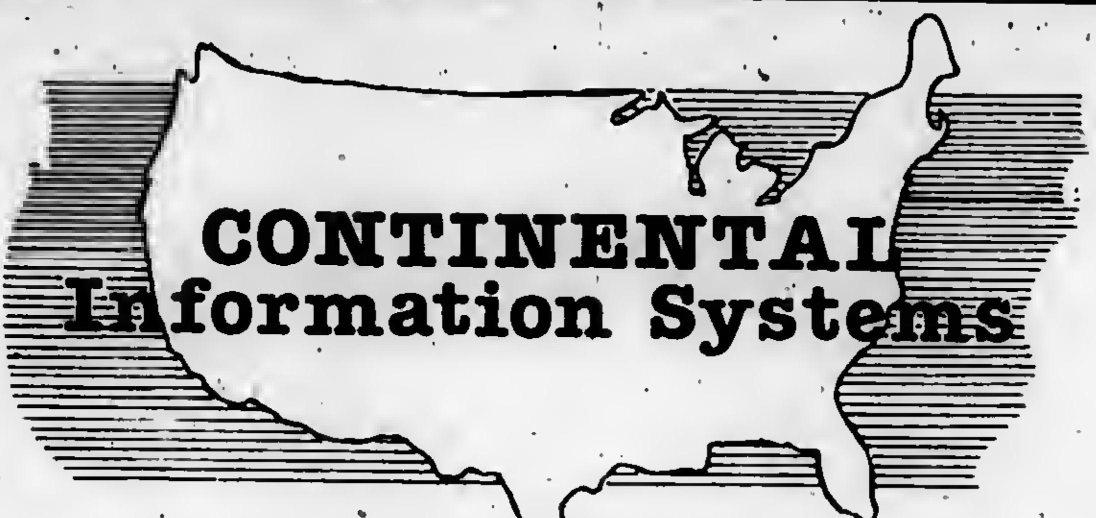

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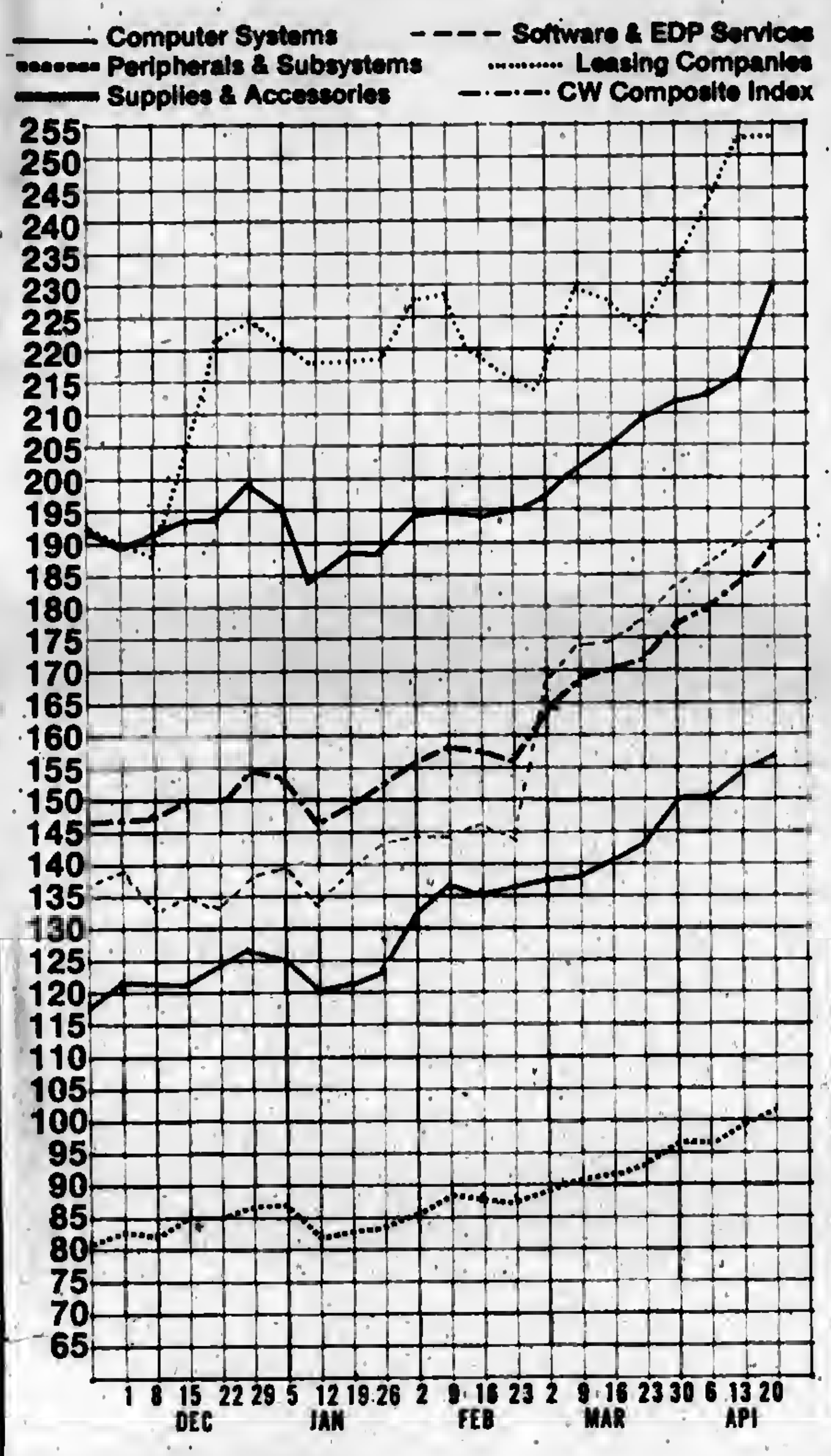

Earnings Reports

ADVANCED MICRO DEVICES
Year Ended March 26

	1978	1977
Shr Ernd	$1.77	$1.64
Revenue	92,331,000	82,118,000
Earnings	5,037,000	4,474,000
3 Mo Shr	.80	.48
Revenue	27,588,000	17,549,000
Earnings	1,849,000	1,299,000

BURROUGHS
Three Months Ended March 31

	1978	1977
Shr Ernd	$.82	$.70
Revenue	504,985,000	442,604,000
Earnings	33,487,000	26,389,000

COMPUCORP
Year Ended Dec. 31

	1977	1976
Shr Ernd	$.23	.....
Revenue	2,329,000	$4,489,000
Tax Cred	94,000	.....
Spec Cred	.....	a1,294,000
Earnings	223,000	(2,174,000)

a-Gain on forgiveness of bankruptcy debt.

COMPUSCAN
Three Months Ended Feb. 28

	1978	1977
Shr Ernd	.....	$.17
Revenue	$2,968,000	3,882,000
Earnings	(58,000)	383,000
9 Mo Shr	.....	.43
Revenue	7,469,000	10,560,000
Earnings	(950,000)	937,000

COMPUTER PRODUCTS
Three Months Ended March 31

	1978	1977
Shr Ernd	$.13	a$.09
Revenue	2,552,723	1,893,289
Earnings	227,080	159,824

a-Adjusted for a 20% stock dividend paid in November 1977.

DATA RESOURCES
Three Months Ended March 31

	1978	1977
Shr Ernd	$.51	$.37
Revenue	7,073,100	5,504,400
Earnings	891,900	502,400

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 19, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 55	50 1/8	+4 1/8	+8.9
N	BURROUGHS CORP	55- 91	66 3/4	+7	+11.7
C	COMPUTER AUTOMATION	18- 30	25 3/4	+ 3/8	+1.4
N	CONTROL DATA CORP	20- 29	27 7/8	+ 3/4	+2.7
C	CRAY RESEARCH INC	15- 40	39 1/2	+4 1/4	+12.0
N	DATA GENERAL CORP	35- 54	49 5/8	+3 1/4	+7.0
N	DATAPOINT CORP	18- 47	46 7/8	+3 7/8	+9.0
N	DIGITAL EQUIPMENT	37- 53	41 5/8	+2 3/4	+7.0
N	ELECTRONIC ASSOC.	2- 5	5	+1	+25.0
A	ELECTRONIC ENGINEER.	8- 16	15 7/8	+ 1/2	+3.2
O	FOUR-PHASE SYSTEMS	13- 26	25 1/2	+1	+4.0
N	FOXBORO	28- 54	34	+1	+3.0
O	GENERAL AUTOMATION	6- 10	9 3/8	+ 3/8	+4.1
C	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	62- 87	72	+7 3/8	+11.4
N	HONEYWELL INC	43- 53	49 1/2	+4 1/4	+9.3
N	IBM	236-286	253	+16 3/4	+7.0
O	MANAGEMENT ASSIST	5- 14	13 3/4	- 1/4	-1.7
O	MICRODATA CORP	7- 18	11	+ 7/8	+8.6
O	MINI-COMPUTER SYST	5- 12	6	+ 1/4	+4.3
C	MODULAR COMPUTER SYS	5- 13	11 3/4	- 1/4	-2.0
N	NCR	32- 49	48 5/8	+4 1/4	+9.5
C	PRIME COMPUTER INC	12- 33	32 1/2	+1 7/8	+6.1
N	PERKIN-ELMER	17- 22	18 1/2	+1	+5.7
N	RAYTHEON CO	16- 40	40 3/8	+2 3/4	+7.3
N	SPERRY RAND	33- 42	39	+2 3/8	+6.6
O	SYCOR INC	8- 22	21 3/4	+ 3/8	+1.7
A	SYSTEMS ENG. LABS	5- 14	13 5/8	+1 3/8	+11.2
A	WANG LABS.	10- 17	16 3/8	+ 3/4	+4.7

LEASING COMPANIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 6	5 7/8	+ 1/8	+2.1
C	BOOTHE COURIER CORP	8- 16	16 5/8	0	0.0
C	COMDISCO INC	9- 16	13	+1	+8.3
A	COMMERCE GROUP CORP	1- 3	7/8	+ 1/8	+16.6
A	COMPUTER INVSTRS GRP	1- 2	3/4	-	-7.0
M	DATRONIC RENTAL	0- 2	1 5/8	- 1/4	-13.3
A	DCL INC	1- 4	2 5/8	- 1/8	-4.5
N	DPF INC	6- 10	9 1/2	+ 1/2	+5.5
N	ITEL	13- 22	18 7/8	+ 1/8	+0.6
N	LEASCO CORP	19- 33	32 1/2	+ 7/8	+2.7
O	LEASPAC CORP	1- 2	1 3/8	- 1/4	-15.3
A	PIONEER TEX CORP	5- 11	6	+ 1/8	+2.1
N	U.S. LEASING	10- 16	13 5/8	+ 5/8	+4.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1	0	0.0
C	ANACOMP INC	7- 12	11	+1 1/8	+11.3
A	APPLIED DATA RES.	5- 12	11 5/8	+1 1/8	+10.7
N	AUTOMATIC DATA PROC	23- 30	28 7/8	+2 1/8	+7.9
O	COLEMAN AMERICAN COS	1- 2	1 3/8	0	0.0
O	COMPU-SERV NETWORK	8- 15	8	- 1/2	-5.8
C	COMP ELECTION SYSTMS	6- 10	9	- 1/8	-1.3
C	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	9 1/8	+ 3/8	+4.2
N	COMPUTER SCIENCES	7- 11	10 7/8	+ 7/8	+8.7
C	COMPUTER TASK GROUP	1- 2	2	0	0.0
C	COMPUTER USAGE	1- 3	2 5/8	+ 1/4	+10.5
C	COMSHARE	5- 11	10 1/4	- 1/2	-4.6
O	DATA DIMENSIONS INC	3- 5	4 1/4	- 1/4	-5.5
O	DATALAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	18 1/4	+ 3/4	+4.2
C	INSYTE CORP	2- 3	1 1/2	0	0.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/4	- 1/8	-3.7
O	KEYDATA CORP	1- 3	2 1/2	+ 3/8	+17.6
A	LOGICON	7- 17	12 7/8	- 1/2	-3.7
A	MANAGEMENT DATA	1- 2	1 1/8	+ 1/8	+12.5
A	NATIONAL CSS INC	10- 19	18 3/4	+ 1/2	+2.7
O	NATIONAL DATA CORP	4- 9	9	+ 1/8	+1.4
A	ON LINE SYSTEMS INC	15- 24	22 1/4	- 5/8	-2.7
N	PLANNING RESEARCH	3- 6	5	0	0.0
C	PROGRAMMING & SYS	1- 1	5/8	- 1/8	-16.6
U	RAPIDATA INC	2- 4	4 1/8	+ 1/4	+6.4
C	REYNOLDS & REYNOLDS	17- 25	23 3/4	+1 1/4	+5.5
C	SCIENTIFIC COMPUTERS	1- 4	4 1/2	+ 1/2	+12.5
O	TYMSHARE INC	14- 23	21 3/4	+ 7/8	+4.1
A	URS SYSTEMS	4- 6	5 7/8	0	0.0
N	WYLY CORP	1- 5	4 3/8	- 5/8	-12.5

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 20	18 7/8	+ 3/8	+2.0
O	ADVANCED MEMORY SYS	7- 11	11	+ 7/8	+8.6
N	AMPEX CORP	8- 13	13 1/4	+ 1/4	+1.9
C	ANDERSON JACOBSON	3- 6	5 1/2	- 1/4	-4.3
N	APPLIED DIG DATA SYS	10- 20	14 1/4	- 1/4	-1.7
O	BEEHIVE INT'L	5- 12	5 1/2	+ 1/8	+2.3
A	BOLT,BERANEK & NEW	6- 9	7	- 3/4	-9.6
N	BUNKER-RAMO	8- 14	14	+ 1/4	+1.8
A	CALCOMP	3- 6	5 1/2	+ 1/2	+10.0
C	CAMBRIDGE MEMORIES	1- 4	3 1/2	- 3/8	-9.6
N	CENTRONICS DATA COMP	16- 30	19 3/8	+ 3/8	+1.9
C	COGNITRONICS	1- 1	3/4	+	+8.3
C	COMPUTER COMMUN.	5- 8	9 3/4	+ 3/4	+8.3
O	COMPUTER CONSOLES	4- 7	5 3/4	- 1/4	-4.1
A	COMPUTER EQUIPMENT	2- 4	4 1/8	+ 1/8	+3.1
C	COMPUTER TRANSCEIVER	1- 1	1 3/8	- 1/8	-8.3
C	COMTEN	9- 16	15 7/8	+1 3/4	+12.3
N	CONRAC CORP	19- 28	21 5/8	+1 1/4	+6.1
O	DATA ACCESS SYSTEMS	4- 5	4 3/4	+ 1/4	+3.5
O	DATA 100	6- 14	13 7/8	+2 1/4	+19.3
A	DATA PRODUCTS CORP	9- 19	16 3/4	+ 7/8	+5.5
O	DATA TECHNOLOGY	3- 4	4 1/4	+ 1/4	+6.2
O	DATUM INC	1- 4	3 7/8	+ 1/8	+3.3
O	DECISION DATA COMPUT	2- 3	1 5/8	- 1/8	-7.1
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
A	DOCUMATION INC	6- 13	13 1/8	+ 5/8	+3.0
O	DATARAM CORP	2- 24	17	0	0.0
N	ELECTRONIC M & M	4- 6	5	- 1/8	-2.4
O	FABRI-TEK	1- 2	7/8	-	-6.2
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	8- 15	12 3/4	+ 1/8	+0.9
N	HARRIS CORP	28- 49	49	+1 3/4	+3.7
O	INFOREX INC	4- 8	7 3/8	+ 1/4	+3.5
O	INFORMATION INTL INC	8- 14	9 1/2	- 1/2	-3.0
O	INTEL CORP	38- 57	48 1/2	+4	+8.9
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	6- 15	13 3/4	+1 3/8	+11.1
N	MEMOREX	23- 39	38 7/8	+3 7/8	+11.0
N	MOHAWK DATA SCI	5- 9	9	+ 3/8	+4.3
O	PENRIL CORP	2- 8	7 1/4	- 3/4	-9.3
N	PERTEC CORP	7- 12	11 5/8	+ 3/8	+3.3
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3	+ 1/8	+4.3
O	RECOGNITION EQUIP	6- 10	7 5/8	+ 1/8	+1.6
O	SCAN DATA	1- 2	2 1/4	+ 3/8	+23.3
O	STORAGE TECHNOLOGY	10- 33	32 3/4	+3 3/8	+19.6
O	T BAR INC	7- 19	17	-2 1/4	-11.6
O	TALLY CORP.	4- 9	8 1/4	- 3/8	-4.3
A	TEC INC	6- 10	7 3/8	+ 5/8	+8.9
N	TEKTRONIX INC	29- 40	38 3/4	+2 1/2	+6.2
N	TELEX	2- 3	4 3/8	+ 1/4	+5.7
O	TESDATA SYSTEMS CP	13- 20	13	- 3/4	-4.7
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 19 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	8 1/2	+ 1/8	+1.4
O	BALTIMORE BUS FORMS	1- 4	3	+ 1/8	+4.3
A	BARRY WRIGHT	10- 20	19 7/8	+ 7/8	+4.6
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 21	20 3/8	- 3/8	-2.9
N	ENNIS BUS. FORMS	6- 12	11 1/2	+ 1/8	+1.0
N	3M COMPANY	43- 56	44 3/4	+2 1/4	+5.0
C	MOORE CORP LTD	24- 37	29	- 1/4	-0.8
N	NASHUA CORP	16- 28	27 3/8	+3 1/2	+14.5
O	STANDARD REGISTER	18- 23	22 1/2	- 1/2	-2.1
O	TAB PRODUCTS CO	8- 19	9 1/4	- 1/8	-1.3
N	VARCO	18- 24	23 7/8	- 1/8	-0.5
A	WABASH MAGNETICS	10- 13	12 3/4	+ 1/8	+0.9
N	WALLACE BUS FORMS	17- 23	22 7/8	+1 3/8	+6.3

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An IBM Surprise: No Bid to Toss Out Case

By Catherine Arnst
CW Staff

NEW YORK – Contrary to most expectations, IBM did not ask that the U.S. vs. IBM antitrust case be thrown out of court on grounds of insufficient evidence when the government brought its direct case to an end here last week.

Observers were surprised because IBM lead attorney Thomas D. Barr had said as early as March 1977 he would make such a motion, and he did not announce his change of mind until the government rested its case. So, almost three years after the start of this mammoth case, IBM began its defense.

IBM has always made such motions in private antitrust actions brought against it. In two cases, Greyhound Computer Corp. vs. IBM and California Computer Products, Inc. vs. IBM, those motions were granted. However, the Greyhound decision was overturned on appeal and the suit was sent back for a new trial.

IBM's motion to dismiss was denied recently in the Memorex vs. IBM trial in San Francisco [CW, April 10].

IBM opened its defense on the 473rd day of trial since the case opened in court May 19, 1975. During that time, some 4,950 documents have been placed in evidence – 3,200 government exhibits, 1,700 from IBM and 50 joint exhibits.

(Continued on Page 8)

Burroughs Gives B6800 Mid-Life Power Kicker, Subs In Mid-Size Line

By Frank Vaughan
CW Staff

DETROIT – Burroughs Corp. has given its B6800 series of large-scale systems a mid-life performance boost with the introduction of four models. The vendor also effectively replaced its medium-scale product line with the announcement of five models in that size range.

In addition, the firm also introduced a data communications subsystem and adjusted prices on its existing large-scale systems.

The large-scale CPUs boast significant increases in power over the models in the B6800 family they will ultimately replace, Burroughs claimed. The single-CPU models B6808 and B6812 offer 40% more performance than the B6807 and B6811, respectively, while the dual-processor B6818 and B6822 offer a similar performance increase over the B6817 and B6821, according to a spokesman.

Within the line, the B6812 and B6822 employ "optimized memory access logic" to provide 25% more power than the B6808 and B6818, he said, attributing the performance increases to a recoding of the micrologic and the use of 16K N-channel memory devices.

On the medium-scale side of the ledger, the entry-level B2805 provides a 33% performance increase over the older entry-level B2802, while the other models making their debut provide an average of 21% better price/performance than previous models in the mid-scale range, he stated.

All of the systems introduced can be configured with up to four CPUs, the spokesman noted, explaining two B6818s would be equal in power to one B6822 with Global memory.

In addition, all of the large-scale models can be configured with up to

(Continued on Page 6)

Senate Eyes Boardrooms

DP Study Finds Firms Interlocking

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – Leaders of major U.S. corporations constantly rub shoulders in boardrooms across the nation, and by doing so, they flirt with antitrust violations and court conflicts of interest, according to a computer-based study released by a Senate subcommittee here last week.

In the first serious study in more than a decade on interlocking directorates among the country's largest corporations, the Senate Governmental Affairs Committee's Subcommittee on Reports, Accounting and Management, under the direction of the late Sen. Lee Metcalf (D-Mont.), examined 130 of the top industrial corporations, financial institutions, retailing organizations, transportation companies, utilities and broadcasting companies.

With the assistance of the staff of the Senate Computer Center and its IBM 370/158, the subcommittee found 530 "direct interlocks" – cases in which two companies had a common director – and 12,193 "indirect interlocks" – in which two companies each had a director on the board of a third company – among the 130 corporations studied.

The computerized study of these companies, whose assets total over $1 trillion – about 25% of the assets of all U.S. corporations – led the subcommittee staff to conclude that "American business is highly concentrated across industry lines" – perhaps more concentrated than it was in 1914, when

(Continued on Page 5)

User Posts Electronic Mail Success

By Don Leavitt
CW Staff

STAMFORD, Conn. – "A study wouldn't teach us nearly as much as getting in and using a working system," Leonard G. Levy said recently in discussing an electronic mail pilot project implemented late last year at Combustion Engineering, Inc. (CE) here.

CE's Automatic Transmission of Mail (Atom) system was developed on a shoestring, according to the manager of advanced systems, who noted many organizations have spent more on studies than he did in creating and installing Atom and training people to use the system.

Based on an IBM 370/168, Atom gives each participant a secure electronic mailbox that houses all mail sent to or from him. By using a terminal almost anyplace in the world, he can create mail or scan, read, print, pend or forward (with notations) mail sent to him by others.

Atom has weaknesses, he acknowledged, but that was expected. It was designed as a "throw-away" system, meant only to provide a limited number of users with "live" experience so they could help define the needs of a follow-on production version.

Probably the biggest weakness is Atom's dependence on IBM's Time Sharing Option (TSO), Levy said. That software was used because it was in place and Atom's developers knew how to make the TSO edit functions easily accessible to the end users.

But TSO was a costly choice since all editing is done on-line, expending computer and communications resources at a rate that will be unacceptable if the production system is built and made available to "everyone at CE above the rank of PFC," as Levy expects to happen "someday."

That could put quite a burden on the system. CE has a teleprocessing network consisting of more than 80,000 miles of leased phone lines in North

(Continued on Page 8)

Picky Burglar Makes Off With $20,000 in Hardware

By Brad Schultz
CW Staff

STORRS, Conn. – Computer hardware valued at nearly $20,000 was stolen recently from the University of Connecticut's Institute of Materials Science here, resulting in the shutdown of $300,000 worth of equipment with which the stolen items were interfaced.

The institute and police are speculating that the thief is "very professionally competent" because the stolen hardware was carefully selected from a vast array of devices, according to Ben Z. Rubin. Rubin is a research associate at the institute.

The thief was neat and methodical, taking items from different rooms and different systems and even returning screws to their positions on the installation racks, Rubin said. This indicated the thief probably plans to set up a small business with the haul, rather than attempt resale, he added, theorizing the thief may be a student at the university who is about to graduate and leave the area.

The stolen equipment has been identified as:

- A Digital Equipment Corp. PDP-8/E

(Continued on Page 8)

IN DEPTH
IN DEPTH

Satellite Business Systems is sure to spur new applications, John Gantz believes, even though the technology is not new. "SBS: Catalyst for Action" begins on Page 24.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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Memorex Trial 'Laid Back'

East vs. West: A Matter of Style

By Catherine Arnst
CW Staff

SAN FRANCISCO — The most visible difference between the Memorex Corp. vs. IBM antitrust trial here and the U.S. vs. IBM trial in New York is style. Both have the same issues and many of the same witnesses, and the participants of one are carefully studying the developments in the other.

But while the New York trial plods on in an atmosphere that is alternately dull and lifeless or charged with rancor, the Memorex trial resembles the city it is in — lighter, more relaxed and far more "laid back."

The primary reason for this difference is the 11 people who will decide the fate of Memorex's charges. The six women and five men are unskilled and unknowledgeable in DP — or were when the trial started in January. To hold their interest during the long trial days — the court sits from 9:30 a.m. to 5:30 p.m., while the New York court sits from 9:30 a.m. to 4 or 4:30 p.m. — the attorneys must present their case as clearly and as quickly as possible and in an attention-grabbing manner.

Consequently, there are a lot of large, multicolored charts and other visual aids accompanying the testimony, and witnesses try as much as possible to simplify the complicated processes they describe.

The attorneys, in turn, avoid inconsequential subjects that might lose the interest of the jury; their questions are generally clear and to the point.

A Matter of Record

In the government trial, there is no great need to make the procedure interesting, nor is there much attempt. The case is being heard and will be decided by a sole arbiter, Judge David N. Edelstein, and the prime concern of the plaintiff, defense and the judge is to "preserve the record."

The record will be the support for any decision Edelstein makes and it will be carefully studied by the appeals courts to assure that, based on the evidence, his decision was valid. Thus, both sides want every possible related piece of evidence and word of testimony in the record, no matter how trivial.

Analysis

At the Memorex trial, IBM started its defense case April 5 and expects to complete it the week of May 15. In one recent week, the testimony of four witnesses was completed.

In New York, there have been only four witnesses since last July.

New York Circus

It is not unusual for a trial before a judge to move more slowly and take longer than one tried by a jury, but U.S. vs. IBM has reached an extreme that caused Sen. Edward M. Kennedy (D-Mass.), chairman of the Senate Antitrust and Monopoly Subcommittee, to call it a "sideshow attraction" [CW, March 6]. A major element of its circus quality is the bitterness between the attorneys for the two parties.

Lawyers are often criticized by the general public for being able to argue either side and they often seem to be bitter enemies in the courtroom but good friends in private life.

In U.S. vs. IBM, however, several attorneys on each side have lost any semblance of professional respect for those on the other side and perceive each other only as the enemy.

There is an abysmally low level of cooperation between the parties; insults fly both in and out of court and each side is suspicious about even the most elementary actions of the other.

During a recent — and typical — court day, IBM attorney Ronald Rolfe accused government attorney Donald Resnikoff of trying to coach a government witness with his objections to Rolfe's questions on cross-examination. Resnikoff, in turn, accused Rolfe of asking questions that were "unfair" and making "ridiculous" objections.

Edelstein finally ordered both sides to leave the courtroom "if you can't act like gentlemen."

Friendliness in West

There is a glaring difference in San Francisco. Both Memorex lead attorney John Endicott and Patrick Lynch, his counterpart for IBM, are good-humored men who communicate easily, with a resulting high level of cooperation.

Several participants in the New York trial assume that those involved in the private action are only keeping up appearances for the sake of the jury, but it is evident that the friendliness remains once the jury has left the courtroom. Members of both teams are cordial at all times and seem to like and respect each other — an assumption one would never make of those involved in the New York case.

As a result, the Memorex trial has far more stipulations and a minimum of objections.

Some of the differences in style can also be attributed to the judges in the two cases. Edelstein, chief judge of the Southern District Court in New York, is very formal and insists on complete decorum in court. He finds little humor in the proceedings and often loses his temper when he believes his authority is being challenged, insulting attorneys and sometimes even specta-

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ADR's MetaCOBOL® Produces Fast, Error-Free COBOL Code for Owens-Illinois

George Shaw and Howard Abernathy are a part of O-I's Corporate DP Center team, serving the needs of 115 plants in the U.S., as well as installations overseas.

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IBM, AT&T Seen Together On 15 Boards

By Edith Holmes
CW Washington Bureau

TELECOMMUNICATIONS INDUSTRY INDIRECT INTERLOCKS AMONG MAJOR COMPETITORS

	AT&T	IT&T	General Telephone	IBM	RCA	Western Electric	Westing-house	General Electric	MAJOR USERS	Exxon	General Motors	Citicorp
AT&T		4	2	22	3	7	9	14		1 8	2 13	1 20
IT&T	4		0	3	1	2	2	1		0	1	3
General Telephone	2	0		2	3	4	0	0		0	0	0
IBM	22	3	2		4	3	5	13		11	15	2 10
RCA	3	1	3	4		1	2	5		3	6	1 9
Western Electric*	7	0	4	3	1		1	5		1	7	7
Westinghouse	9	2	0	5	2	1		6		4	10	1 7
General Electric	14	1	0	13	5	5	6			5	15	1 11

* 100% owned by AT&T

The above chart was taken from the Senate Subcommittee on Reports, Accounting and Management's study of interlocking directorates. In boxes where two numbers are shown, the number of direct interlocks are shown in the upper right; the number of indirect interlocks appear in the lower left.

WASHINGTON, D.C. — IBM and AT&T directors met each other across the boardroom tables of 15 different companies in 1976, according to a computer-aided study made by a Senate subcommittee.

"IBM is the leading participant in a fight against AT&T for a competitive part of the business communications market," the report, released last week, noted, yet "directors of IBM were found to interface with directors of AT&T on the boards of American Express, Bankers Trust, Chemical New York, Citicorp, Continental Illinois, J.P. Morgan, Caterpillar Tractor, Continental Oil, Du Pont, Mobil and U.S. Steel," the study said.

These "indirect interlocks" — instances in which IBM and AT&T each had a director on the board of a third firm — are not illegal, but they provide "substantial opportunity for direct policy discussions and potential understandings among these major competitors," according to the report from the Senate Governmental Affairs Committee's Subcommittee on Reports, Accounting and Management.

Based on its examination of 130 major U.S. corporations involved in various industries including retailing, finance, transportation, utilities and broadcasting, the subcommittee, which was chaired by the late Sen. Lee Metcalf (D-Mont.), has recommended that Congress outlaw all interlocking directorates between companies with over $1 billion in sales or assets.

The subcommittee believes such a law should extend to all lines of business because of the potential such links have for antitrust violations and conflicts of interest.

Communications Interlocks

As part of its study, the subcommittee focused on the telecommunications industry. While the staff uncovered no "direct interlocks" — situations in which two companies had a common director — among major competitors, the subcommittee found that such indirect interlocks as those between IBM and AT&T were "very significant" during 1976.

AT&T and IBM met each other on the 15 boards through 22 routes. Although there was no direct interlock between the firms themselves, IBM was directly locked to New York Telephone Co., the largest subsidiary in the Bell System, through their common director, Amory Houghton Jr., in 1976.

The study of the communications competitors showed RCA, "another participant in the battle," was indirectly interlocked with AT&T, once on the board of Citicorp and twice on the board of U.S. Steel. RCA directors also met IBM directors on the boards of Citicorp, Metropolitan Life and United States Steel, according to the subcommittee's report.

International Telephone and Telegraph (ITT), the second largest communications equipment maker, interlocked with AT&T on the Chrysler, First City Bancorporation, Southern Railway and U.S. Trust ITT interlocked with IBM three times.

The subcommittee found General Telephone and Electronics Corp. (GT&E), a smaller competitor of both IBM and AT&T, indirectly interlocked with those companies on the boards of Bankers Trust and Continental Oil. Also on the Bankers Trust board was a director of Western Electric, AT&T's wholly owned subsidiary, thus "providing additional strength to AT&T's position there," the study said.

'Summit Discussions'

Citicorp appears to have provided a rather full opportunity for summit discussions in the telecommunications industry," the staff stated. "On that huge international banking board sat the chairman of AT&T; the deputy chairman of General Electric Ltd; the chairman of Xerox Corp.; the chairman of Du Pont; a director of RCA; a director of CBS; a director of American Broadcasting Companies; a director of General Electric; directors of Sears, Roebuck and J.C. Penney; a director of Eastman Kodak; directors of General Motors and Ford; two directors of IBM; a director of Westinghouse; and a director of the New York Telephone Co."

As with communications competitors, major suppliers of communications services were also tied to AT&T and IBM. GE linked with AT&T through 14 director routes on 10 boards; for example. GE indirectly interlocked with IBM 13 times on eight boards, including American Express, Chase Manhattan, Chemical New York, Citicorp, J.P. Morgan, Scott Paper and Southern Pacific — "all very large and powerful companies.

"Such directorate routes could supply convenient conduits for possible private resolution of the public debate between monopoly and competition in the telecommunications industry," the subcommittee staff concluded. It also suggested in its study that AT&T and IBM had ample opportunity to influence their major users through boardroom participation.

For example, AT&T's boardroom "provided a convenient forum for discussion and possible agreement" among six of the nation's largest banking firms — Citicorp, Chemical New York, Manufacturers Hanover, Bank-

(Continued on Page 8)

[illegible]

DP Study Shows Extent of Corporate Interlocks

(Continued from Page 1)

Congress passed the Clayton Act following the investigation of J.P. Morgan and the "money trust" in 1913.

While the Clayton Act prohibits direct interlocks between competing industrial and commercial companies, the law does not cover the wide range of interlocks that have multiplied in the last 60 years. As a result of its inquiry, the subcommittee staff has recommended that Section 8 of the Clayton Act be amended to prohibit all types of interlocks between actual and potential customers, suppliers and sources of credit or capital.

123 of 130 Connected

The Senate subcommittee discovered 123 of the 130 firms studied were connected, on an average, with half of the other major companies in the inquiry.

In addition, the staff found the 13 largest corporations not only were linked, but accounted for 240 direct and 5,547 indirect interlocks, reaching an average of more than 70% of the other 117 companies.

The 13 largest corporations ranked by assets were AT&T, BankAmerica Corp., Citicorp, Chase Manhattan Corp., Prudential Insurance Co. of America, Metropolitan Life Insurance Co., Exxon Corp., Manufacturers Hanover Corp., J.P. Morgan and Co., Inc., General Motors Corp., Mobil Corp., Texaco, Inc. and Ford Motor Co.

The leading competitors in the automotive, energy, telecommunications and retailing fields met extensively on the boards of America's largest financial institutions, corporate customers and suppliers, according to the 1,000-page report entitled "Interlocking Directorates Among the Major U.S. Corporations."

For example, while direct interlocks between major competitors in the telecommmunications industry did not appear from the computer analysis, the subcommittee staff found significant indirect connections. Directors of AT&T saw IBM directors across the boardroom tables of 15 intermediate companies through 22 interlocking routes, the report said (see story on page 4).

In addition to its examination of concentrations in particular industries, the staff found the largest commercial bankers clustered on major insurance company boards and insurance directors joined on the banking company boards. "The boardrooms of four of the largest banking companies (Citicorp, Chase Manhattan, Manufacturers Hanover and J.P. Morgan), two of the largest insurance companies (Prudential and Metropolitan Life) and three of the largest nonfinancial companies (AT&T, Exxon and General Motors) looked like virtual summits for leaders in American business," the study said.

The subcommittee concluded that these patterns of interrelationships indicate an overwhelming potential for antitrust abuse and possible conflicts of interest that could affect prices, supply and competition and have an impact on the shape and direction of the American economy.

The use of the computer in this study marked one of the first times the Senate Computer Center has been asked by a subcommittee to assist in an investigation, James Estep of the center said.

The Computer Center performed all the programming for the subcommittee, using Computer Corp. of America's Model 204, an on-line programming package with its own hierarchical structure for data bases. Estep said the package proved excellent in tracking down indirect linkages between corporations.

The data base made up of the names of corporate directors of the 130 companies during 1976 was largely compiled by the subcommittee staff in the absence of current and complete corporate officer and director information from such federal agencies as the Securities and Exchange Commission (SEC), the Justice Department's Antitrust Division, the Federal Reserve Board and the Federal Trade Commission (FTC).

Estep said the initial programming for the project required the efforts of one person on the Computer Center staff for a period of less than three weeks.

The subcommittee hopes that, as a result of its study, Congress will pass legislation prohibiting interlocking directorates between corporations with more than $1 billion in sales or assets. This proscription should apply to all lines of business, including regulated and nonregulated enterprises, according to the subcommittee staff.

In addition to amending the Clayton Act, the subcommittee recommended that Congress legislate a "Business in the Sunshine Act" requiring open corporate board meetings that could be closed when trade secrets, privileged or special financial information and personnel matters are discussed.

The subcommittee would also like to see the public represented on the boards of large corporations. Regulatory agencies could force this kind of public participation in those industries they govern, the staff urged. These agencies should also collect and make public current and complete reports on interlocking directorships of companies under their jurisdiction.

The staff expressed its belief that "computerization is far enough advanced to provide a central and up-to-date source for that information."

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Range of Software Serves Burroughs Additions

By Don Leavitt
CW Staff

DETROIT — Software capabilities offered by Burroughs Corp. for users of its recently announced B2800/3800/4800 processors (see Page 1) include the Master Control Program (MCP) operating system, various languages and utilities for on-line data entry, text editing, teleprocessing programming and on-line report generation.

An appropriate implementation of MCP, a broader range of languages, the Data Management System (DMS-II), Network Definition Language (NDL) and Message Control System (MCS) software will be available for the latest B6800 processors as well, a spokesman noted.

All of the processors being introduced now are object code-compatible with earlier systems, providing users with a "very smooth" upgrade path, he said. Many of the languages and utilities are now available across the Burroughs line so development started on machines at one level is transportable to those at other levels, he added.

One Environment

The MCP supports dynamic main memory allocation and management of the other system resources. Although the actual MCPs installed at the different levels of hardware differ in detail, they were all designed to give users essentially one operating system throughout the line, the spokesman said.

Cobol, Fortran, Basic and Burroughs Programming Language compilers are available as part of the bundled mid-range systems. Compilers supporting ANS Cobol '74 and RPG-II are also available to B2800/3800/4800 users as separately priced options.

The RPG compiler is said to be compatible with the one previously available for the B1800 and with IBM's RPG-II.

An On-Line Data Entry System (Odesy), described as a package that supports editing and validation procedures on multiple CRTs, is another mid-range offering that has been available on the B1800s. So is the On-Line Reporter package, which allows users to develop report generation and inquiry routines interactively and store them for later.

Text Management

The Command and Edit (Cande) language, previously available on the B1800 and the B6800, is said to be a CRT screen-based, on-line facility utilizing the B874 systems and communications processor to provide editing, manipulation and control of text-handling operations for the remote terminal user.

The Generalized Message Control System (Gemcos), announced as available on the enhanced mid-range systems, is another software package that has been available on the B1800 and is available for B6800 users.

Gemcos is a generator which creates user-level software for communications functions such as transaction routing, audit and recovery, concentration of messages and accumulation of network statistics, he explained.

B2800/3800/4800 users can also consider the Automated Documentation System (ADS), which assists in the on-line production of written documentation. It supports formatting, editing and final printout of textual material, according to Burroughs.

For the mid-range systems, RPG, Cande and ADS will be delivered late this year, Burroughs said. RPG will cost $50/mo; Cande, $1,760 or $60/mo; and ADS, $1,500 or $50/mo.

Odesy ($4,540 or $152/mo), Gemcos ($6,000 or $200/mo) and the On-Line Reporter ($1,000 or $33/mo) are scheduled to be available in the second quarter of next year.

Burroughs Gives B6800 Mid-Life Kicker

(Continued from Page 1)

four I/O processors (one per CPU), up to 16 data communications processors and up to 15M bytes of memory.

Code Compatibility

All of the B6800 models are object code-compatible with other B6000 and B7000 systems, the spokesman said, adding that the B6800s can be programmed in Cobol, Algol, Fortran, PL/I, Basic and APL. All reportedly utilize Burroughs' Data Management System, Network Definition Language and Message Control System software.

Each of the 6.7 MHz CPUs in the B6800 line comes with both an I/O processor and a maintenance diagnostic processor. The systems have a 300 nsec read access time for 6 bytes, and each of the machines, although not word-oriented, has a 60-bit word (48 information bits).

The B6808, with one CPU, 768K bytes of main memory, an I/O processor with 20 channels, an operator console with two operator displays and a maintenance diagnostic processor costs $425,000 and leases for $16,615/mo on a one-year lease the firm used as a base for all other lease prices.

The B6812, with 1.5M bytes of main memory and "all of the features of the B6808" plus optimized memory access logic, sells for $671,760 and leases for $25,000/mo on the one-year plan.

The dual-processor B6818, with two 768K-byte processors, includes two I/O processors with a total of 40 channels, one Global memory control with 768K bytes of Global memory, two operator consoles (each with two operator displays) and two maintenance diagnostic processors sells for $4,146,640 and leases for $35,700/mo.

The B6822, which includes all of the features of the B6818 plus optimized memory access logic, costs $1,400,160 and leases for $44,965/mo. Deliveries on all the large-scale offerings are scheduled for the third quarter.

Three- and five-year lease plans are also available.

Add-on memory comes in 768K-byte increments and sells for $120,000 with a lease price of $3,950/mo.

In other large-scale pricing action, Burroughs reported that purchase prices for the current B6807, B6811, B6817 and B6821 systems with "typical memory configurations" have been reduced an average of 18%, while lease rates "have increased slightly on the average."

Burroughs also announced its B6360 entry-level data communications subsystem for the latest B6800 models. It features a data communications processor with 24K bytes of local memory and eight data communications lines. The unit sells for $50,000 and leases for $1,569/mo.

Medium-Scale Systems

In the medium-scale range, the B2805 has a 3 MHz CPU and comes with 100,000 bytes of main memory that can be increased to a maximum of 500,000 bytes in 100,000-byte increments.

The B2805 costs $100,000 and leases for $2,640/mo. Memory increments sell for $20,000 and lease for $660/mo.

The B2835, which also has a 3 MHz CPU, comes with 125,000 bytes of memory. Its I/O subsystem includes integrated Data Link processors for the console, disk drives, printer, tape drive and card reader. The Data Link processors execute I/O commands independently of the CPU.

The Data Link processors also optimize the management of large data bases and terminal networks simultaneously with batch processing operations, the spokesman claimed, noting the B2835's I/O subsystem can accommodate up to 24 Data Link processors with an I/O transfer rate of 3M million byte/sec.

The B2835 costs $135,000 and leases for $3,625/mo. Additional 250K-byte memory increments cost $14,100 each and lease for $580/mo.

A basic B3805 consists of a 250,000-byte, 4 MHz CPU, an operator display console and integrated peripheral controls. Featuring a read access time of 500 nsec for two bytes, it sells for $175,000 and leases for $5,495. A 100,000-byte add-on memory increment sells for $30,000 and leases for $990/mo.

The B3845 also has a 4 MHz CPU. It comes with 500,000 bytes of memory, an operator display console and integrated Data Link processors. The basic system sells for $230,000 and leases for $7,690/mo. Add-on memory costs $28,840 for a 250,000-byte increment and leases for $1,045/mo.

The B4885 has a 500,000-byte, 8 MHz CPU. With an operator display console and integrated Data Link processors, it sells for $390,000 and leases for $12,750/mo.

Memory is expandable to one million bytes in 100,000-byte increments that sell for $30,000 and lease for $850/mo.

Initial deliveries on all of the medium-scale systems is scheduled to begin this month, the firm said.

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Contracts Not 'Afterthoughts'

Avoid Salesmen's Distractions, Report Warns

By Brad Schultz
CW Staff

WINTER PARK, Fla. — A DP vendor's sales representative may use a number of techniques to distract a customer from considering the fine points of a written agreement, treating a form contract "almost as an afterthought or, in the words of one marketer, an 'oh, by the way,' " according to *CNReport* Volume 1, Issue 12.

This ploy can be perpetrated by nearly any vendor but is most readily employed by large, well-known mainframers, the report said, indicating that a critical element in the ploy's execution is user faith in the vendor, usually generated by the latter's reputation in the DP community.

Downplays Agreement

A salesman might implement this strategy by downplaying the significance of the form agreement at every turn, even — if possible — neglecting to mention it during negotiations, the report noted. Examples include leaving the contract at the sales office, putting it "in preparation" or "in typing" and promising its delivery "next week."

A salesman might also make the agreement-signing event very casual, the report continued, explaining that he might tell his prospect, " 'I'll drop by at 10 on Monday to get your signature on the agreement'; or 'Why don't we play golf Saturday morning? That way I can bring the contract along for your signature and we can have the gear shipped Tuesday.' "

Further, a salesman might avoid furnishing his prospect's attorney or senior management with the form agreement for review prior to signing, or he might deliver it in advance, leaving out such important information as delivery schedules and maintenance obligations, *CNReport* said.

Other techniques for applying this strategy, according to the report, include presenting the form agreement to a user at the point when his sense of urgency is keenest or when his faith in the vendor is "maximized," and neglecting to offer a copy of the contract to the user after he has signed it.

This ploy is valuable to vendors because it enables them to avoid the problems associated with long, drawn-out contract negotiations, the report said, explaining users may adopt a tougher stance or back out completely as deliberations begin to drag.

The ploy also lets the vendor use its own standard form agreement, which is "almost always an artfully worded document designed to give maximum protection to the vendor and minimum protection to the user," the report said.

Further, the ploy allows a vendor salesman to accentuate the effects of his hype rather than the negative qualities of the agreement, the report noted.

CNReport recommended that users follow four rules in countering this vendor ploy:

- Obtain copies of all relevant vendor contracts, supplements and schedules at the time negotiations begin.
- Have the contract thoroughly reviewed by all members of the negotiating team before the negotiations begin.
- Have the legal staff review the agreement and prepare all necessary changes and additions, or an alternatve agreement, as far as possible in advance of the proposed signing.
- Avoid being rushed into signing *anything* without adequate review by legal counsel.

The annual U.S. and Canadian subscription rate for *CNReport* is $195, and single copies cost $20, according to the report's publisher, International Computer Negotiations, Inc., P.O. Box 364, Winter Park, Fla. 32790.

DPMA Planning Meet on Impact Of Privacy Laws

CHICAGO — Experts on the practical impact of privacy legislation will participate in a 1-1/2 day conference sponsored by the Education Foundation of the Data Processing Management Association (DPMA) on June 22-23 at the Hyatt Regency O'Hare Hotel here.

The impact of privacy legislation on information processing at the federal and state levels and on business and the individual citizen will be discussed, according to Edward J. Palmer, DPMA executive director.

Conference moderator will be J.T. Westermeier Jr., member of the law firm of Arent, Fox, Kintner, Plotkin and Kahn of Washington, D.C., who has written extensively on the privacy issue.

Admission to the conference is $125 for DPMA members and members of DPMA provisional special interest groups and $155 for nonmembers. The $30 differential may be applied toward DPMA membership dues for those seminar registrants who apply for membership within 90 days of the seminar, the DPMA said.

For a registration form and other information contact Carol Harte, conference coordinator, DPMA, 505 Busse Highway, Park Ridge, Ill. 60068.

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User Puts Stamp of Success on Electronic Mail

(Continued from Page 1)

America and more than 20,000 miles in Europe.

The company, based here, is a highly diversified supplier of energy equipment and building materials. Its data center in Windsor, Conn., includes a 470V/6 from Amdahl Corp.; a Cyber 172 and a 7600 from Control Data Corp.; and a pair of PDP-11s from Digital Equipment Corp. along with the 168.

Test Going Well

Combining the query capabilities of the inquire package from Infodata Systems, Inc. with the editing and teleprocessing support of TSO, Atom was made available to a small test group in early December. The group chosen was the DP management team, but not because of its knowledge of DP, Levy said.

The choice was made because Levy wanted to exercise the system as much as possible. To do that, he needed a group with a commonality of interest and a need to communicate frequently both up and down — through levels of management — and across — between peers.

Atom currently addresses only the "in/out basket" portion of the electronic mail processing spectrum. Although Inquire supports text search and CE has put together coding for the archiving and filing of messages sent electronically, Levy deliberately chose not to implement such a facility in the Atom system.

Users could encounter tremendous problems, he explained, if at the end of the pilot project the entire system were withdrawn and they had no hard copies of correspondence received or sent.

Generally speaking, however, Atom is going well. People work with terminals at home at night and over weekends and they take portable units with them on trips in order to keep in touch with the organizations.

People would probably use it a lot more in normal office environments if CE could find a good word-processing system to front-end the electronic transmission of messages. A word processor would allow an executive to dictate a draft, have it typed into the system and in hard copy for review, corrected and on its way.

That's the goal, but so far Levy hasn't found a word processor that handles the final stop — transmitting the final corrected text to a host CPU. A local word processor would not only make the executive and the secretary more comfortable, it would free the communications lines of all editing traffic.

The Atom-based pilot system will probably stay in place into September, Levy estimated, but what happens after that is still undecided.

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Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process... including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. $65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add $3.90. For outside USA, U.S. $76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

IBM, AT&T on 15 Boards

(Continued from Page 4)

ers Trust, Continental Illinois and Western Bancorporation.

In addition, General Motors, Chrysler and Caterpillar Tractor represented the automotive industry on the AT&T board; Exxon and Mobil appeared on the firm's board for the energy industry; and J.C. Penney, Montgomery Ward and Federated Department Stores made up the AT&T board's retailing contingent, according to the subcommittee report.

The senate study's computer printouts showed AT&T was directly interlocked with Texas Instruments, Inc. two years ago. The study also indicated the boardrooms of the nation's largest financial corporations provided a convenient meeting ground for major competitors in the computer industry.

While Honeywell, Inc., IBM, Sperry Rand Corp. and Hewlett-Packard Co. do not appear to have been directly interlocked during 1976, directors from each of these firms met regularly on the board of Chase Manhattan. At those meetings, James H. Binger of Honeywell, Patricia R. Harris — then an IBM director, now secretary of the U.S. Department of Housing and Urban Development, William R. Hewlett of HP and Norma T. Pace, a director of Sperry Rand, also encountered Juanita M. Kreps, then a director of Western Electric and now secretary of the U.S. Department of Commerce.

In addition to its indirect competitor and direct user connections, IBM also appears to have had a direct hand in the affairs of the press during 1976. Now Secretary of State Cyrus R. Vance, then an IBM director, also served on the board of the New York Times Co.

IBM's vice-president and general counsel Nicholas DeB. Katzenbach was a member of the computer industry leader's board while he acted as a director of the Washington Post Co.

Two Trials Differ in Style

(Continued from Page 2)

tors.

In San Francisco, Judge Samuel Conti reigns in a far more relaxed atmosphere. He often enters the courtroom, robes flying, before his clerk has a chance to announce him, and confers with the lawyers about procedural matters casually in open court. Edelstein almost always holds such unstructured discussions in the robing room, out of public view.

Conti constantly jokes with the attorneys and sits through the proceedings with a bemused smile. His major concern appears to be in expediting the trial as much as possible. If a problem arises, he generally tells the attorneys to come to an agreement outside of court.

Of course, Edelstein may not often use that approach because it does not often work: The government and IBM have rarely come to an agreement about anything outside of court.

IBM: No Move to Dismiss

(Continued from Page 1)

There have been 52 witnesses whose time on the stand ranged from half a day for Dr. Philip Morse of MIT to 78 days for Dr. Alan K. McAdams, the government's chief economic advisor for this case.

Judge David N. Edelstein, the sole arbiter in U.S. vs. IBM, handed down several opinions as the government's case ended. He denied IBM's motion for a mistrial [Jan. 9] as being "totally without merit" and he refused to allow the firm to reopen discovery, which would have meant interrupting the trial [March 27].

Edelstein granted a government motion to conduct depositions of 47 IBM witnesses and he signed a stipulation allowing IBM to drop 58 of the 70 user witnesses it had scheduled; the parties had agreed the testimony of any more than 12 would have been cumulative.

The end of the plaintiff's case signalled a changing of the guard on the government staff. Lead attorney Raymond Carlson, who was eligible for retirement last fall, stepped down from the command post and was replaced by Robert Staal.

University Thief Very Selective

(Continued from Page 1)

CPU, serial no. 4201.

- A DEC PC04 tape reader, serial no. 458.
- A Kennedy Co. 9000-9 RAW tape drive, serial no. 510-804.
- A Kennedy 9217 formatter, serial no. 510-499.
- A Remex RRF1150 BCI/651 tape reader, serial no. 37766.

The institute is posting a $500 reward for information leading to apprehension of the thief and another $500 reward for information leading to recovery of the equipment. Rubin said he can be reached at the institute by dialing (203) 486-4716 or 486-4622.

So Manuals Can Be Simplified

GM Program Rates Level of Text Difficulty

By Howard A. Karlen
CW Staff

DETROIT — Has your car's mechanic been getting better lately?

The General Motors Corp. (GM) here is trying to help him by using an analysis system to measure the readability of its publications, including GM shop manuals, dealer service procedures and warranty and owner's manuals.

A computer program called Simple Test Approach for Readability (Star) was born five years ago, the company said, when a group of GM divisional service representatives discovered a fact that was well-known to others: shop manuals were difficult for mechanics to read and understand.

The concept of readability was developed in the 1940s by Rudolph Flesch and involves counting the number of words, sentences and syllables in written text. To apply a computer to this task, GM wrote a program for its Honeywell Information Systems, Inc. 6000, using Basic. The program reads text and then produces statistics showing the number of sentences, words and syllables, the average sentence length, the number of syllables per word and an overall index of difficulty. If it is felt that these are too high, the text is revised manually.

Studies over the years have indicated that most people feel most comfortable reading material written on the ninth- to 11th-grade level, according to GM engineer Richard Jilbert, so simplifying the material is not an insult to the mechanics' intelligence. Many classics of American literature, such as *Robinson Crusoe,* and *Tom Sawyer,* are written at about the seventh-grade level, he added. In addition, comprehension is a function of the way words are attached to each other and not simply a function of the reader's capabilities.

A study of the shop manuals published by GM showed they were written at or above the 12th-grade reading level; about half of the mechanics using them read, on the average, at an eighth-grade level, according to GM. These levels, combined with the technical nature of the manuals, meant that half their intended audience got only limited use from them.

GM gave the following example of a text it revised after the Star analysis. The original read: "If your vehicle is equipped with a stowaway spare tire, your spare is designed to provide you with more usable interior space. The spare is located in a deflated condition resulting in a reduced overall diameter." After rewriting, it read: "If your car has a stowaway spare tire, your spare provides you with more usable storage space since it is stored deflated."

Since developing Star, GM has applied it to other publications. An early test of memos taken from GM's Opel Division in Germany showed they were very difficult to read.

Since the concept behind the Flesch index is applicable to all forms of written text, any organization that produces written material for wide use can use Star. GM has made the program's text available free to anyone wishing to use it. Copies can be obtained by writing to the GM Public Relations Staff, 3044 W. Grand Blvd., Detroit, Mich. 48202.

Santa Cruz Sets Summer Courses

SANTA CRUZ, Calif. — The University of California Extension here is offering its eighth annual Institute in Computer Science from July 10 through Aug. 11.

The program will consist of six courses in programming methodology, data base management systems, operating systems, the design and analysis of algorithms, compiler construction and computer graphics.

The principal emphasis of the program will be the "professional increment," according to a spokesman who explained this means a highly trained computer professional should gain from the institute something new and useful.

The prototype course on compiler construction will include two weeks of intensive instruction and practice, during which time students will write and exercise their first compiler.

Courses range from $425 to $600 each. Further information is available from Joleen Kelsey, University of California Extension, Carriage House, Santa Cruz, Calif. 95064.

How to increase productivity in a COBOL shop...for $25

When you think of it, the programming done in most COBOL shops is pretty haphazard. In general, programs are coded without ever being designed so they have no structure. Program documentation (if any) is likely to be incomprehensible. Few programs are coded in an understandable style. And testing and maintenance are often a shambles.

As you would expect, these practices are reflected in programmer productivity. In a study done in 1965, for example, the average COBOL programmer was shown to produce only 10 to 12 lines of tested code per day. What's worse, a study done in 1975 showed no improvement. In other words, we have been stuck for ten years at an incredibly low level of productivity.

Since the mid sixties, however, the techniques of structured programming have promised a way to improve productivity. In one experiment, for example, programmers who used structured programming produced from 35 to 65 tested lines of code per day. That's a 300 percent or more increase when compared with the results of unstructured projects. Another study showed an increase in productivity of 77 percent or more when the techniques of structured programming were used.

"Your book is by far the most readable and instructive book on structured programming that I've read—and I've read them all."

Unfortunately, few companies today are benefiting from structured programming. Only about one-fourth of the computer installations claim to be using the techniques of structured programming. And I know that many of these companies use the techniques far less than they would care to admit...and with results that they couldn't brag about. In short, though the theory promises much, no one yet has developed a practical method for applying the theory.

With this in mind, I'm happy to announce two books on structured programming that I think will have a major effect on programmer productivity. The first is a training textbook called *Structured Programming for the COBOL Programmer.* The second is a reference manual called *The Structured Programming Cookbook.* Both were developed by Paul Noll, who is a software specialist and training manager for a large company in San Francisco.

What the Textbook Does

Like other books on structured programming, Paul's textbook presents the theory behind the structured programming movement. Unlike other books, however, Paul's book presents a method for applying the theory that works...a method that is complete, logical, and practical.

Perhaps the major shortcoming of other books and courses on structured programming is the treatment of program design and documentation. In general, these subjects are either given academic treatment or are omitted altogether. In contrast, Paul gives specific guidelines for designing and documenting programs with the emphasis on practicality. As Paul says, "It's ridiculous to try to teach structured coding. and testing without first teaching structured design and documentation."

In chapter 2, then, you'll learn how to design a structured program. You'll learn the four steps for creating structure charts...what modules should go at what level...six things to watch for when refining structure charts...and much more.

In chapter 3, you'll learn how to document the modules within the structure chart using HIPO documentation. Why HIPO? Because Paul feels it is the most effective form of documentation that is currently available and it is the one most likely to be around ten years from now. But Paul doesn't use the cumbersome IBM implementation of HIPO. Instead, he shows you how to use an efficient HIPO subset.

After you have mastered structured design and documentation, chapters 4, 5, and 6 show you how to use the other techniques of structured programming. These techniques include structured coding, top-down testing, structured walkthroughs, chief-programmer teams, and development support libraries.

What the Cookbook Does

One of the problems with training is that it too often isn't applied after the programmer returns to his job. That's why we created an easy-to-use reference book that will follow the programmer back to his desk.

Section 1 of this book is called Standards and Guidelines. It summarizes the principles of the text for each phase of program development. So if a programmer can't remember the six steps to follow when creating a HIPO diagram or how to use compound conditions in a COBOL IF statement, he can use the cookbook to refresh his memory in a hurry. From the manager's point of view, this section is an instant standards manual for a structured programming shop.

"Mr. Noll has written a straightforward, no-nonsense text which tackles head-on the problems of proper program design when writing a structured COBOL program."

Sections 2 and 3, however, are a more important aid to productivity. They present the complete solutions for four model programs. Since structured programming encourages you to develop similar programs in similar ways, this means that you won't have to develop each new program that you write from scratch. When Paul Noll develops an update program, for example, he finds that he can use the structure chart, some module documentation, and even some of the COBOL code from the model update program in the cookbook. Imagine how this can increase a programmer's productivity.

Our Unlimited Guarantee

Together, I think Paul Noll's text and cookbook can have a major effect on the productivity in a COBOL shop. In six chapters in the text, Paul presents a complete system for developing structured programs. In three sections in the cookbook, he has created a tool kit for the COBOL programmer. At $25 for the pair, you don't need much programmer improvement to justify this investment. And this could be the most important purchase you will make this year.

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Quantity	Book	Unit Price	10 or More	25 or More
________	Structured Programming for the COBOL Programmer	$15.00	$13.75	$12.50
________	The Structured Programming Cookbook	10.00	9.00	8.00

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Seek Cost-Effective Process

Energy Researchers Simulate Coal Gasification

By Ann Dooley
CW Staff

PALO ALTO, Calif. — Researchers at the IBM Scientific Center here are using computer simulations of the coal gasification process in an effort to help relieve the country's energy shortage.

Coal-generated gas, once a common source of energy, fell out of use because it proved too expensive compared with cheaper and cleaner petroleum. But with modern technology, researchers hope to find more efficient and cost-effective methods for coal gasification as an energy alternative.

The gasification process calls for raw coal to be released through a coal lock into the gasifier, where it is blasted by a combination of steam, oxygen and air. Ash is filtered out and the raw gas produced is purified before being used in gas turbines or burned to create steam for steam turbines. The turbines then turn the power generators.

"We're creating a mathematical model in the computer of the physical and chemical processes that take place in coal gasification," Dr. Louis Lopez, manager of process analysis and project manager at the IBM center explained.

Operating Conditions Studied

The system creates simulations that can be used to study the effects of changing certain operating conditions within the gasifier, Lopez said. Once these effects have been discovered, researchers can design better processes and operate them more efficiently, he added.

Before the study can really achieve results, it is necessary to come up with the right mathematical equations, he noted.

Variables Analyzed

Coal has different compositions, so it must be analyzed for its content and heating value. Once these factors are known, researchers can analyze other variables such as the size of the particles, how the coal reacts to stress and how much air, oxygen and steam must be added to create the desired gas.

Researchers must also determine the best way to remove sulfur from the coal.

Every factor must be tested against every other one, Lopez noted. "If we put in the air, steam and coal at such a rate and temperature, we must then analyze how each of the elements react given that certain set of circumstances," he explained.

Data from actual coal gasification tests and operations is entered into the IBM 370/145 the researchers use to construct the mathematical models. "We take the real data and build from that to predict how an actual device will operate," Lopez said.

The completed computer model will be extremely detailed and mathematically sophisticated so it will be able to consider all the necessary factors and alternatives. Then it will be possible to ask "what-if" questions and make some predictions, Lopez said.

Book Outlines Job Offerings In DP Industry

NEW YORK — The minicomputer industry explosion will create hundreds of thousands of new job opportunities in the near future, according to Herman McDaniel, whose book *Careers in Computers and Data Processing* describes more than 100 occupations in these fields.

According to the publisher, the book was written "to answer the questions of students who are considering this expanding and high-salaried field." Among the areas of interest are systems design, testing and production, sales and installation, operation and operational support, programming, systems analysis, keypunching, auditing and maintenance.

Qualifications Outlined

The book includes descriptions of the duties and responsibilities of each job and explanations of the training and education needed to qualify for them, the publisher said. In addition, the author discusses the traits and interests desired by employers and tells where the jobs exist in the public and private sectors.

The 188-page book is available for $10 (cloth edition) or $7.50 (paper edition) from Petrocelli Books, Inc., 384 Fifth Ave., New York, N.Y. 10018.

Exchange Started For Banking DP

NEW YORK — The Banking Systems Information Exchange (BSIE) has been formed by a group of systems professionals here to provide a forum for discussing bank-related DP topics.

Founders come from Bankers Trust Co., the Chase Manhattan Bank, N.A., Chemical Bank and Manufacturers Hanover Trust Co.

Requests for information should be addressed to BSIE at Manufacturers Hanover Trust Co., 39th Floor, 55 Water St., New York, N.Y.

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Monthly Examines Value of Arbitration Clauses

By Marguerite Zientara
CW Staff

BOSTON — When drawing up a contract with a hardware or software vendor, one should consider carefully whether to include a clause saying that in case of a dispute the parties will commercially arbitrate their differences under the rules of the American Arbitration Association, according to the April newsletter *Computer Law and Tax Report.*

The newsletter introduces the pros and cons of arbitration as defined by Lane McGovern of the Boston law firm Ropes and Gray in an article for *Idea,* published by the PTC Research Foundation of Concord, N.H.

McGovern pointed out that whereas arbitration originated as a method of settling disputes between merchants and buyers about the quality, weight or delivery of commercial products, commercial arbitration is now being applied to licensing agreements, stockholder disputes, business acquisitions, leases and distributorships.

While the advertised advantages of commercial arbitration are speed, economy and justice, McGovern noted, the dollar stakes are substantial, the risks to each party are great and, except for cases of corruption or fraud, it is unlikely there will be judicial review of the arbitrator's decisions.

Further dangers in commercial arbitration are that the arbitrator may not have any useful expertise in the area and will probably have limited experience as an impartial judge, McGovern said. The arbitrator not only does not have to follow court rules of evidence, he also does not have to follow the substantive rules of law that apply to contracts.

Self-Tailored Remedies

McGovern pointed out that the arbitrator can fashion his own remedies, as opposed to using those authorized by the legislatures and court custom. Finally, he noted that the arbitrator does not have to say how the decision was reached.

In spite of these dangers, McGovern feels there is a place for commercial arbitration, since it offers a method of resolving disputes without the formality and bitterness of a court hearing.

Arbitration Requirements

To protect the parties to a contract, McGovern suggested including in the arbitration clause a requirement that the arbitrator be knowledgeable in the DP area. He also suggested there be a requirement that the arbitrators decide "according to the law" and that a lawyer be a member of the arbitration panel. Other suggested requirements are that the testimony be transcribed and the decision be accompanied by findings of fact and a statement of reasons for the decision.

McGovern pointed out that in the labor relations field, for example, arbitrators have been setting forth in writing the facts and reasons for decisions for years. While the parties will have to pay more for an arbitrator who undertakes these added responsibilities, they can still get quick justice without forfeiting many of their rights to appeal against injustice, McGovern noted.

Computer Law and Tax Report has a subscription price of $48 per year. It is published monthly by Warren, Gorham & Lamont, Inc. 210 South St., Boston, Mass. 02111.

Job Survey Sees Operators Up, Punchers Down

WASHINGTON, D.C. — The employment outlook for console and peripheral equipment operators is expected to rise about as fast as the average for all DP occupations, while jobs for keypunch operators will continoe to decline, according to the U.S. Department of Labor's "1978-79 Occupational Outlook Handbook."

As with analysts and programmers, the trend of small businesses operating their own systems and the increased use of direct data entry techniques will reduce the demand for operators [CW, April 17].

Statistics show 565,000 persons worked as console, auxiliary and keypunch operators in 1976. These workers were employed in every industry but especially in the insurance sector and in firms that provide DP services for a fee.

This occupation does not require as specialized a background as the other professions. A high school education is important, but on-the-job training is the most likely way to learn the work, according to the handbook.

Average weekly earnings of keypunch trainees ranged from $120 to $140 a week in private industry, according to the Department of Labor. The weekly earnings of begining console operators averaged about $150 weekly. Experienced workers' salaries ranged from $205 to $215 and lead operators earned $230 to $260 weekly.

Inexperienced console and keypunch operators started at $126 a week in the federal government, where the average salary in 1976 was $245 for console operators and $160 for keypunch operators.

Throughout the economy, console operators earned slightly more and keypunch operators earned slightly less than the average earnings for all nonsupervisory work in the private sector.

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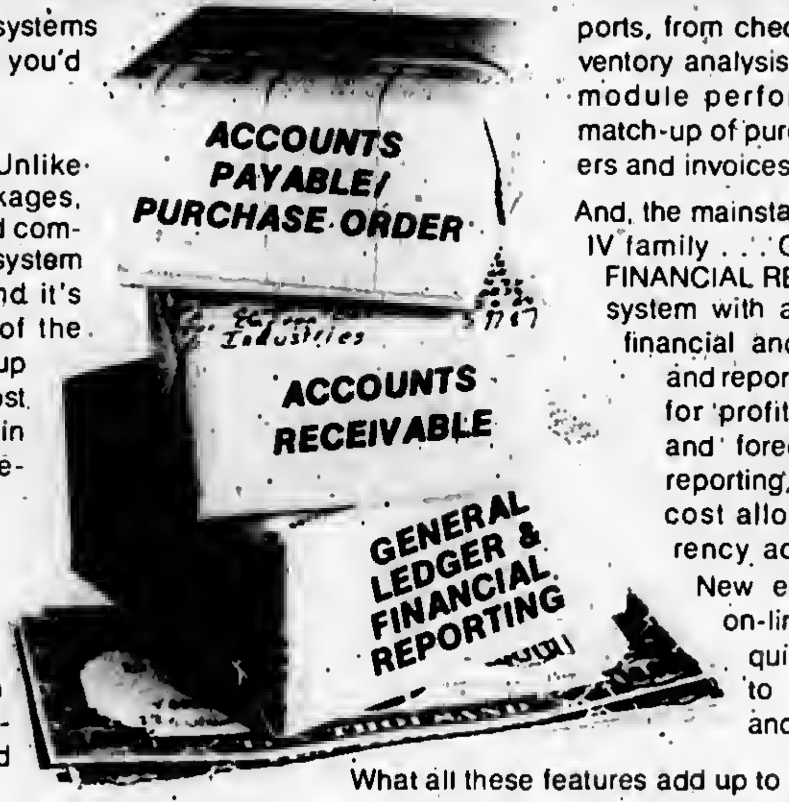
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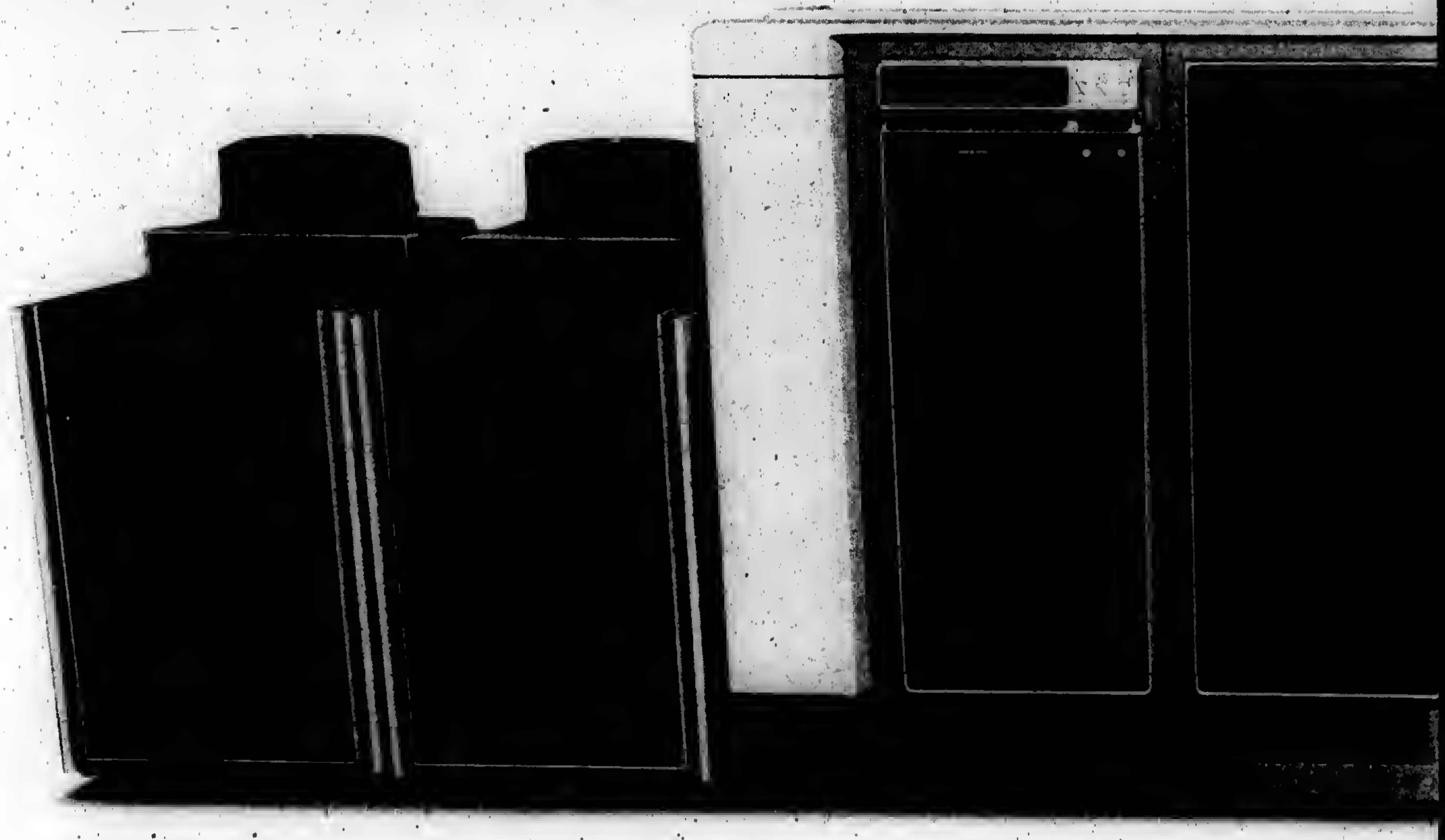

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Dangers Seen in Corporate Planning Trends

By Don Leavitt
CW Staff

ST LOUIS — Fundamental improvement in corporate planning will occur only when we gain a deeper understanding of what corporate planning is and how it functions in the life of an organization. Certainly the current emphasis on computer-based modeling avoids many issues that should be faced, according to the keynote speaker at the recent meeting of the Planners League.

"The general trend today in management at all levels and in all areas is dominated by the system paradigm, by the idea of control through making explicit and quantifying every key variable and relationship that figures in the organizational equation," Dr. James S. Williamsen said.

"Should this domination become a widely accepted and desired goal for society, the Orwellian future — '1984' — may be the ultimate result," the director of methods and planning for L.D. Schreiber Cheese Co. warned.

"In such a world, corporate planning — armed with the technologies developing today — will be adopted to fit the control-oriented objectives of the society generally. The free economy disappears along with other, more basic freedoms," he said.

"Society becomes a totally controlled system; corporations become subsystems dedicated to supporting the whole in some very specific way. The corporate planners become the guardians of subsystem stability and anticipators of unwanted change" if this view prevails, he warned.

While this may seem like a complete inversion of what corporations and corporate planning are all about today, Wiliamsen added, "It does serve to show the ethical neutrality of a means to an end, in this case, the neutrality of a computer-based technology that can bewitch us into thinking that all systemization and quantification are intrinsically good."

'Postindustrial Society'

On the other hand, the keynoter reminded the gathering sponsored by Austin, Texas-based Execucom Systems Corp., "Another and more acceptable view of the future of corporate planning can be roughed out in terms of the 'postindustrial society' that sociologist Daniel Bell has predicted will emerge as we move toward the year 2000."

The creation of a new intellectual technology forecast by Bell to handle decision making "is, of course, a concept we have frequently touched on — the one based on the rapidly growing information sciences and computer technology. Our computer planning technology is just one example," according to Williamsen.

"In the special case of corporate planning, Bell's first dimension (in which he sees a change from a goods-producing to a service economy) relates to the question of planning objectives and where they fit in the frame of corporate objectives and directions generally. This area is largely ignored in favor of planning technology," he continued.

"The corporate planning community's sensitivity to Bell's second and third dimensions" — in which he predicted the preeminence of the professional and technical class and the centrality of theoretical knowledge as the source of innovation and of policy formulation for the society — "helps to explain the lack of focus on planning objectives and their formulation and evaluation," Williamsen asserted.

"Quite simply, there is today an accelerating shift toward the professional and technically oriented planner in the corporation. Along with this, we are seeing great emphasis on the 'axial principle,' which focuses on theoretical knowledge," he said.

In contrast to Bell's fourth dimension of the postindustrial society in which he sees control of technology and technological assessment, Williamsen currently sees a "preoccupation in planning the technological underpinnings of the corporation's business area — assessments of its value and contribution to the bottom line."

To bring today's computer-based corporate planning into postindustrial society, developers will have to put a "front-end" on it: "a piece which puts planning technology in perspective by subordinating it to the corporation's objectives generally. More specifically," Williamsen added, "it would be subordinate to planning objectives and to the corporation's philosophy and style of forming and evaluating them.

"The gap between our understanding of the true nature and role of corporate planning and our toolbox-oriented ability to do it will widen until there is a pressing need to know what we are doing in corporate planning and why," he warned in conclusion.

College Sidesteps Funding Crunch By Constructing Its Own DBMS

ATLANTA — If you can't get funds appropriated for purchase of a data base management system (DBMS), perhaps you can build one yourself like DPers at West Georgia College did.

That was the advice given here at Expo '78 by Joseph Doldan, the state college's director of information processing.

Before creating its DBMS, West Georgia was basically a file processor, Doldan indicated, with many separate files on students, staff, faculty and labor. Separate files were maintained for each class of personnel for use in processing payroll, personnel records, class schedules, grades and the like on the college's 256K IBM 360/40, he said.

When the legislature rejected its funds request for a DBMS, the college built one oriented around "people," he said, but it didn't move forward in a vacuum.

Since they knew the state would eventually move into IBM's MIS, the implementation team; some of whom had had experience with the Total system from Cincom Systems, Inc., structured the system to permit relatively easy conversion.

Record structures were built around common data elements such as demographic information and academic records, he said.

Doldan reminded attendees who are considering going to DBMS not to do it without carefully defining the relationship between the system's users and the implementation team. The users will establish the needs, set the limitations and exceptions, evaluate the system after it is implemented and experience the problems, he said.

Carefully established priorities are critical as is support from upper management, he noted.

He also urged attendees to strike a balance between short- and long-range plans in accordance with their organization's goals.

Sometimes it might be necessary to work toward a common data base through a half-way point of multiple data bases in order to keep those old programs running, he said, indicating that was nothing to be embarrassed about.

Finally, he said, information management must be controlled if the DBMS is going to be effective for decision making.

Student Program Planned For DPMA Conference

PARK RIDGE, Ill. — The Data Processing Management Association (DPMA) has issued invitations to its 100 student organizations to submit papers for a special students' program at the DPMA's 27th annual conference. Dr. James R. Oliver, vice-president for administrative affairs, said he hopes the writers of the best papers will present them at the conference in New Orleans.

The conference, which will be held at the New Orleans Hilton Hotel Oct. 29 - Nov. 2, will also include presentations on career outlook, growth potentials and planning in the information processing field. This is the first time the special student's program has been conducted, the DPMA said.

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Enthusiasm Marks Experiment

Handicapped Receive DP Operator Training

By Howard A. Karten
CW Staff

BASSETT, Calif.— The first effort in the U.S. to train developmentally handicapped people as computer operators is working here at the San Gabriel Valley Training Center. If the experiment succeeds, it could open up new avenues uf regular employment for some of America's most severely disabled individuals.

The prugram, aided by a grant from IBM, was completed by nine of its original 11 students. Most of these have already started internships at local businesses, including Southern Califurnia Edison, IBM and the Glendora Community Hospital.

One of the people in the business community who has worked with an intern is Helen Vafakos of Southern California Edison in Los Angeles. She said trainee Cindy Peterson "is working very satisfactorily, is well accepted and communicates well with the others. She is persistent and very enthusiastic, and her enthusiasm has rubbed off on others." Vafakos added that Peterson "is an eager and highly motivated employee."

Program 5 Months Old

The program was started five months ago following conversations between Dr. David French, director of the Work Adjustment Program and clinical services for the training center and an IBM employee who has a daughter at the center. Five students were selected for an introductory course in computer operations.

In the last session of that course, Mary Fuad, an IBM systems engineer who volunteered to develop the program, made a videotape of the students and showed it to IBM in hopes of getting a grant for the project. She got the grant, along with two System 32s, a 3741 data entry station and teaching materials.

The students selected all have mild disabilities, including autism, cerebral palsy and retardation. However, according to Fuad, they compensate for these disabilities with their enthusiasm. "The mutivation of these people was incredibly high." One student with cerebral palsy, Fuad said, worked for three hours every night practicing her typing.

Programmed Instruction

To train the students, Fuad began with the IBM programmed instruction course. She expanded both the content of the course and the length of time it took. As a result, she said, "They probably know more than most operators because they know internals and what's making the machine tick, rather than just knowing what to type."

Fuad, who has a B.A. in education, said that two of the biggest problems she faced were attention span and socialization. Her students had a short attention span to begin with, and there were continual disruptions of the class by center personnel showing the program to visitors. Despite this, she said, she had little trouble keeping their attention.

Peer pressure and the student's motivation also contributed heavily to the program's success. "My God, you have never seen such incredible performance from these people . . . it has just been amazing. Dedication is very characteristic of the population; they just want to be able to work," Fuad said.

"The things I worked the hardest on were emutional," she added. A significant part uf the computer operator training program at the center is group therapy and concentrates on improving the self-image of the participants.

"I saw five years' worth of intensive therapy improvements in six months," Fuad said, adding that she expects her pupils to be a valuable asset to their employers. "Many jubs in DP are routine and have high turnuver, but I expect these people to be with their empluyers for a long time, because they are su challenged and mutivated."

Preinterview Help

Because of the difficulties handicapped people uften face in looking for jubs, Fuad did some preinterview work with putential employers. "I would talk about the students' mutivation and dedication to putential employers, and they would say 'I think they would be a pusitive worker model to my peuple, because they will love their wurk.'"

Once the empluyers were briefed about the students, the interviews went mure easily fur buth, since the employers knew what to expect, she said.

Cummenting on the program, Peter Davids, manager uf the IBM General Systems Division's Equal Oppurtunities Prugram, said, "IBM is very interested in identifying cummunity projects invulving the handicapped that are beneficial tu as many handicapped individuals as possible. Every IBM location in the country has a charge tu do things like this fur the community."

As far as its experience with the program, Davids added, "We're delighted with what we see so far and with the prospects for the future . . . This has given us the impetus to give consideration to other such prujects."

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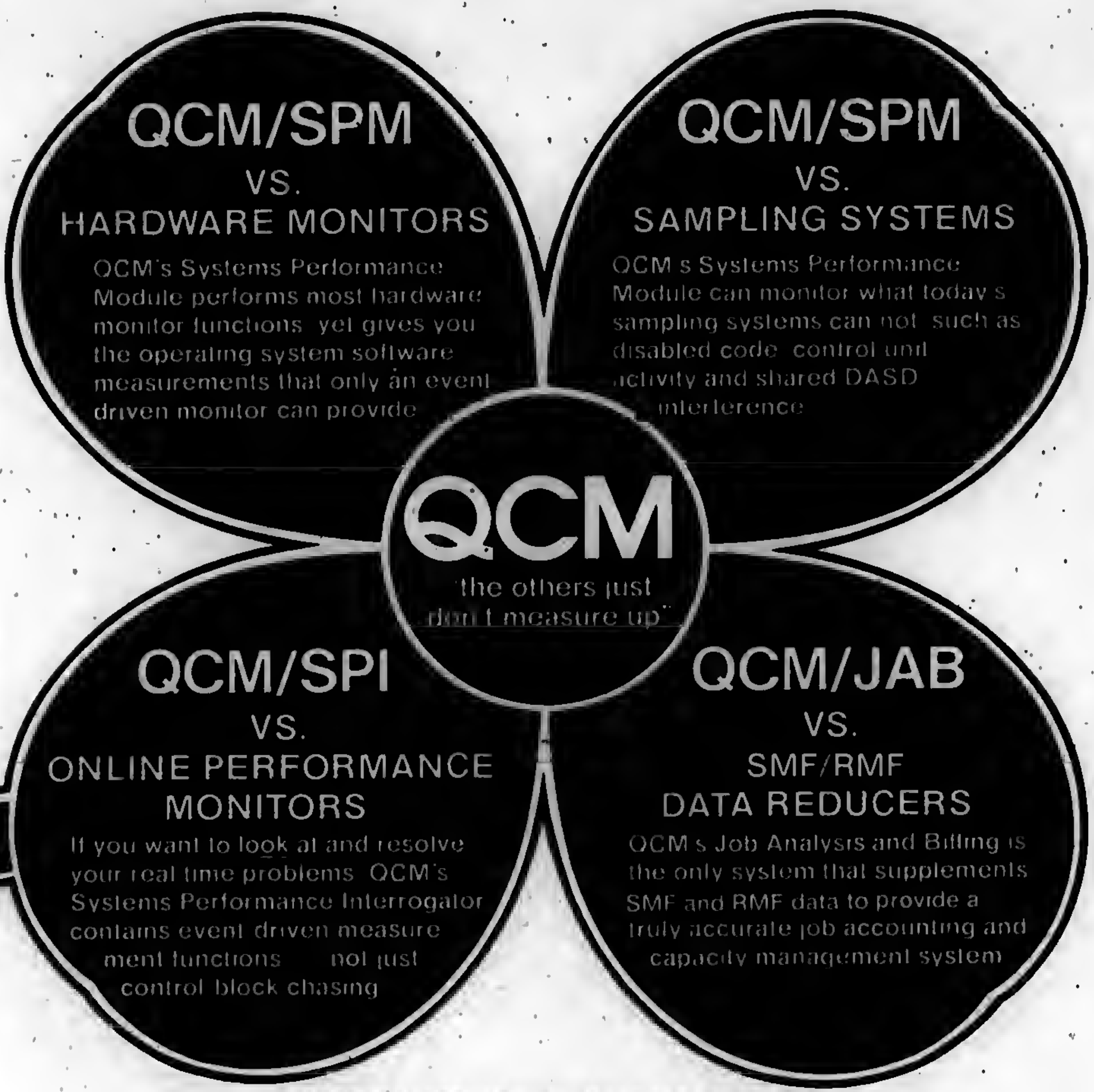

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User Enthusiasm Called Key to DDP Success

By Tim Scannell
CW Staff

ATLANTA — User enthusiasm and education are critical for the successful operation of a distributed data processing (DDP) system, according to Richard P. Jones, marketing vice-president at Dataflo Systems.

"If users are not particularly enthusiastic about a system, it won't work, but if they are, they'll make the 'lousiest' system function and nobody would know the difference," Jones said here at Computer Expo '78.

Education is equally important because it tends to "get things out of the hands of the experts" and into those of people who have actual DP experience, Jones continued.

"DDP means different things to different people," Jones explained. Generally, "users use it to mean what they want it to mean." Technically, DDP is "the functional distribution of certain DP activities along logical organizational lines," Jones said.

DDP has actually been around for quite some time, but in different degrees, Jones explained. A 25% DDP site could be likened to a CPU with several dumb terminal stations that are used "for inquiry . . . or for printing."

A mainframe with intelligent terminals can consequently be a 50% site because there is some processing involved at each station, rather than just "slave" printing, he said.

Independent or remote computers, directed by a standard protocol or under close control, is the next degree, Jones related. Work at each station is supervised from a central point or facility that dictates what work is supposed to be performed.

The final degree, or a 100% DDP center, is one in which everybody at each station "is allowed to do their own thing however they want to do it," Jones said. The central mainframe is eliminated altogether and each manager functions within certain limitations.

Jones sees DDP as the natural evolution of things in DP. Initially, there was one single computer that was designed to perform a single function such as complex calculations or census tallies.

This machine evolved into a computer that was capable of performing several tasks concurrently in a time-sharing or shared-processing mode, Jones stated.

The final step in the DP evolution process is the use of multiple computers, each of which performs a dedicated task.

"This, in a sense, is back where we started from, but on a higher plateau of technology," Jones observed.

Conversion Advantages

There are many obvious advantages to converting to a DDP system, Jones continued. First of all, the equipment is considerably less expensive than full-scale mainframes. "At Dataflow, for instance, we have six Digital Equipment Corp. PDP-11s and every one of them is 20% faster than the IBM 1401 that, as recently as 1966, was the corporate computer," Jones said. "All six minicomputers together didn't cost half as much as the 1401 did," he added.

Because of the elimination of complex software routines, fewer experts are needed, Jones stated. "Conversely, fewer specialists can get a lot more done a lot faster."

Upgrading a system isn't as difficult as with a larger mainframe. "It's a modular kind of thing rather than the huge jump that users have to take when they run out of gas with the big machines," he remarked.

One of the great advantages of DDP is that it gives each user a renewed sense of responsibility. "The user becomes immediately involved and responsible for what is accomplished. This eliminates the 'them' and 'us' syndrome," Jones pointed out. The user accepts change because he wants it, he said.

Other advantages include a more realistic approach to DP needs and functions from the user's point of view. Suddenly, the user is in charge of his own station and sees the problems and restrictions firsthand, Jones noted. Each organization has its individual jobs to perform which disperses the workload, relieving the bottleneck problem, Jones added.

Finally, each workstation is, in itself, a backup computer site. "When something is down, the whole world doesn't stop — only that piece," he noted.

Some Disadvantages

On the other hand, Jones described some disadvantages to a distributed system.

Security becomes a much greater problem since the intelligent terminals are scattered all over the building or the country. "It is less secure than if you have them locked into a room," Jones said.

Servicing the equipment becomes a problem because it is not located at one central site. "It isn't like someone driving up the road" to service your machines, he noted.

There also seems to be a problem of control or getting the users at the various stations to follow operational rules, he said.

Opposition from the central DP department personnel is also an occasional problem, Jones said. "They see it as a loss of control of their empire, so to speak, when it should be seen as an opportunity to enhance their value to the company," he stated.

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Architecture of Data Bases To Change in '80s: Diebold

VENICE, Italy — In the 1980s, changes in the need for information will require a new architecture of data bases designed so intelligence can be synthesized from a pool of data and retrieved in ways not yet developed by most organizations, according to John Diebold, chairman of the Diebold Group, Inc.

In delivering the keynote address to the 40th plenary meeting of The Diebold Research Program/Europe here recently, Diebold said, "I feel information will be recognized as a valuable resource on the same level as capital and labor. We shall abandon the time when it has been consistently underpriced, underutilized and its contribution underrated."

As support for his theory, Diebold cited the fact that organizations are experiencing new needs. Supply uncertainties and changes are placing emphasis on "supply management" rather than the "demand management" where most place emphasis today, Diebold said. Adjustments will have to be made to allow organizations to review their product mix on an ever more frequent basis.

International uncertainties, profit squeeze and the proliferation of areas in which the corporation is evaluated will force those corporations that want to remain competitive to rethink their information needs, he asserted.

To allow more cost-effective resources, information will be used for planning and decision-making as well as to measure performance and the organization's responsiveness to its growing constituencies, he said.

Diebold stated that information architectures will have to be redesigned to respond to these emerging needs because, first of all, the wrong information is generated. Second, he said raw data is often contained in data bases that cannot communicate among themselves and thirdly, even assuming corporations could generate the correct information, it would take too long to do it because large applications can't be produced in a period of less than several months to a year.

Some of the limitations of our present information architectures are not compatible with the needs of faster business response to unplanned change or the greater complexity of performance measurement that organizations will need in the 1980s, Diebold said.

Architecture Models

Models of interactive computing with a cohesive data base architecture are not new, Diebold said. They have been used in specialized areas such as rent-a-car businesses and airline reservations. The differences between these and those that will be needed in the future are differences of scale. Corporations will need a major diffusion of these principles so they will be applicable to all operations in the 1980s, he asserted.

The new systems will enable corporations to generate new forms of information, change plans and implement them in a short response time and introduce complex performance measurements.

Development of this information architecture will take years of first building an information infrastructure, then application systems and finally communications networks, he said.

The new information philosophy will be accompanied by emphasis on data structures, on super mainframes with massive bubble memory or on yet larger minicomputers with high-capacity communications links.

Via DP Matching Project

Sheriffs' Offices to Pool Inmate Escort Teams

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Sixteen sheriffs' offices across the country will start pooling the escort teams they use to transfer prisoners from state to state this month with the aid of a computer-aided project expected to save the sheriffs' departments about $200 per trip, the Justice Department announced here recently.

Project Captis, financed by a $432,960 Law Enforcement Assistance Administration (LEAA) grant as a six-month pilot program, is designed to cut costs by making it possible for escort teams to carry prisoners in both directions instead of only one way on many of their interstate trips, the department said.

Sheriffs will enter their future prisoner transfer plans into the system, including such nonsensitive information as the Originating Agency Identifier (a nine-character identifier assigned to every law enforcement agency, court and corrections institution in the country); sex of the prisoner; a subject danger code, (indicating the relative risk in transporting a prisoner, and the earliest and latest transfer dates possible, according to David Hudak, the Captis project director for the National Sheriffs' Association.

The Captis data base is stored in a Prime Computer, Inc. Model 300 with 128K words of memory located at the Association's national headquarters here, according to Hudak.

National Vehicle

Captis will use the National Law Enforcement Telecommunications System (Nlets), in existence since 1964, as the vehicle for its message switching, according to Norbert Schroeder, a communications specialist for the National Criminal Justice Information and Statistics Service who is working with the sheriffs' association.

Nlets, which was upgraded in 1973, is a message-switching communications network used by federal and state law enforcement and criminal justice agencies throughout the U.S., except Hawaii, to swap criminal information. The system is accessed by 6,000 terminals, according to Executive Director Timothy Sweeney.

Nlets is based on a Data General Corp. Nova 800 minicomputer with 48K words of memory located in Phoenix. The controller was custom designed for Nlets by Action Communications Systems, Inc., Sweeney said.

"What will happen, I'm sure, is that the really risky prisoners won't be put into the system; they'll be handled with relative security. This is designed for the more mundane prisoners, so we can make use of team work in transferring prisoners," Hudak said.

$200 Savings

About 50,000 prisoners were transported across state lines in 1976 at a cost of $25 million, or an average of $500 per trip, according to the LEAA. Using Captis, the cost of each trip that is matched up with another will be about $300, the LEAA estimates. More current (1977) figures are not available.

The participating counties are Pinellas and Hillsborough, Fla.; Jefferson, Colo.; Maricopa, Ariz.; Salt Lake, Utah; Multnomah, Ore.; Los Angeles, Calif.; Milwaukee, Wis.; Montgomery, Md.; Cobb, Ga.; Tarrant, Texas; Natrona, Wyo.; Cumberland, N.C.; Ada, Idaho; Ingram, Mich.; and Shawnee, Kan.

Even though the system will start with only 16 sheriffs' offices as members, anyone with access to Nlets will have access to the Captis information, according to Hudak. There is no charge to the user.

Afips Appoints D.C. Office Head

WASHINGTON, D.C. — Alexander D. Roth has been named director of the American Federation of Information Processing Societies (Afips) Washington office. Roth, a lawyer, replaces Philip S. Nyborg, who will become vice-president and general counsel for the Computer and Communications Industry Association (CCIA).

In addition to his experience in several areas of law, Roth worked for IBM for four years as a programmer, systems engineer and technical representative.

Roth comes to the post from Swift & Co. in Chicago, where he was a member of the law department. Prior to that, he served part-time as director of the Law School Computer Facility at the University of Michigan, where he was involved in consulting and administrative support, including providing computer services for law school classes and faculty research projects.

Afips is a federation of 15 nonprofit scientific, educational and professional societies representing approximately 120,000 individuals concerned with computers and their applications. The Washington office was established in 1975 to provide an information service to Afips constituent societies and to make available to government groups some of Afips' technology-related expertise.

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Morin to Keynote DPMA Conference

BLOOMINGTON, Minn. — David Morin, director of International Data Corp.'s Information Systems Services, will keynote the Region IV Conference of the Data Processing Management Association (DPMA) here May 10 at the Radisson South Hotel.

His talk, "Planning for Change," will focus on trends in personnel costs, distributed processing and other areas that affect the DP effort.

For more information, contact the Northwest Chapter of the DPMA, Box 9566, Minneapolis, Minn. 55440.

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May IDC Seminars to Examine Small Systems, '80s Environments

WALTHAM, Mass. — International Data Corp. (IDC) will present two seminars in May, "Small Computers at Large User Operations" and "EDP Organizations Environment in the 1980's." The first program, to be held May 22-23, will include research results, consultant presentations and vendor, user and consultant viewpoints on the supermini alternative, a spokesman said.

The second program, to be offered May 24, will discuss user budgeting, DP personnel problems and solutions, hardware, software environments and IBM strategy.

The programs will take place at the Rye Hilton in Port Chester, N.Y. Price for "Small Computers at Large User Organizations" is $495 for a single attendee and $350 for each additional team member. "EDP Operations Environment in the 1980s" will cost $245 for a single and $175 for additional members. Cost to attend both seminars is $695 for a single attendee and $495 for each additional team member.

The programs will be repeated in June at the O'Hare Inn in Chicago. "Small Computers/Large Users" will be offered on June 26-27, and "EDP Operations" will be held June 28.

For further information, contact Jayne Bell, IDC, Box 915, Waltham, Mass. 02154.

NSF Leases Data Base Of Science Citations

PHILADELPHIA — A just-developed *Science Citation Index* (SCI) data base said to provide bibliographic information in the areas of program planning, science policy and the sociology and history of science and scientific communication has been leased by the National Science Foundation (NSF).

The agreement gives NSF, its grantees and contractors access to the complete data base, which was developed by the Institute for Scientific Information (ISI), here.

The references cited by a given source publication are accumulated by the SCI, an ISI spokesman said, noting that more than five million source items have been indexed to date, and more than 50 million references to earlier works have been extracted from these items.

The NSF is said to be using all of the SCI's three major sections: a source index alphabetically listing authors who have recently published in journals covered by SCI; corporate index containing each of the authors' institutional affiliations; and a citation index alphabetically listing references cited at the end of each source item.

The NSF has been applying the SCI to examination of the structure of scientific specialties. Data from the index has also been used in studies of scientific review literature and in NSF evaluations of its own internal programs and functions, such as peer review, the spokesman added.

Requests for more information on the SCI should be directed to Dr. Morton V. Malin, ISI vice-president for professional relations and contract research, 325 Chestnut St., Philadelphia, Pa. 19106.

Contract Negotiations Topic of June Course

NEW YORK — A three-day course in "Computer Contract Negotiation" will be held June 5-7 at the St. Moritz Hotel here.

The course will reportedly address the legal and financial aspects of contracting for DP products and services. It is designed for managers, attorneys, financial officers and other professionals responsible for protecting an organization's interests, a spokesman said.

Among the 20 segments of the course are "Introduction to the Contracting Process," "History and Possibility of Good Contracting Practices," "The Steps to a Signed Contract," "Understanding Your Adversary" and "Software Development Contracts."

The course will be taught by Joseph Auer, president of International Computer Negotiations, Inc. (ICN); Dick H. Brandon, president of Brandon Consulting Group, Inc.; and Sidney Segelstein, a partner with the law firm of Goldstein & Schrank.

The course is sponsored by Brandon Consulting Group, ICN and Brandon Systems Institute.

Preregistration is required, the spokesman said. The $575 fee includes the course text, a copy of the book *Data Processing Contracts — Structure, Contents & Negotiation,"* bound copies of ICN's monthly *Computer Negotiation Reports,* various reference materials and luncheon.

Additional information can be obtained from Ruth Dargis, Brandon Consulting Group, Inc., 505 Park Ave., New York, N.Y. 10022.

Library Saves $370,000 on System Conversion

By Marguerite Zientara
CW Staff

TACOMA, Wash.— The Tacoma Public Library (TPL) here recently automated its book circulation system to save time and provide better service, and thanks to a staff-developed model conversion system, the library reportedly saved an estimated $370,000 on the project.

The Automated Library Information System (Alis), developed by Dataphase Systems, Inc. of Kansas City, Mo., is essentially a "massive inventory control" system, according to a library spokesman. The system can check library materials in or out instantaneously through the use of Recognition Equipment, Inc. Model 40 optical character recognition (OCR) wands connected to 14 Beehive Medical Electronics, Inc. B100 CRT terminals, according to Kevin Hegarty, library director.

The system also offers many other features, according to Hegarty, but to get these benefits the library had to convert its manual card file for use by the computer, and that's where the staff's money-saving thinking entered.

Data Base Purchased

Historically, libraries have sent their manual card files to service bureaus for conversion, often at a cost of $1.50 to $1.60 per title. "With the number of titles we have — a quarter of a million — we're talking about a considerable cost," Hegarty said.

TPL instead purchased a data base of 1.9 million titles "typical to a public library" from Blackwell North America, Inc., a Portland, Ore. vendor of books and computer services. These data base tapes include the author, title, Library of Congress (LC) number and other information about each book in machine-readable form, Hegarty said.

The Blackwell North America data base was stripped to a basic abbreviated record (from 1,000 bit/record to an average of 400 bit/record), excluding added entries, so the entire data base could be contained in the minicomputer using two Control Data Corp. 300M-byte disk drives, according to Hegarty. The system also includes a Data General Corp. 6021 magnetic tape drive.

The library's 250,000 titles are matched to this data base using search keys such as LC number, International Standard Book Number (ISBN), author, author/title or title, Hegarty explained. The LC number, when available, is sufficient for a "hit" 90% of the time, he said.

As hits occur, the holdings are marked for inclusion in the TPL data base, with local item information added. "Misses" are keyed into a currently created data base using standard cataloging techniques.

Approximately 80% of the library's collection is listed on the tapes, Hegarty said. The rest must be converted piece by piece directly from the books, a process which takes "10 times as long," he said.

When the conversion is complete, the 1.9-million-title data base will contain TPL holdings only. At that time, the TPL data base will be sent to the Washington Library Network (WLN), a statewide group of libraries that is developing an automated information system, for inclusion in its data base, Hegarty explained.

Blackwell North America update tapes are added weekly, ensuring the currency of the data base. "We intend to keep the data base in our minicomputer for three years under our contract with Blackwell. During that time, other WLN libraries in the state can access the data base while it resides here," Hegarty said.

System Costs

Cost of the entire TPL system will be $280,883, Hegarty said, which includes a one-time software charge of $50,000. The one-time installation charge was $12,000. "Another library coming into the circulation system will not incur either charge," Hegarty said. The total cost figure also includes a 5.1% sales tax.

The library began on-line operations April 3 for a 60-day trial period at the main branch and will operate in the library's other branches beginning in September.

Tacoma Public Library is the second library in the nation to use the OCR wand for its circulation system, Hegarty said.

The wand reads the identification number of the book label as well as the number assigned to each library patron's coded library card and inputs that information to the system's DG Nova 3 minicomputer, Hegarty said.

When the book is returned, its identification number is disassociated from the patron's number and erased from the memory bank, so there will be no record of what an individual patron is reading.

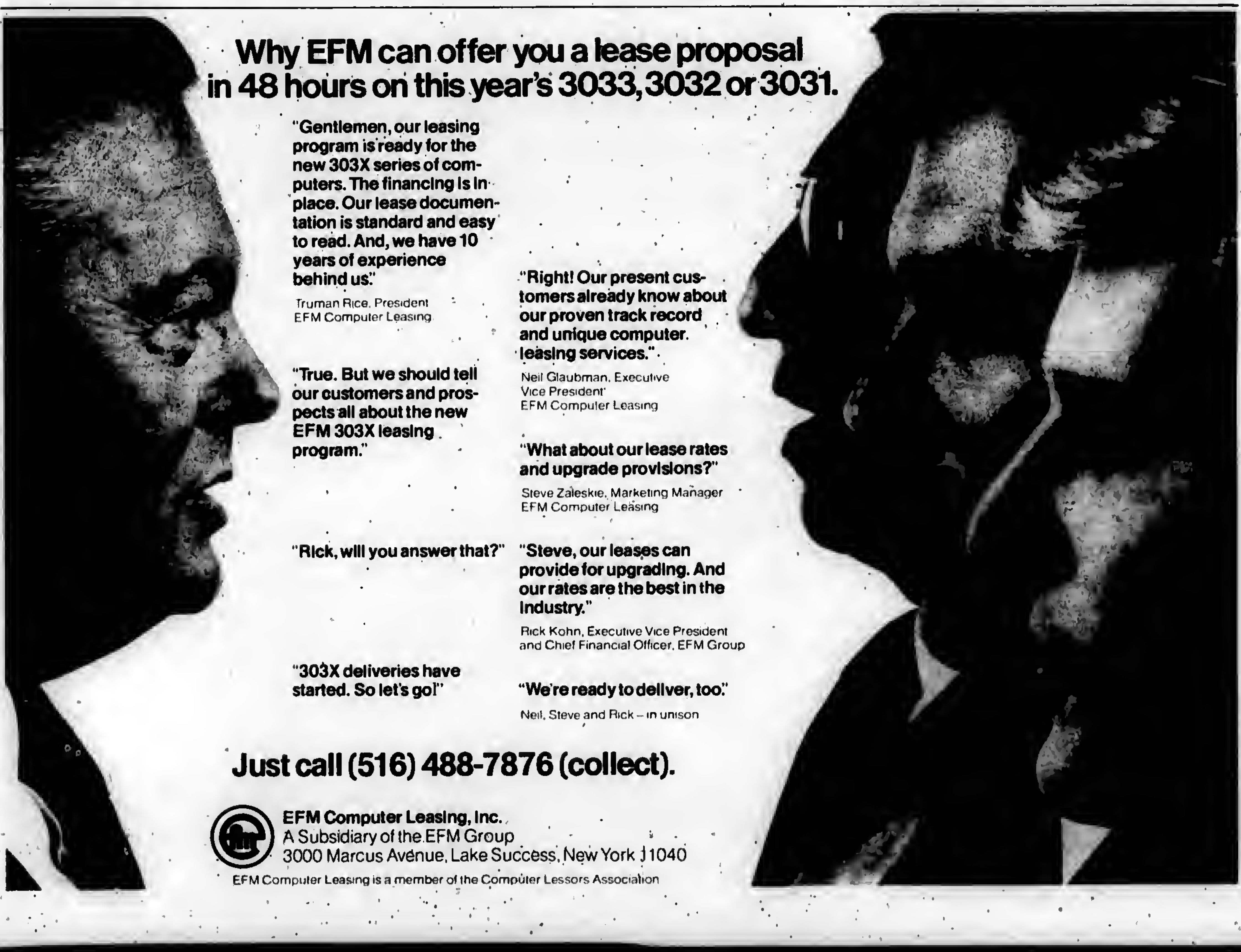
In addition to checking books out, the system can indicate when a book is returned and whether there is a reserve hold on it. Before the computerization, librarians had to review long lists of reserve books, which was "quite a pain," a spokesman said.

Overdue notices were previously processed "with great labor," but now the system will automatically print an overdue notice on three-part forms, which then merely have to be franked and mailed, Hegarty said.

In September, when all branches go on-line, the system will be able to indicate instantaneously which branches have copies of a particular book.

The Alis system will serve as a prototype for participants of the WLN, Hegarty said.

Future plans for the system include printing catalog cards and spine labels; checking in periodicals, of which the library receives hundreds; printing missing periodical notices for vendors; and keeping track of books on order. Within two years, the library anticipates the system will furnish it with a microfilm catalog of all the library's holdings, information contained on about five million cards.



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Users Urged Not to Reject Third-Party Leases

By Tim Scannell
CW Staff

ATLANTA — Third-party leasing is something a lot of users don't get involved in because they're afraid, Ken Brindle, vice-president of International Computer Negotiations, Inc. said here recently at Computer Expo '78.

A well-negotiated third-party lease is generally less expensive from the user's point of view. Most lessors offer a structured payment plan that is "pretty much limited to the creativity of the person putting the arrangement together for you," Brindle remarked.

Third-party leasing is basically an operating lease whereby a user pays for use of the equipment rather than for the hardware itself, he explained. "The manufacturer is happy because he gets his money Day One, the user's happy because he's actually paying less and the leasing company is obviously happy or it wouldn't be in the business," he said.

One third-party leasing plan is called a step lease; it allows users to contract for computer equipment at staggered prices. For instance, equipment that might normally cost the user $15,000/mo can be acquired for payments that amount to $9,000/mo in the first 12 months, $12,000/mo in the next 24 months and jump to $18,000/mo in the final 36 months.

This way, a user's payments increase as his profits increase — making less of a strain on the company's books, Brindle noted. The plan can also be used in reverse — higher payments to lower — for companies with a firm financial foundation.

Knowing a lessor's residual rates, or the amount of return on equipment, is an important factor of third-party leasing, Brindle said. "What you need to know when you negotiate a third-party lease is the same thing you need to know when you go to buy a car," he observed.

This includes the purchase price of the equipment, the annual interest rate involved, whether there is a residual rate and, if so, how much.

The important thing is that users examine the entire package and see just what they are paying for, Brindle stressed. Residual rates vary from lessor to lessor because each has bought the equipment at a different price.

It's not unusual to find a user paying for $1 million worth of equipment that, in fact, cost the lessor $750,000, Brindle pointed out.

The Negative Side

There are, of course, some negative aspects in third-party leasing, Brindle stated. For one thing, the contract usually involves making a commitment of five years or more.

Before anything is signed, a user should examine the future of his organization and its anticipated growth because entering into a lease too soon can sometimes prove to be a heavy financial burden, Brindle said.

Upgrades, as a part of third-party leasing, are usually "less difficult and more expensive," Brindle explained. A user who wants, for example, a later model disk drive as a replacement for the device he originally leased must first "pay the balance on the equipment already installed, then start paying on the new equipment."

Difference in Dates

In entering into contracts with users, lessors often distinguish between "pre-commencement rental days" and the actual "installation date" of the equipment, Brindle continued.

A user's lease, according to some contractual provisions, begins on the first of the month if the equipment is installed on that particular date or on the following initial monthly day. If the equipment is not installed on the first, a lessor may charge the user for the days before the following month.

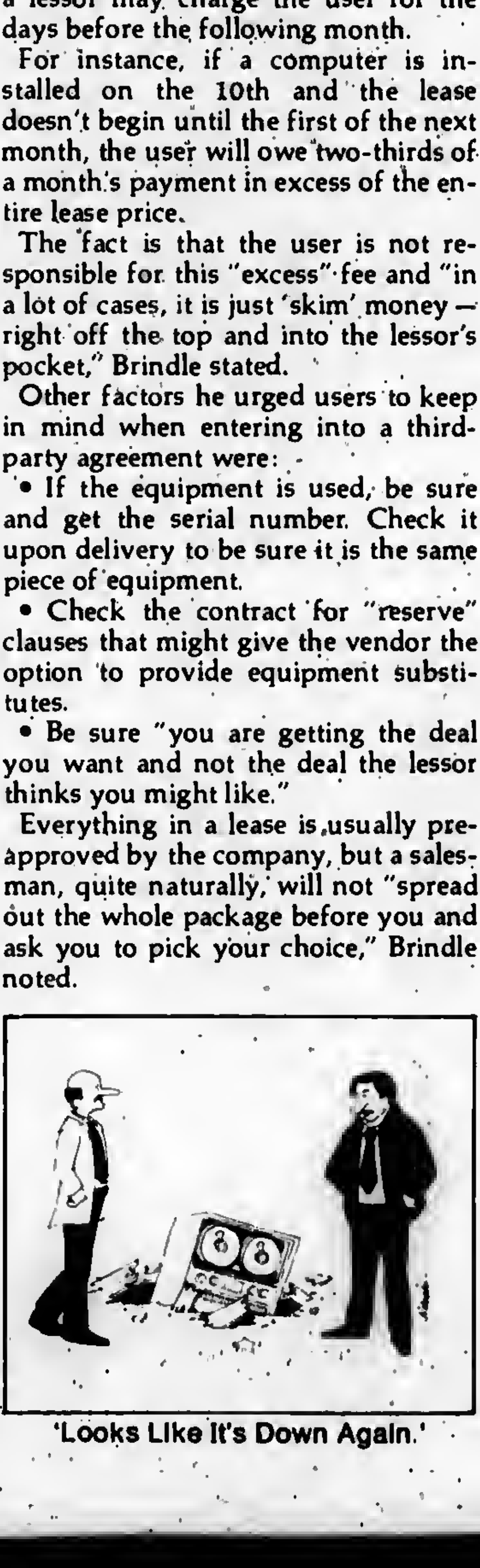
For instance, if a computer is installed on the 10th and the lease doesn't begin until the first of the next month, the user will owe two-thirds of a month's payment in excess of the entire lease price.

The fact is that the user is not responsible for this "excess" fee and "in a lot of cases, it is just 'skim' money — right off the top and into the lessor's pocket," Brindle stated.

Other factors he urged users to keep in mind when entering into a third-party agreement were:

- If the equipment is used, be sure and get the serial number. Check it upon delivery to be sure it is the same piece of equipment.
- Check the contract for "reserve" clauses that might give the vendor the option to provide equipment substitutes.
- Be sure "you are getting the deal you want and not the deal the lessor thinks you might like."

Everything in a lease is usually pre-approved by the company, but a salesman, quite naturally, will not "spread out the whole package before you and ask you to pick your choice," Brindle noted.



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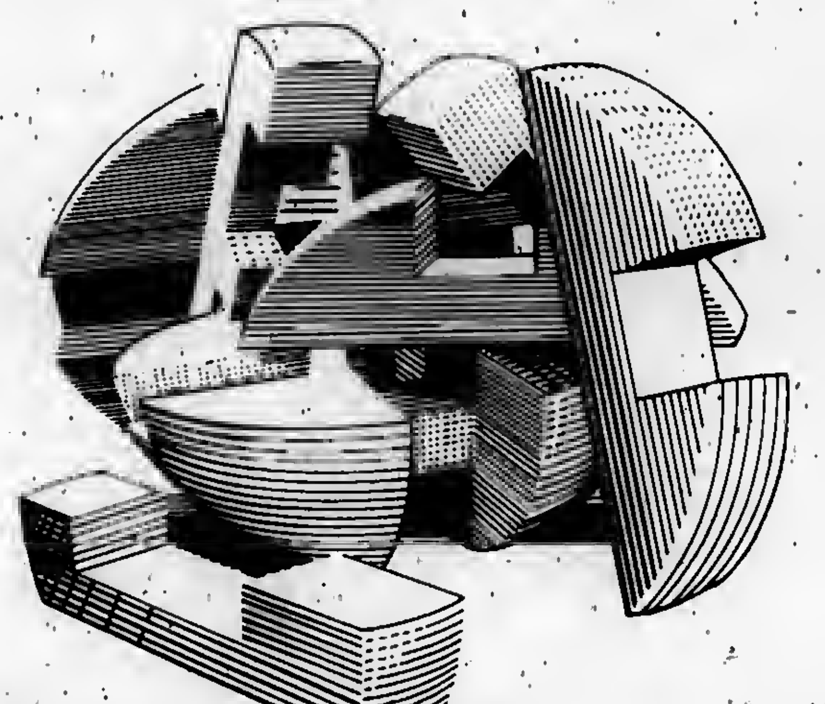

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Machines Not Only Concern

Managers Held Responsible for Their 'Teams'

By Tim Scannell
CW Staff

ATLANTA — Most DP centers are managed like a football team whose coach isn't familiar with all the members and the players themselves aren't even sure who the other players are, according to Jack Stone, managing director of Computer Education International and a *Computerworld* columnist.

Speaking at Computer Expo '78 here recently, Stone said the primary duty of a manager within a DP environment is to act as the referee or intermediary, between the people inside and outside the computer room. Unfortunately, most managers have become so involved with the technology and sophistication of the computer industry that they have forgotten how to deal with people on a personal and humanistic level, he added.

People-Oriented Manager

Stone cited as an example a company that went through six DP directors with no noticeable improvement in the production level of the shop. The company finally hired a manager whose only qualification, aside from his experience, was that he was "a leader of people," Stone recalled.

This "unique" manager referred all of the technical problems to his technical staff while he focused his attention on people. He organized nontechnical meetings during which employees could talk about "human" problems, assignments, career paths or anything else on their minds.

The result was that morale was boosted, interest and pride were renewed and production increased, Stone observed.

Before a manager can start managing, he must stop the in-fighting among his employees, Stone noted. As an example of this "firefighting," Stone highlighted the relationship between operators and the programming staff.

Operators love DP until "they find out they are being accused of failures of the system to output on time," Stone explained. "That's when they get disillusioned."

Corporations don't recognize operators as professionals or supply necessary training, "yet they will hire some 17-year-old kid, sit him in front of a 168 and let him alone on third shift, where he is virtually running the organization," Stone said.

Operators, contrary to what management might think, view themselves as professionals and feel they, too, are entitled to all the physical "trapping" given to systems programmers. These benefits include a desk, a sign embossed with their name, piped-in music, current editions of the operational manuals and, most importantly, the opportunity for career development, Stone said.

Another problem that arises between operations and programming is the "culture conflict," or clash of the higher echelon with the lower. "Systems programmers like to view the machine as *theirs* because they have the responsibility to keep the hardware/-software going. On the other hand, operators view the computer as *theirs* because, after all, they operate the machinery," Stone stated.

When the system fails, however, both parties try to shift the responsibility and disown the system, each blaming the other for the problems.

There are several things managers can do to stop or at least diminish the in-house fighting, Stone said. First, the manager must not take on any new work until the present operations are in order.

"If you can't do well what you are doing now, any additional work will make what you're doing that much poorer," Stone noted. "Until you can stop the workflow, get control of what you're doing at the moment and set up procedures for accomplishing new things, managers will never stop the fighting."

Second, a manager must convince personnel that even though they are part of the team effort, "they also have the ability to express themselves as individuals." Employees should be given the resources and the time to accomplish assigned jobs, Stone said.

Third, everything that happens within the DP center should be done according to a master schedule that is readily available to everyone.

Proper project controls and rules should also be established within the DP environment, but for reasons other than control of the personnel, Stone stated. "Controls are established to ensure that people have the opportunity to turn out high-quality work and to make sure that management doesn't screw up the work schedule."

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MIS Managers' Planning Needs Seen Growing

By Nancy French
CW Staff

ATLANTA — The director of management information services (MIS) whose company will be truly prepared for its future information needs won't be worrying about whether to install System A or System B — he will be planning and tying together the entire information resources of his firm.

That was the view expressed in the keynote session at Expo '78 here last week by Robert Swid, a consultant with Booz, Allen and Hamilton's Washington, D.C. office.

Effective information resource management (IRM) requires formal strategic planning, he said.

In the next five years, managers who only a few years ago were concerned solely with computer system selection will see digital telephones and the ultimate melding of voice and data into input and output digital streams, he said.

The recent introduction of new smart facsimile and optical character recognition terminals will trigger the electronic mail room, he said. Further, teleconferencing — with video, audio and computers — will allow a whole new set of information for simulated face-to-face communications, eventually even between offices and residences.

Smart micrographics, the blending of microfilm and other image techniques with computer technology, the laser printer and portable communicators will be a part of that picture, he predicted. Even so, most of an MIS manager's efforts will focus on the development of what Swid called "interactive workstations."

These workstations will come in three categories: one version for managers and their assistants; a second, specialized version for clerks, typists and others who work "in more of production mode"; and a third for professionals such as programmers, actuaries and designers who need interactive computers and information retrieval support.

The workstations will be used for information transfer, such as correspondence status reporting and commentary; interactive exchange, such as conferencing, inquiry, problem-solving and education, and convenience applications such as message handling, time scheduling and activity recording, Swid said.

Such workstations will require "fairly complicated sets of networks," he said, describing one such network as interorganizational, allowing companies to exchange information with one another electronically.

Four-Phase Plan

To distribute these resources effectively, the MIS manager will need a complete understanding of his organization's business objectives and must integrate them into a four-phase strategic plan, Swid explained.

Phase I involves setting strategic objectives. Some might include growing selectively in certain markets, reducing operating expense ratios and improving customer service.

The IRM function then translates these business needs into a series of strategic objectives that will apply over the next five years. These might include such goals as improving the level of management information systems, reducing operations expenses, raising productivity and enhancing the flexibility of the systems already in place.

Phase II involves using the system strategic objectives that have been developed to "creatively explore the various options that exist." This is done based on a knowledge of the technologies that may emerge in the next five to 10 years together with an objective assessment of the strengths and weaknesses of the existing DP organization, he explained. From here, the MIS manager will be able to derive a set of strategic issues to be addressed.

"What mix of systems activities will be the most rewarding in the next several years? Should the organization tilt toward building brand new stand-alone systems or, on the other hand, toward developing a single integrated system based on expanding existing systems?".

There are also some "what-if" questions to fold into the mix including "What if the business does not grow as fast as management expects? How would the plan be affected by inflation or depression?"

Phase III involves rating each particular opportunity in terms of its cost/-benefits relationship and its fit with available resources, he said.

The manager who encounters a project with a very high cost/benefit payback that may be inappropriate to implement at a given point in time because of a weakness in the organization or lack of appropriate resources might wish to defer that project for several years and build the strength in the organization that is needed to tackle that particular opportunity, he said.

Only then does Phase IV — system selection — come into play.

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Calendar

May 10, Bloomington, Minn. — **Region IV Conference**, sponsored by the Data Processing Management Association (DPMA). Contact: Northwest Chapter DPMA, Box 9566, Minneapolis, Minn. 55440.

May 24-25, New York — **Telecommunications Networking Strategies for Distributed Processing Applications**, sponsored by The Yankee Group. Contact: Kate Cogswell, The Yankee Group, Harvard Sq., P.O. Box 43, Cambridge, Mass. 02138.

June 1-2, Arlington, Va. — **Managing Tomorrow's Information Technology: The Key to Improved Government Operations**, sponsored by the Federal ADP Users Group. Contact: USPDI, Conference Manager, 719 N. Belgrade Road, Silver Spring, Md. 20902.

June 1-3, Los Angeles — **A History of Programming Languages Conference**, sponsored by the Association for Computing Machinery's Special Interest Group on Programming Languages. Contact: Rorrie Ratkevich, Ground Systems Group, Hughes Aircraft Corp., 1901 W. Malvern, Mail Drop 606-K126, Fullerton, Calif. 92634.

June 5-6, New York — **Software Management Conference**, sponsored by American Institute of Aeronautics and Astronautics (AIAA). Contact: AIAA Conferences, Suite 1010, 5959 W. Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90009.

June 5-7, Chicago — **Pattern Recognition and Image Processing Conference**, sponsored by the Institute of Electrical and Electronics Engineers (IEEE). Contact: IEEE, P.O. Box 639, Silver Spring, Md. 20901.

June 5-7, Chicago — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also in New York June 7-9.

June 5-7, Chicago — **Data Base Management Systems: A Comparative Analysis**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also in Philadelphia June 28-30.

June 5-8, Anaheim, Calif. — **National Computer Conference**, sponsored by the American Federation of Information Processing Societies (Afips). Contact: Afips, 210 Summit Ave., Montvale, N.J. 07645.

June 5-9, Atlanta — **Manual Systems: Fundamentals of Analysis and Design**, sponsored by American Management Associations. (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

June 7-9, Washington, D.C. — **Applied Data Communications Systems**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

June 7-9, Philadelphia — **Effective Computer Operations Management**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran N.J. 08075. Also being held June 19-21 in New York and June 26-28 in Washington, D.C.

June 7-9, New York — **Data Base Management Systems: General Concepts and Planning Guidelines**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 21-23 in San Francisco and June 28-30 in Washington, D.C.

June 7-9, Philadelphia — **Word Processing: Guidelines for Planning, Design and Implementation**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 14-16 in Los Angeles and June 28-30 in Washington, D.C.

June 7-9, Chicago — **Data Processing: An Introduction to Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 21-23 in Washington, D.C.

June 8-9, Washington, D.C. — **Data Communications: Advanced Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 21-23 in Chicago.

June 8-9, Philadelphia — **Minicomputers and Microcomputers: Selection and Usage Guidelines**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 22-23 in Los Angeles.

June 12-14, New York — **DP Project Management: A Practical Approach**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held June 26-28 in Los Angeles.

June 12-14, Denver — **Ninth Conference on Computers in Undergraduate Curricula**, sponsored by the University of Denver. Contact: Dr. William Dorn, Department of Mathematics, University of Denver, Denver, Colo. 80208.

June 12-16, Helsinki, Finland — **Seventh Triennial World Congress**, sponsored by the International Federation of Automatic Control (Ifac). Contact: Ifac 78 Secretariat, POB 192, 00101 Helsinki 10, Finland.

June 13-15, Zurich, Switzerland — **Minis and Microcomputers and Their Applications and Computers in Banking (Mimi 78)**. Contact: Intercon-vention Congress and Convention Services Ltd., c/o Swissair, 8058 Zurich, Switzerland.

June 14-16, Washington, D.C. — **Linear and Nonlinear Model Fitting**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

June 15, Gaithersburg, Md. — **Reorganization of Federal Data Processing**, sponsored by the National Bureau of Standards. Contact: Charles Bridges, 151 Fleetwood Terrace, Silver Spring, Md. 20910.

June 18-20, Barcelona, Spain — **Computer Data Security Using Commercial Cryptographic Technology.** Contact: Charlene Woolard, Ketron, Inc., Valley Forge Executive Mall No. 10, Wayne, Pa. 19087.

June 18-22, Dallas — **1978 Government Management Information Sciences National Conference.** Contact: Charles L. Collier, Director of Data Services, Dallas County, 504 Records Building, Dallas, Texas 75202.

June 19-21, Atlanta — **10th National Data Processing Security Seminar,** sponsored by Data Processing Security, Inc. Contact: Jon Allen, Program Director, 235 N.E. Loop 820, Hurst, Texas 76053.

June 19-21, Las Vegas — **Fifteenth Design Automation Conference**, sponsored by the Association for Computing Machinery (ACM) and the IEEE Computer Society. Contact: ACM, 1133 Ave. of the Americas, New York, N.Y. 10036.

June 20-22, Geneva, Switzerland — **International Microcomputers/Minicomputers/Microprocessors '78 Conference,** sponsored by Industrial & Scientific Conference Management, Inc. (ISCM). Contact: ISCM, 222 W. Adams St., Chicago, Ill. 60606.

June 20-23, Barcelona, Spain — **First World Computing Services Industry Congress,** sponsored by Association of Data Processing Service Organizations (Adapso), European Computing Services Association and Japan Software Industry Association. Contact: Adapso, 210 Summit Ave., Montvale, N.J. 07645.

June 21-23, Toulouse, France — **Eighth International Congress on the Operating Reliability of Data Processing Systems,** sponsored by the IEEE Computer Society of New York. Contact: Comite d'Organisation du FTCF-8, 7, Avenue du Colonel Roche, 31400 Toulouse, France.

The CW Calendar generally appears in the first and second issues of each month, and events are listed a month in advance. All conference announcements should be sent to Calendar, CW Editorial Department, 797 Washington St., Newton, Mass. 02160, at least six weeks prior to the month in which the event is slated to occur.

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SBS: Catalyst For Action

By John Gantz

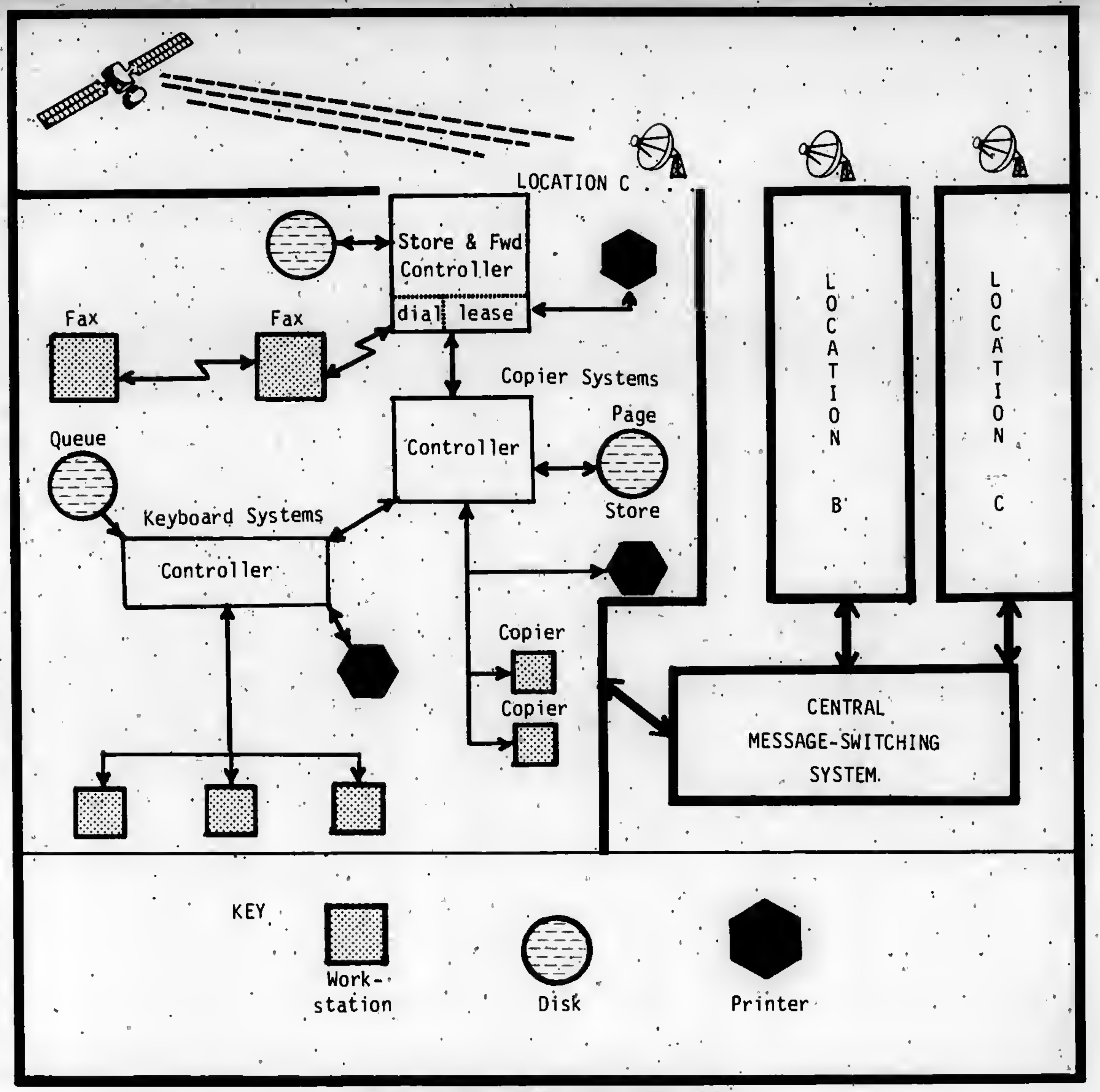


Figure 1. A Hypothetical Total SBS System

A decade after its inception as CML Satellite Corp., the entity now known as Satellite Business Systems (SBS) will begin beaming voice, computer and video information through the U.S. skies. Although the technology won't be radically new, the system capacity particularly great or the service unopposed by competitors — SBS is nonetheless unique for two reasons:

For one, it portends *new* applications of high-speed data transfer. Voice usage, a mainstay at first, will diminish in its share of the bit stream as teleconferencing, electronic mail, computer load-sharing and as-yet-undevised applications grow.

For another, SBS is a subsidiary of IBM.

Estimates of Demand

SBS' first users will come from a small coterie of large U.S. companies with immense long-haul voice and data traffic and multiple remote locations. As its target market, SBS chose 415 companies from the Fortune 500 and various Fortune 50 listings (800 companies) and set about to estimate demand.

Detailed case studies were made on 16 of the companies chosen and, after examination, the data on them was extrapolated to find the total market demand for satellite services among large commercial users.

From those studies came the SBS estimates of earth station and satellite voice-equivalent circuit demand presented to the Federal Communications Commission (FCC) in an April 16, 1976 amendment to its original filing of December 22, 1975. These are admittedly conservative estimates of demand.

After its initial 16-company market study, according to an article in the June 1977 issue of *Fortune*, SBS went to another 16 companies in its target market of 415 and performed some specific network analysis. Although SBS is close-mouthed about the results of these studies, *Fortune* reported the company's methodology was this: First, current customer data, mail and voice traffic and executive travel was analyzed; second, projections were made to 1979; finally, computer routines were used to determine the savings an SBS service of a particular configuration and traffic penetration could provide.

The "hard" savings reportedly turned out to be not so great — most companies have relatively few routes with enough traffic to support satellite use. Three of the studies showed only 15% to 20% of the companies' traffic would be eligible for SBS takeover, with savings at less than 5% of total communications costs.

SBS will therefore look to new applications to spur demand and, in fact, the company has been quite candid in admitting its success will lean heavily on them. SBS spokesmen talk of "acting as the catalyst" in generating new applications.

To buoy their contention that users will be ready to implement the new applications by the time its satellites are aloft, they cite the prevalent industry statistics on the growth of data terminal installations and the overall growth of data communications.

The total business communications market, for instance, grew from $14 billion in 1965 to $31 billion in 1974. It will reach $61 billion in 1980 and total more than $100 billion by 1985.

Emergence of Hybrids

The new applications SBS sees its system fostering feature the integration of separate communications systems now at hand and the emergence of hybrids. Today's labels for what might develop include electronic mail, teleconferencing and high-speed computer-to-computer communications (file transfer, load sharing, "virtual channels").

Typical equipment involved would include facsimile devices, store-and-forward controllers, image storage devices, remote copiers, satellite delay compensators, wall screen TVs, freeze-frame video devices, etc.

To foster the development of these new applications, SBS is proceeding along a two-fold path — explaining SBS possibilities to equipment manufacturers in hopes of spurring product development and educating users to the "soft" savings inherent in the new applications. Three specific examples of the new applications SBS hopes to nurture follow.

The technology is not particularly new or unique, but Satellite Business Systems promises to spur a new world of applications. In this chapter from an International Data Corp. Special Report, the author tells why.

On a sleepy Independence Holiday in July 1974, IBM surprised most of the industry by announcing intentions to make its first corporate acquisition in over a decade. The purpose of the acquisition would be to enter the domestic satellite communications business, recently opened to competition by the Federal Communications Commission.

Today that intention has been realized by IBM's partnership in Satellite Business Systems (SBS), a descendant of CML Satellite Corp. CML was formed as a joint venture in 1971 by MCI Communications Corp., Lockheed and Comsat General Corp.; IBM bought out MCI and Lockheed.

Under an FCC order, IBM and Comsat took in a third SBS partner. That partner is Aetna Casualty and Surety Co., a subsidiary of Aetna Life.

SBS' filings with the FCC proposed a switched digital system for private-line (intracompany) transmission of voice, data and image. It is a system with significant differences from today's commercial satellite systems:

- **The SBS system will use a higher-than-normal frequency for transmission, permitting the use of smaller rooftop, courtyard and parking lot antennae. These, in turn, will reduce the need for local or regional terrestrial loops.**
- **The SBS system will be all-digital, even for video transmission. By using time-division multiple-access techniques, it will allow users to adjust dynamically their network capacity to meet changing traffic patterns.**
- **The initial system will feature two satellites aloft and one spare on the ground. It s initial capacity will be I/O transponders capable of 43M bit/sec . . . about the equivalent of 12,000 to 14,000 voice circuits.**
- **The unattended earth stations will each house, in addition to the necessary transmit/receive radio frequency equipment, a burst modem and a communications controller. The latter, made by IBM, will act as an intelligent interface between the user's and SBS' networks.**

SBS expects to be one of the first commercial users of the National Aeronautics and Space Administration's (Nasa) Space Transport System (The Space Shuttle), with launch scheduled for the summer of 1980 and commercial start-up in 1981.

One of SBS' early marketing, research and user education efforts has been Project Prelude, a three-month experiment held last year in which actual SBS-type applications were tested on the Nasa/Canadian CTS satellite. More experiments have ensued and more are bound to follow.

This year SBS will report its first operating income — from preoperational services supplied to IBM for testing purposes.

ELECTRONIC MAIL

Among its 16-company studies, SBS looked at the potential for electronic mail — electronic store-and-forward systems for *intra*company information distribution. In its workstation surveys, SBS' Tom Rush said at a Yankee Group seminar last year, the following statistics were unearthed:

ORIGIN

40% = Documents Handwritten
40% = Documents Typed
13% = Documents Dictated
6% = Documents Self-Composed
1% = Documents From Dictating Equipment

PROCESS

50% Documents = Letter/Memo
35% Documents = Forms
10% Documents = Messages
5% Documents = Reports

From 50% to 80% of the documents could be captured in electronic form; 20% to 50% were facsimile-eligible. Fifteen percent exhibited special characteristics and were ineligible for capture.

As for company mail overall, SBS found 50% of all mail was *inter*company (first class and priority). Forty percent (first class and priority) was *intra*company, 10% fell into other categories. Eighty-six percent of *intra*company mail was considered "satellite-eligible."

According to SBS scenarios, an electronic mail system (Figure 2) could evolve along three convergent lines:

- Separate facsimile systems evolving into clustered systems, then to store-and-forward systems with disk on the controller. (Systems like the recently announced Graphic Sciences, Inc. Dex-5100 already have some rudimentary store-and-forward and copier capabilities.)
- Keyboard document systems (IBM magnetic card) evolving to clustered systems with controller and storage replacing, separate magnetic card files. Text editing and high-speed printing could be added, however, thanks to the increased intelligence of the controller.
- Disparate copier systems evolving along the same controller/storage route, . . . adding electronic collating and reduction/enlargement. Scanning becomes a one-shot occurrence, and magnetic card units can become input devices to the copier controller.

Eventually these systems could be interconnected, especially the distributed fax units to the copiers and the keyboard systems to one another. Such interconnections allow the removal of redundant equipment — extra magnetic card units and printers — and provide the advantages of an integrated in-house system.

Once the in-house systems are in place, the next step is to interconnect separate locations within a company. Presto, the copier/fax/word-processing system becomes an electronic mail system.

TELECONFERENCING

Another application, also with facsimile as an important ingredient, is the replacement of executive travel (and jet lag, lost time, etc.) through the use of a mix of video and audio equipment: teleconferencing. At its simplest, teleconferencing is a basic conference phone call; at its most complex, it can include full-color motion video, image storage and retrieval, high-speed facsimile and remote computer access.

Most teleconferencing will probably stress the hard-copy transferral and freeze-frame video over full-motion TV since bandwidth requirements — and hence costs — are much less for still-frame and limited-motion transmission. (Figure 3).

The devices SBS envisions being used in a teleconferencing set-up — based on current teleconferencing systems and current on-the-shelf technology — include:

- **Document scanner** — makes up the input half of one of today's fax units. Scanners, which would have to operate at less than .5 sec/page, scan full pages and possibly come equipped with multiple page feeders or open-scan capability, would drive the hard-copy applications. They could also be used in lieu of TV cameras.
- **Document data processor** — processes scanner signals and reconstructs received facsimile signals. A major

(Continued on Page 26)

(Continued from Page 25)

function of the data processor is to compress scanner signals — at a ratio of 10:1 — with an I/O data rate of 10M bit/sec and compressed data rate of 500 kbit/sec. Document processors currently operate as subsystems in fax units (and the needed compression ratios exist, although they have their price).

•**High-resolution image display** — displays detailed documents and information encoded by the document scanner. Although 1,000- to 2,000-line graphic resolution is currently under development, future component technology is uncertain. SBS sees teleconferencing as an impetus.

•**Hard-copy printer** — a memory-driven printer to provide hard-copy on demand from images displayed or stored on the TV display, high-resolution image display or teleconferencing storage media; also to be used with the document scanner for local printing. Throughput required, according to SBS: 1 page/sec.

•**Digital video encoder/decoder** — the analog-to-digital and digital-to-analog converter and compression/reconstruction device. Input could also come from a standard TV camera. For motion video, these units must operate at 6.3M bit/sec. Full-motion systems are still under development (still-frame systems are available today), and compatibility problems also exist.

•**Multi-frame image storage** — a random-access, 1- to 2-sec retrieval device for freeze frames, full-motion stills or document data. Currently, available devices include digital disk packs, analog video disks and micrographic units.

•**Wall displays** — TV screens along the lines of the Advent Corp. entertainment model, perhaps with larger screen sizes and better resolution. Cost is still a major hurdle, with $10,000 per unit an SBS goal.

•**Conference console** — the nervous system for the teleconferencing center. An alphanumeric display and standard equipment interfaces would be needed. All the required hardware is available today, although international standards and lower costs would be advantageous.

•**Image storage and refresh/display** — would drive the TV display and/or high-resolution image display and the hard-copy printer and provide interim storage for the image data processor. It would need to store three images at up to 3.8M bits and provide compatible interface speeds for real-time conferencing. A megabit product is currently available in the $2,000 to $5,000 range; future memory devices for individual workstations at less than $5,000 are desirable.

Teleconferencing applications are not new. The Department of Defense installed a system as early as 1959; SBS charted at least 15 other systems (not all still in existence) among government, large companies and universities. There are undoubtedly more.

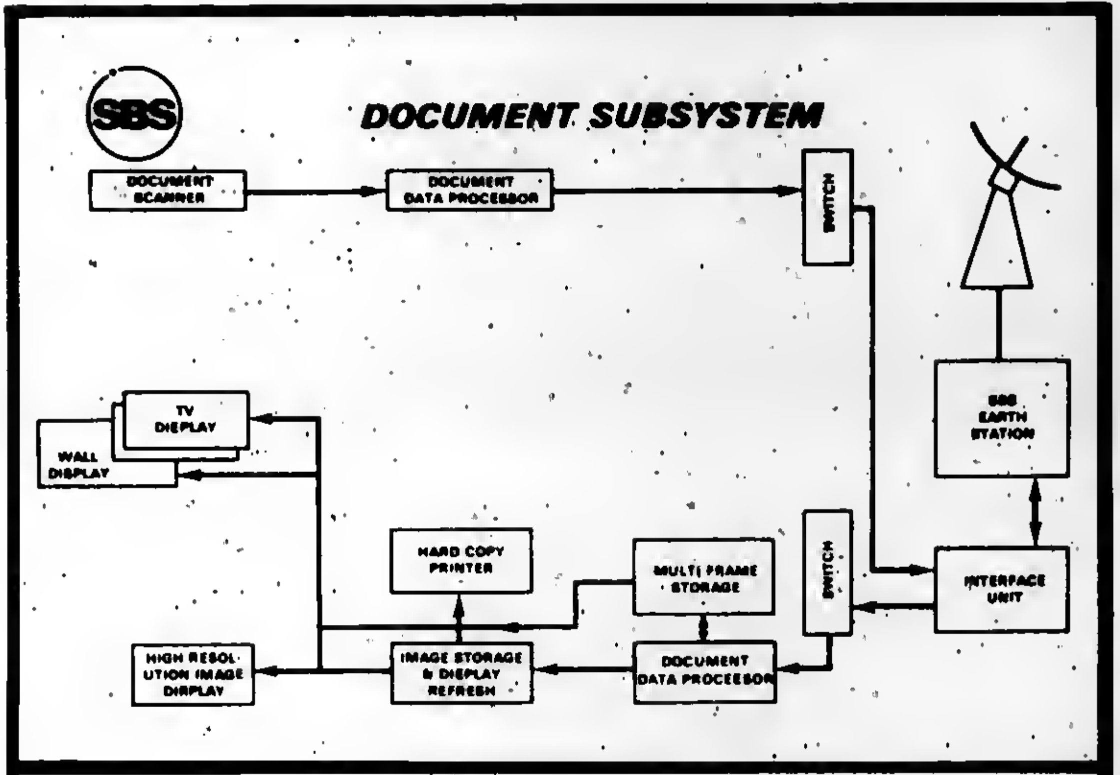
Besides eliminating the cost of some executive travel, teleconferencing has other benefits. Chief among these is meeting flexibility: 10 five-minute meetings cost as little as one 50-minute meeting. Follow-up is reduced ("I'll send that when I get back to the office"), and face-to-face (or at least face-to-still-frame) contact is available to more people.

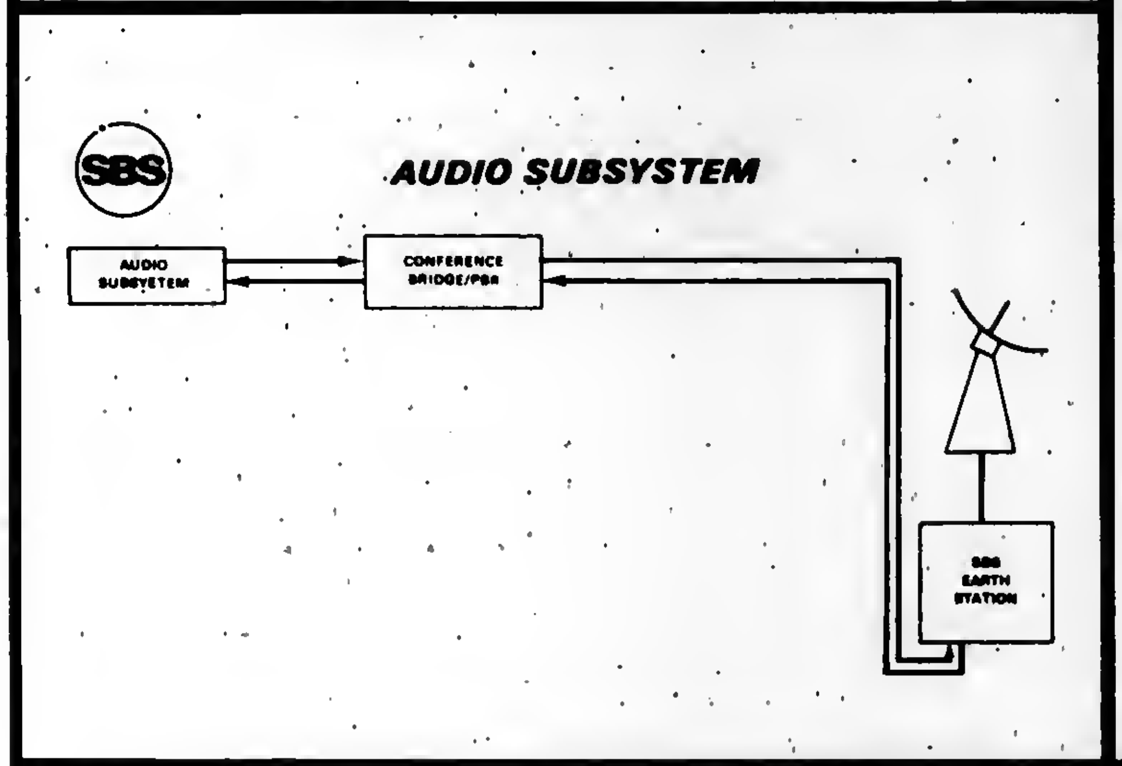
Personal Observations

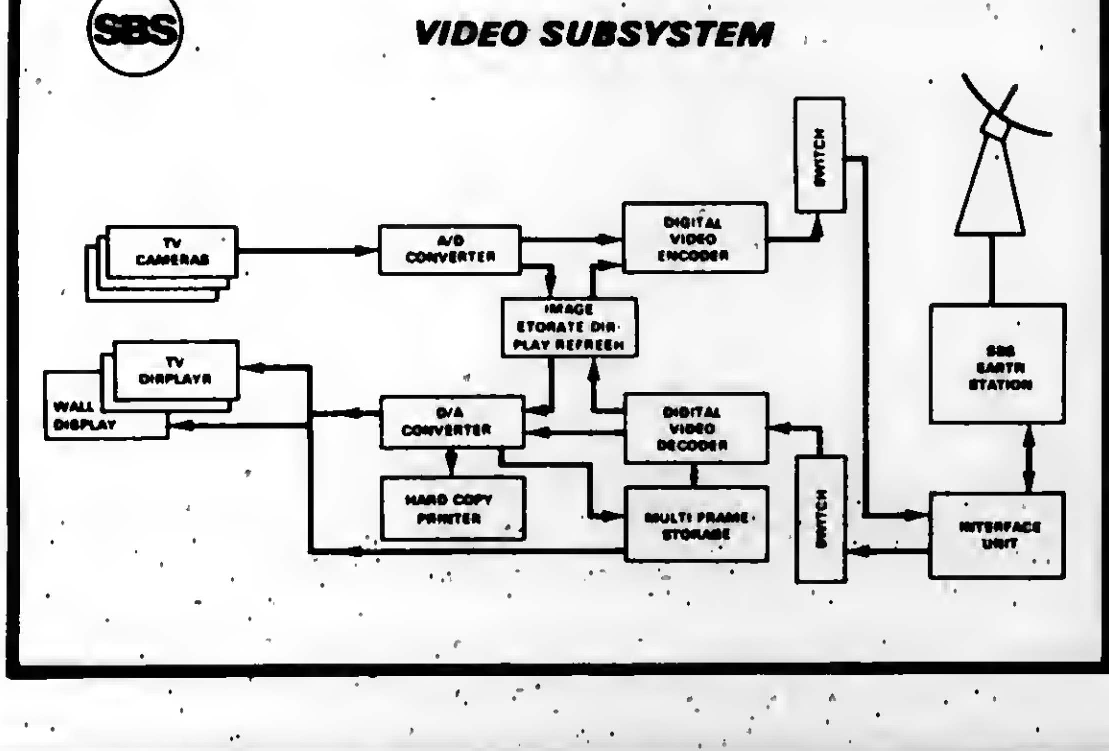
At a Project Prelude session at Texaco's Harrison, N.Y. site last December, I made these observations:

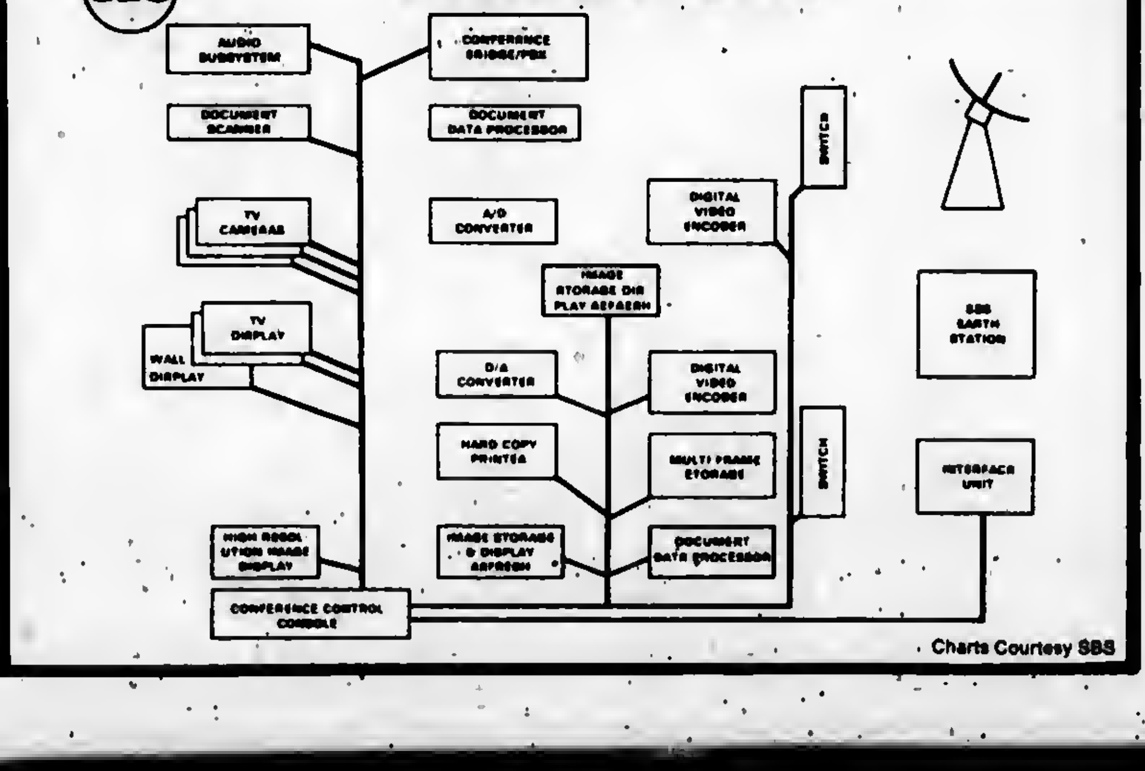
- Despite the sophistication of the users and participants, teleconferencing is still a rough-hewn affair. It's reminiscent of the early days of TV, when the news consisted of pictures of ticker tapes. New applications generic to high-speed digital-fed teleconferencing will probably grow slowly.
- According to SBS studies, teleconferencing works best when the participants know each other and the main objective is problem-solving or straight information exchange. It's appropriate for all management levels and works as well with impromptu meetings as with regularly scheduled ones. It's not suggested, however, for initial contacts, sales, delicate negotiations or personnel appraisals.
- The idea of a teleconferencing service bureau comes to mind...with sessions booked in advance, just as travel currently is, but with cross-country flight and jet-lag eliminated.
- One of the proposed benefits of teleconferencing — the ability to conduct impromptu long-distant visits — may be offset by control hassles over the conference facilities themselves. Which department gets to use the facility when, who authorizes the use, how is abuse prevented? (One of the *advantages* of travel vs. teleconferenc-

Figure 2









Charts Courtesy SBS

ing is the natural prevention of unnecessary trips.) Are the new applications necessary?

- Freeze-frame presentations aren't as weird or disconcerting as one accustomed to watching TV might expect (there's a whole hobby ham radio cult getting into it, by the way).
- Another disadvantage to teleconferencing over travel: equipment failures. And debugging *integrated* systems brings complications of a new order.

HIGH-SPEED COMPUTER COMMUNICATIONS

SBS executives consider high-speed data-exchange an area ripe for satellite services. Why? Why satellite communications in the first place? Why not good old terrestrial lines? Several reasons:

- Terrestrial lines are slow, with traffic generally limited to 4,800 bit/sec or less. Faster transmission requires special equipment, line conditioning or the bundling of circuits together. The SBS system will allow traffic at speeds up to 613M bit/sec.
- Land-based communications are necessarily point-to-point; diverse computers linked together would require through connections or links from one computer to another.
- With time-division multiple-access systems, satellites can offer distribution of capacity on a dynamic basis; costs can be allocated according to system usage.

"The implications of these facts," Dr. William Cook, Comsat Labs' manager of computer systems development, wrote in a recent Comsat publication, "are that it may now be economically feasible to consider establishing geographically dispersed networks of large computers communicating with each other at speeds approaching those at which the computers themselves work."

Cook sees advantages in near-instantaneous availability of large data bases at remote locations: "Obvious applications exist in the area of earth resources data collection, banking applications, electronic mail, communications in multinational corporations and organizations, data processing services and information retrieval and archival services."

Symphonie-Based Experiment

In a recent experiment unrelated (?) to SBS, IBM and Comsat hooked together two IBM computers in a 4,000-mile satellite link to test protocols, CPU performance and certain applications under high-speed transmission. The French-German Symphonie satellite was used, with transmission speeds of 1.544M bit/sec.

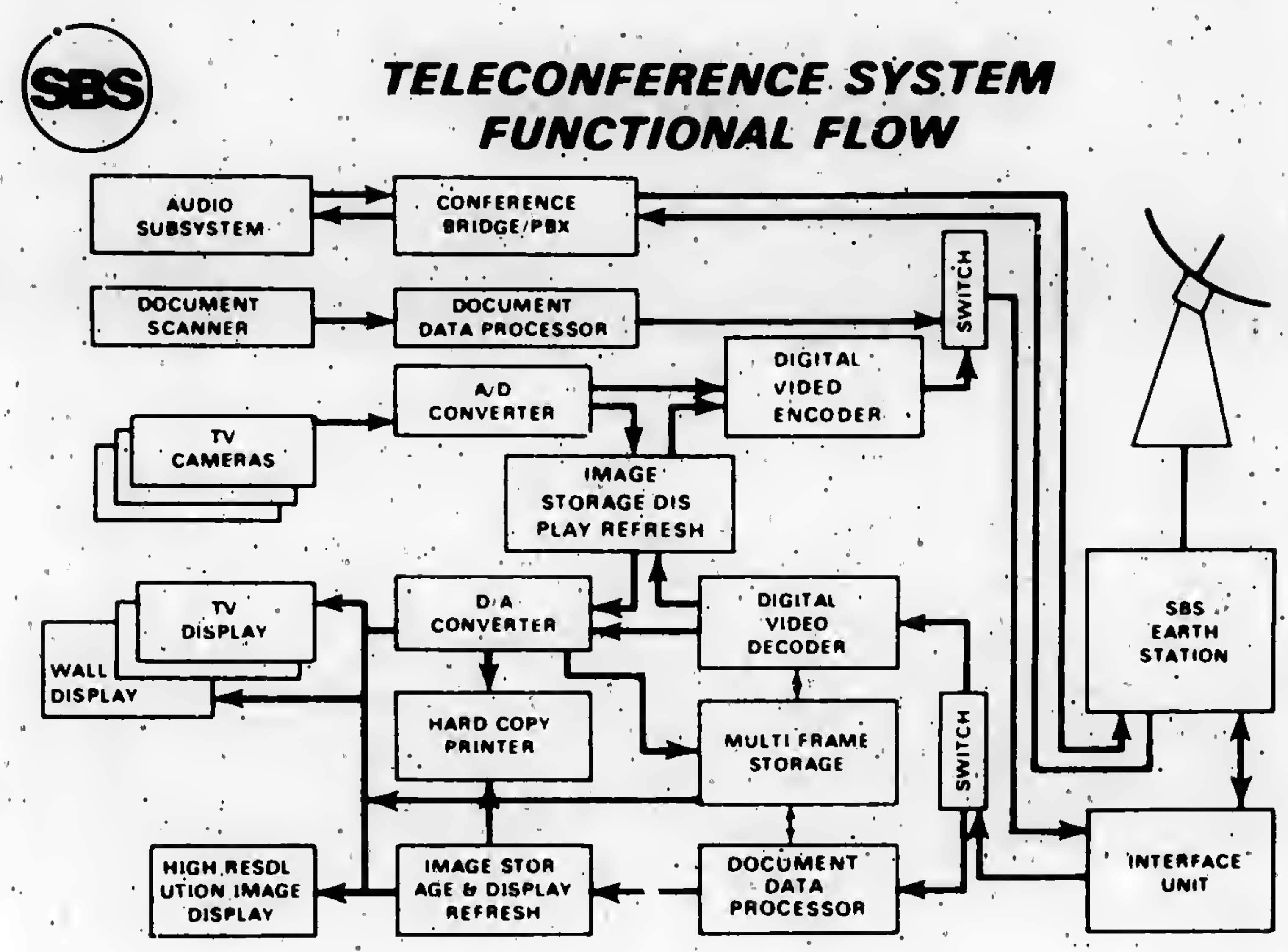
The system put together by IBM and Comsat is diagrammed in Figure 4. The Gaithersburg (Md.) 370/158 was a multiprocessor operating in stand-alone mode, the 158 in La Gaude, France, was a uniprocessor. Both had 2701 front ends which had been modified specifically for the 1.544M-bit transmission.

The modems were modified versions of terrestrial microwave equipment usually used for T-1 (AT&T's digital transmission system which operates at 1.5M bit/sec) channel applications. The Codecs are forward error-correcting devices, used to provide data as error-free as possible to the link.

One earth terminal, a 15-foot diameter rooftop affair which took less than a working day to erect, was provided by Comsat Labs; another was provided by the French postal, telephone and telegraph (PTT) authority and located in a parking lot. Its antenna was 16 feet in diameter.

The Symphonie system consists of

(Continued on Page 29)



The chart above, taken from a slide presented by SBS at its "Product Opportunity Conference" for teleconferencing vendors, depicts a full-blown intracompany system.

Several subsystems, diagrammed on the opposite page, interact to provide the teleconferencing function. Those subsystems include:

- The document subsystem for handling hard copy requirements, including storage and display
- The video subsystem for handling TV and freeze-frame requirements, also including storage and display
- The audio subsystem for transmission of voice traffic
- A control system for integrating the various devices and subsystems that includes a system console

Note that many of the devices serve more than one subsystem, and that lesser teleconferencing systems than that shown are possibile.

Figure 3

Chart Courtesy SBS

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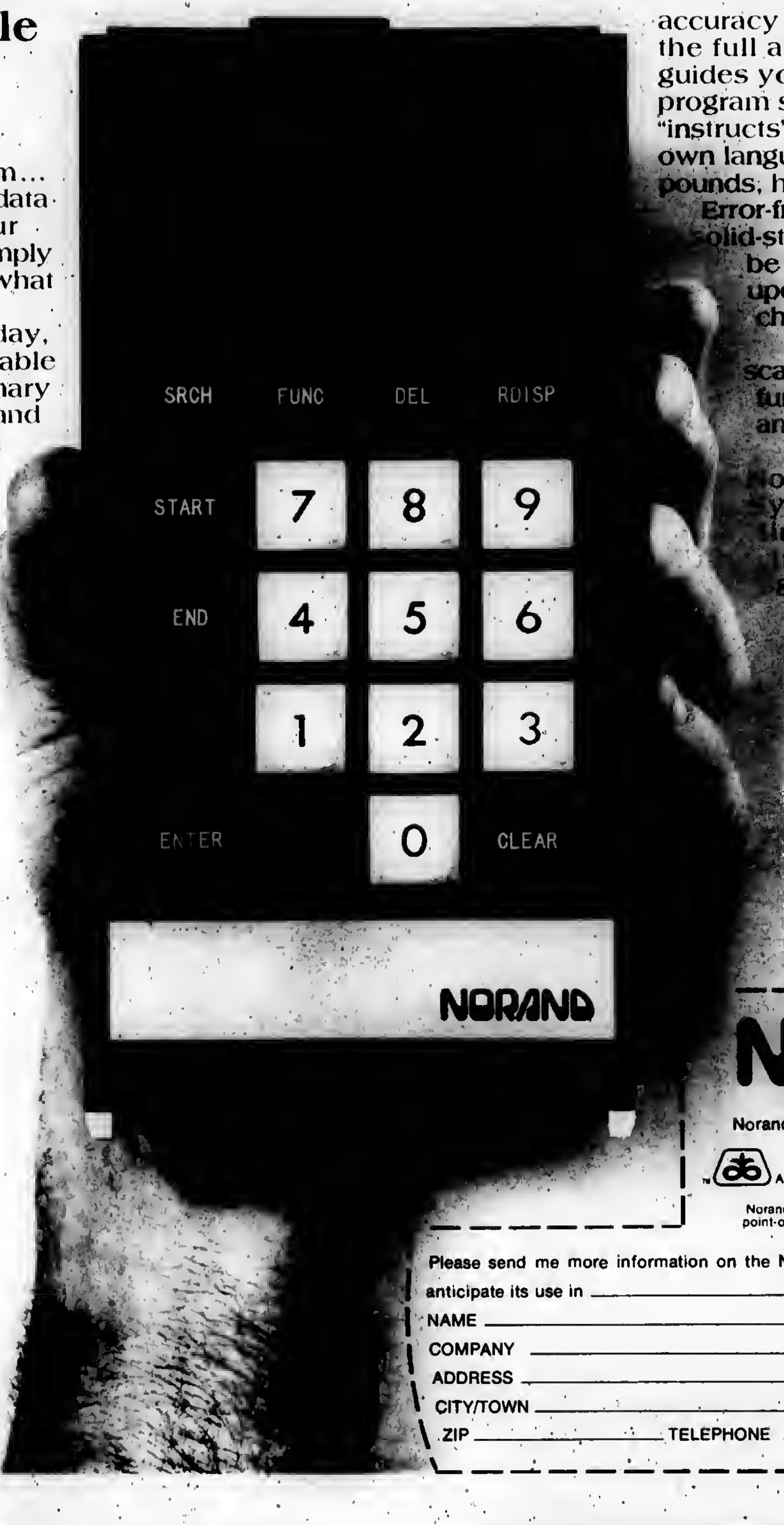

Telecommunicate over an ordinary telephone. Acoustic coupler shown here.

Optional wand scanner reads bar codes.

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(Continued from Page 27)

two telecommunications satellites launched in late 1974 and mid-1975 by the French and German governments. It operates in the 6/4 GHz frequency range, similar to most existing telecommunications satellites (SBS' will operate at a higher frequency).

The data link protocols used were various types of Higher Level Data Link Control (HDLC), with throughput measured on full-duplex and half-duplex transmission under normal and asynchronous response modes. Throughput efficiency of the HDLC protocol is a function of error on the transmission channel, propagation delay, HDLC frame size and the number of frames transmitted at once, response mode, error control technique and type of duplex operation.

Experiment Results

The results of the experiment showed that in achieving maximum throughput, the maximum number of bytes outstanding in the link is the most important parameter . . . *the number corresponds to the minimum buffer size required to store unacknowledged frames of transmitted data.*

With buffers ranging from 105K- to 205K bytes, depending on response modes, virtually error-free throughput approaching full-link utilization can be achieved (a bit error rate of 10^{-8}).

For very small frame sizes — the amount of data sent at once — it was noted CPU time per frame may become larger than frame transmission time.

The CPU time evaluations were based on measurements taken under experimental conditions, Comsat cautioned, and were affected by the experimental nature of the software used. That experimental software provided data collection capabilities far beyond the requirements of a practical user and thus isn't representative of the "real world." The results *were* used to compare HDLC formats.

There are two major contributors to CPU time: 1) the time required for HDLC protocol control functions, and 2) the time required to transfer the information content, which is proportional to the frame size. The experiment determined that the first of the two factors predominates.

Although IBM's and Comsat's plans were to assess the potential benefits of satellite transmission for certain computer applications — with measurements planned for interactive user response times, remote job entry, tape-to-tape transfer delays and load-sharing data set exchange delays — the test period was shortened and only the tape transfer tests (simulated high-sped fax transmissions) were made.

Comsat and IBM have now petitioned the FCC for permission to conduct a second phase of the Symphonie experiment, with a third earth station to add networking complexity.

Hurdles to Overcome

The hurdles to computer-to-computer communications via satellite can be summarized this way:

- Telecommunications protocols will have to be revised to allow for the propagation delay.
- Earth station costs so far are still high enough to preclude true multipoint setups.
- Interconnect equipment will have to be devised to handle protocols, timing, encryption and CPU-to-earth station connections.
- Terminals connecting directly to the earth station will also need some modification, according to SBS.
- Longer data block transmissions — needed to prevent error and acknowledgment protocols from throttling throughput — will require large buffer capacities. Mini-computer based nodes may be the answer.

For high-speed computer-to-computer communications to be *most* effective, according to SBS, direct channel-to-channel — or "virtual channel" — connections between remote computers will be required. These would avoid a lot of telecommunications overhead and allow dynamic transmission. But, at the least, large-scale data transfers will be facilitated by the higher bit rates.

For instance, a data base transfer that previously took several hours could take only three minutes. Such data base transfers would allow the establishment of regional — but completely up-to-date — data bases for cheaper local access.

A CONCLUSION

So far the satellite business has been an unprofitable one. Last year none of the carriers made a profit on an aggregate revenue base of $50 million to $60 million. This year it will be touch-and-go. On the historical side of it, SBS has a tough row to hoe.

The new applications will have competition, too. Bell's Advanced Communications system and the packet-switching specialized carriers will vie for data traffic; ITT, Southern Pacific Communications and the Graphnet Fax networks will compete in the electronic mail business; and the broadcast companies may well get into teleconferencing.

There's also plain old resistance to change:

- While high-speed fax is possible, vendor offerings are currently a hodge-podge of incompatible systems — even those under the same nameplate. With customer bases to protect, the established vendors may not be wont to introduce brand-new products.
- In high-speed data, how big a market for satellite-specific front-end processors must there be to generate new products? Will users just getting into minis and distributed processing want to centralize again, albeit with regional hosts?
- Will businesspeople really want to give up a chance to get away from the everyday routine . . . or at least, can they do without the personal contact denied by teleconferencing?

Addressing this resistance to change, RCA President Edgar H. Griffiths said to a group of security analysts in New York last November, in talking about RCA America's losses, "You might ask, 'Why hasn't the satellite become instantly or almost instantly profitable?' The answer appears to be that it is a new technology, and it isn't easy for a new technology to be accepted. It is going to take some time.

"In addition, there has been some very aggressive counterpricing by the Bell System on its land lines. We have a deep feeling that the satellite business will become profitable and that it will

(Continued on Page 30)

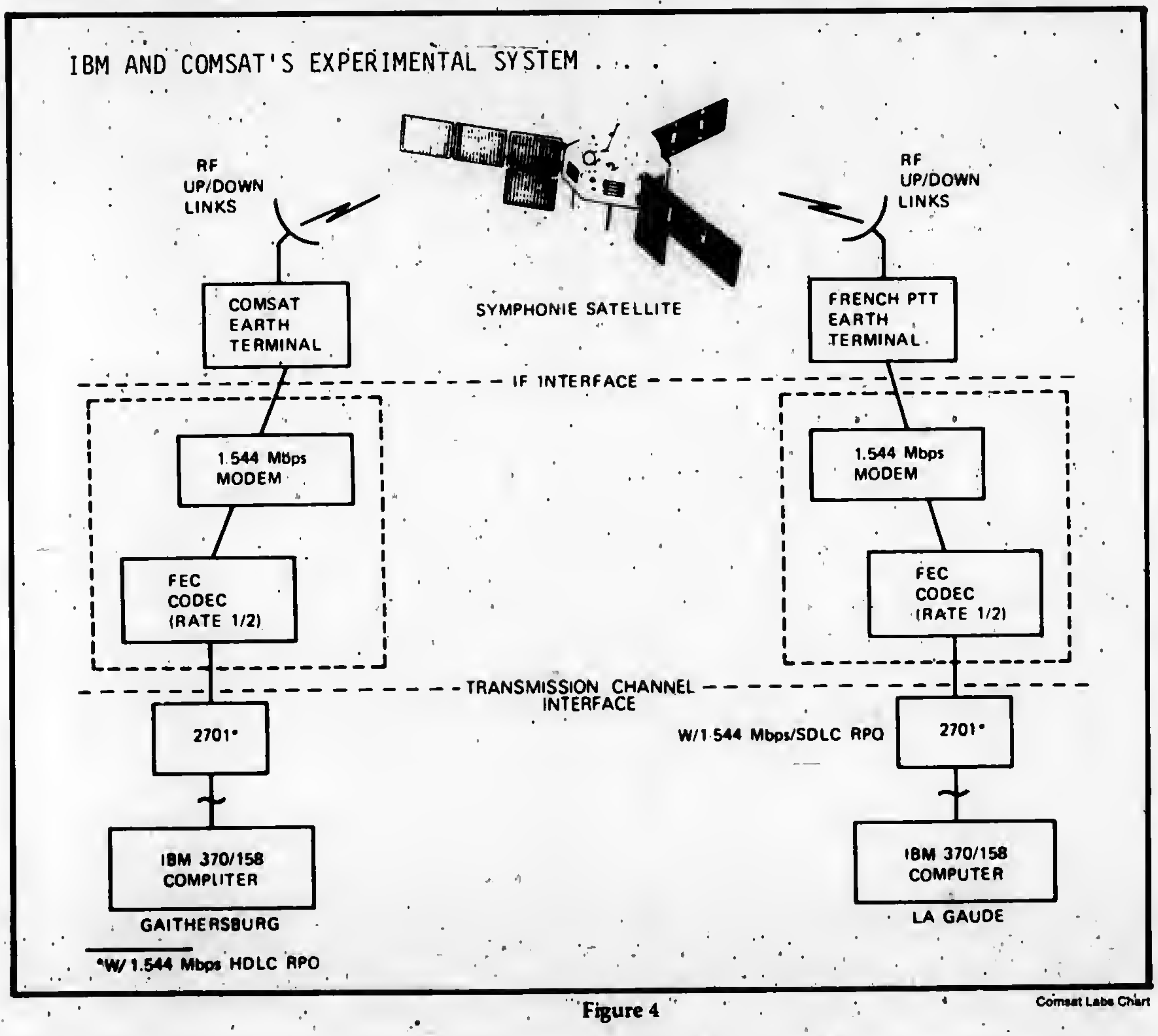


Figure 4

Comsat Labs Chart

To each his own.

Get off the routing list and on to the subscriber list.

CIRCULATION DEPT.
COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
797 Washington St., Newton, MA 02160 • (617) 965-5800

SBS: CATALYST Page 30

IN DEPTH

(Continued from Page 29)

become a vast business. It is simply taking longer."

Will SBS succeed? Probably. Behind the company is the financial muscle of its parent companies — not to mention their business. It's been estimated that IBM and Aetna could eat up a fourth of SBS' initial system capacity.

Behind the company is also the momentum of all that data communications growth. Aetna and SBS are now conducting experiments in teleconferencing using the Nasa-Canadian CTS satellite.

Other satellite carriers are hoping to make it with less innovative programs (this generation). All expect to be in for the long haul. And SBS initial target of 375 earth stations to pay for system costs is modest.

Will SBS succeed beyond this modest dream? That's another question.

CW Photo by R. Frank

John Gantz is one of the founders of the Distributed Processing Reporting Service and editor of "Distributed Processing Newsletter" at International Data Corp. (IDC) in Waltham, Mass. The former managing editor of "EDP Industry Report," he participants in IDC seminars and custom research projects in data communications and distributed processing.

Prior to joining IDC, Gantz was a freelance writer on topics ranging from the optical system of Polaroid's SX-70 camera to backpacking on the Appalachian Trail. He is a former officer on nuclear submarines and holds an A.B. from Dartmouth College.

A complete copy of "Satellite Business Systems: A Special Report" is available for $90 through Mary Trayte at IDC's Distributed Processing Reporting Service, 214 Third Avenue, Waltham, Mass. 02154.

NCC '78 THE RECORD BREAKER

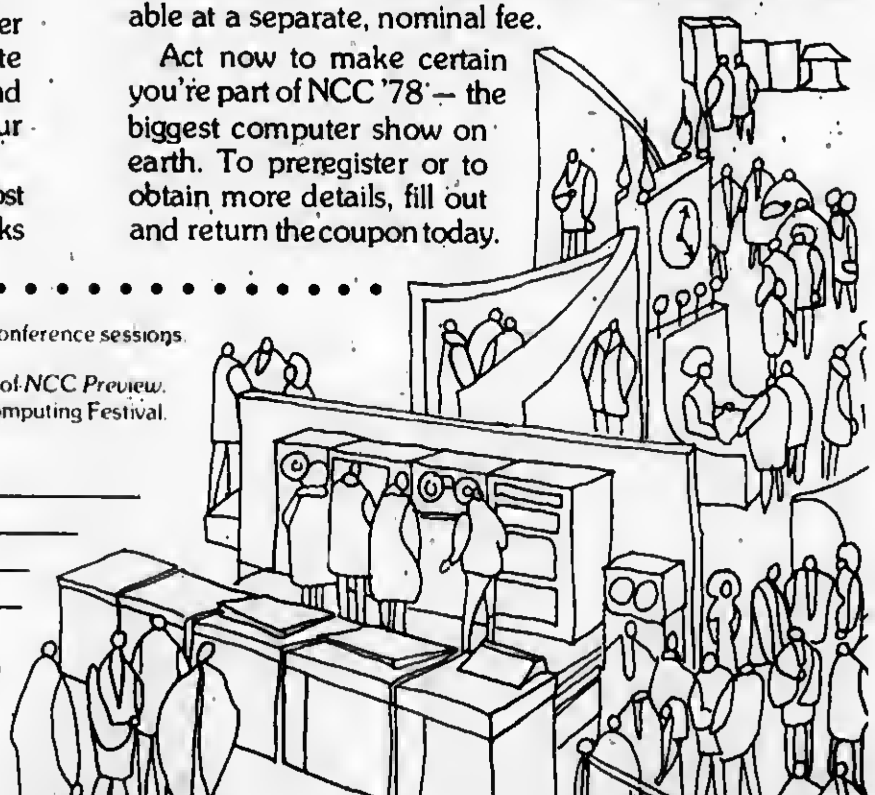
The 1978 National Computer Conference, June 5-8 in Anaheim, promises to be the largest and most diverse computer conference and exposition ever held. NCC '78 will combine the biggest with the best with a number of new NCC records expected... the largest exhibit of computer products and services ever held; total conference attendance of up to 40,000 computer specialists and information processing users; plus a Personal Computing Festival which will provide a unique national forum for this fast-growing field.

NCC '78 will be a rewarding learning experience for anyone with a need to know about the latest developments in computing and information processing. The conference exhibit program will be the largest single display of computer hardware, software, systems, and services ever staged. All exhibit space for NCC '78 is sold out, with more than 330 organizations reserving 1,382 booths — surpassing the previous record of 1,146 booths set at the '77 NCC in Dallas. More than ever, NCC will be an extraordinary showcase for the latest developments in computing with over 4,000 industry representatives on hand to demonstrate their latest products and services, provide technical and commercial data, and to help you find solutions to your specific needs.

The Personal Computing Festival will be the most exciting event of its type ever held. The Festival marks a first for NCC — a major conference-within-a-conference with its own program of approximately 30 sessions, commercial exhibits of consumer computer products and services, and a contest featuring "homebrew" microprocessor systems, devices, and applications. All Personal Computing Festival activities will be held in the Disneyland Hotel Convention Center, just a few minutes from the Anaheim Convention Center.

And there's much more. A technical and professional program of some 100 sessions will cover new frontiers in computer methodology, applications, systems, and societal concerns with emphasis on practical applications and current issues rather than on theoretical concepts. Special attention will be given to how the use of computers can help alleviate the national energy problem. In addition, a Professional Development Series of 15 seminars will feature topics critical to increasing professional skills and aiding in career development. Each seminar will be available at a separate, nominal fee.

Act now to make certain you're part of NCC '78 — the biggest computer show on earth. To preregister or to obtain more details, fill out and return the coupon today.



☐ I wish to preregister for NCC '78 and have enclosed $60 covering conference sessions, exhibits, other activities, plus preregistration benefits.
☐ Please send me all the facts about NCC '78, including future issues of *NCC Preview*.
☐ My company is interested in exhibiting at the NCC '78 Personal Computing Festival.
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NATIONAL –SPECIAL LEAR SIEGLER ISSUE–

INFORMER

May 1, 1978

RUMORED TO BE PART OF PROJECT X:

HUGE SHIPMENT HEADED FOR NCC?

Lear Siegler– A Leading Independent Terminal Manufacturer

Page 4

★ ★ ★

Committee Stalemated On Project X Decision As NCC Draws Near

Page 16

★ ★ ★

Project X Canisters Leaking

Page 11

★ ★ ★

$895 Dumb Terminal– To Make a Terminal Less Expensive, You'd Have to Make it Cheaper

Page 21

★ ★ ★

Project X in No Way Harmful to Human Life

Page 9

★ ★ ★

Ballistic Printer– Must See to Believe

Page 20

PROJECT X ROLLING

Mysterious LSI truck, reportedly loaded with Project X secrets, seen heading toword NCC. Truck is unmarked to confuse pursuers. INFORMER PHOTO

The INFORMER learned late yesterday, through a source located deep within Lear Siegler, Inc. HQ, that a shipment could already be on its way to the National Computer Conference (NCC). The shipment almost assuredly contains some of the wonder devices that LSI's Project X has been working on so strenuously and secretly.

The rumors that Project X was initiated to completely dominate the NCC through the deployment of astonishing new computer industry devices appears grounded in truth. New, smart terminals, a highly intelligent terminal controller, mind-fogging new printers, and even a complete data system seem destined to be revealed, INFORMER sources indicate.

Our informant at LSI HQ, severely hampered by doubled and tripled security measures in and around the hush-hush Project X, was able to leak few details, but they provided us with our first "hard facts." We were told of two new terminals being developed within the Project, each one capable of truly amazing exploits. Dubbed the ADM 31 and ADM 42 respectively, these incredible new devices are to be low-cost, smart editing terminals with microprocessor-based logic. Even as we sat listening, stunned, to this information over the telephone, our contact indicated he might be cut off at any time. Seconds after that, the transmission was, indeed, mysteriously terminated. Attempts to re-establish contact were futile.

Our informant's last audible phrases revealed a few titillating facts about the new terminals, however. It seems that the 31 will have two full pages of memory and function keys. What intricate functions these keys will actuate is something even the INFORMER will not know until further information becomes available. The 42, we also learned, is to have extended pages of data and additional RAM for its function keys. Even though the hard facts on these two new terminals were few, the implications are staggering, and it seems certain that LSI's dominance of the NCC is assured.

What other astounding revelations does Lear Siegler have planned for the NCC? What are the rest of the 31's and 42's awesome capabilities? Are the innuendoes that LSI is leaving the rest of the computer industry in

(Please turn to page 17, column 2)

Editorial

Loosening Old Ties

Users who loosely couple Amdahl Corp. and IBM CPUs are reinforcing the Amdahl assertion that IBM software is fully compatible with the non-IBM mainframes.

Not that proof was needed, but these coupled configurations give graphic proof that both types of CPUs can run the same utility software [CW, April 24]. Amdahl has admitted that a few changes had to be made in the error recovery code within the ASP utility, but this difference is essentially transparent to the user.

The commonality between these two vendors brings into focus the translators, conversion routines and other migration tools provided by many other vendors to wean a user away from IBM software.

There is no way to measure how many users have rejected non-IBM CPUs because of the significant software upheavals associated with their acquisition. The Amdahl/IBM compatibility has eliminated such headachas for these users.

The industry has lived for a long time with locked-in environments created by vendors to perpetuate their products. In software and data communications, environments have often heen contrived to give the user carefully defined but limited mobility.

In their heyday, the plug-compatible peripherals showed that commonality can be beneficial to both user and vendor. Perhaps it is time to transfer this concept, as Amdahl is doing, into other important areas.

Serious Flaws in Antitrust Laws

The decision by the U.S. Department of Justice not to ask for interim relief in its massive antitrust case against IBM is a good one; but it does point out the failures of the nation's antitrust laws.

The department decided against asking for relief because it felt such a request would delay the trial inordinately, not because it did not feel it has proved its case against IBM.

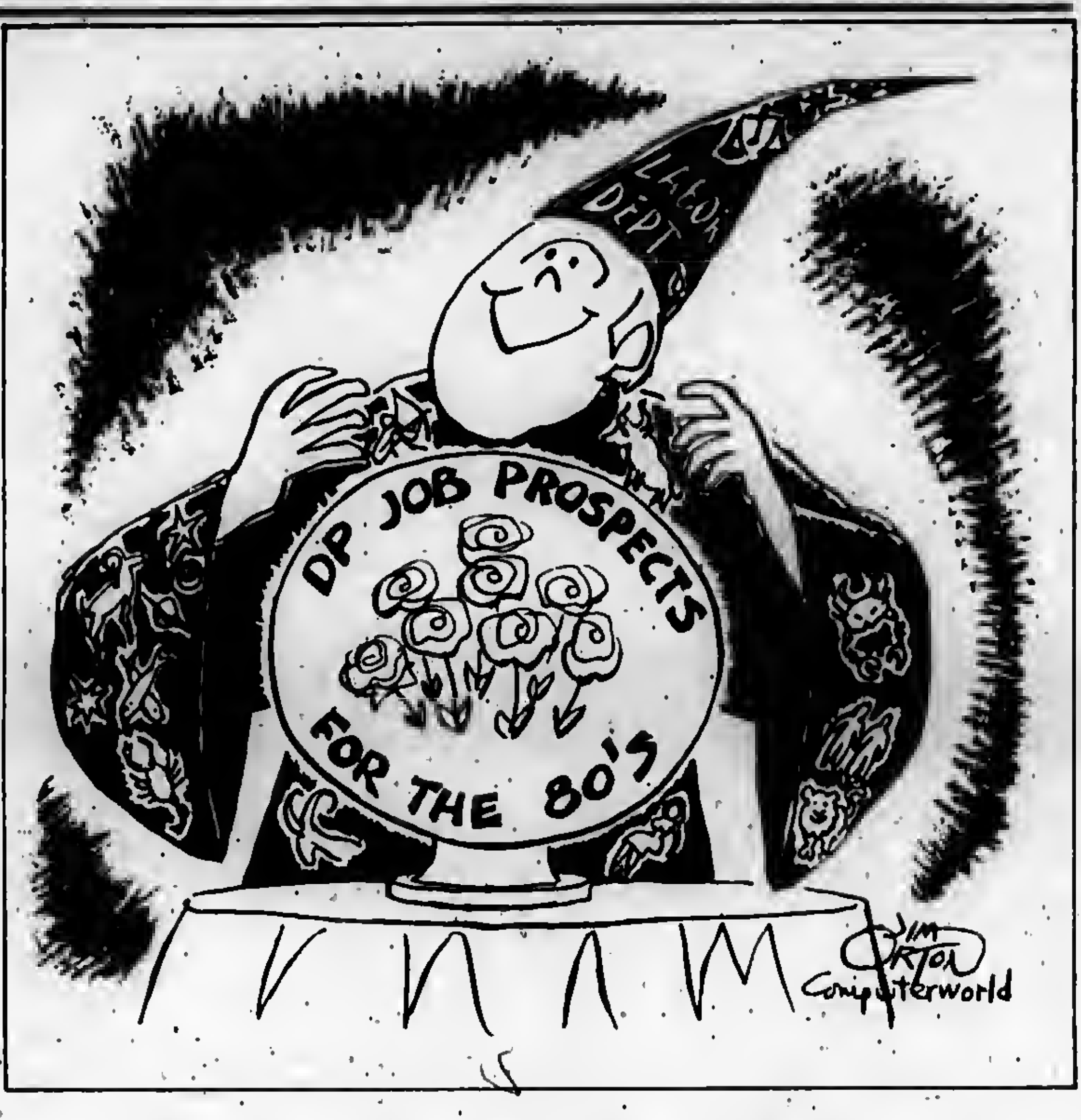
Clearly, there would have been a great deal of delay if the government had asked for such an order, and it is much better for it to pursue the whole case against IBM rather than waste time in stopgap measures.

But that decision shows once again how easy it is for a well-heeled corporation to delay the course of such a trial. The fact that IBM could have delayed the entire matter for up to a year if Justice had asked for interim relief shows there is something wrong with the antitrust laws.

It is in the interests of a corporation that monopolizes a market to delay any case brought against it as long as possible. After all, if the firm is truly a monopoly, it wants to keep earning those monopoly profits as long as it can.

The delays in U.S. vs. IBM — many caused by IBM maneuvering and some by government incompetence — have already taken up too much time.

If IBM really feels it is innocent of the charges, it should push for all possible speed in resolving the case and not try to slow the trial any further.



Letters to the Editor

Adding to Confusion

In the bantering in recent issues over the standardization of data base management systems (DBMS), thera has been continued reference to the "Codasyl DBMS standard." For the record, the Conference on Data Systems Languages (Codasyl) does not make standards; it is responsible for developing technical concepts and presenting them to the public domain as published specifications.

The writing of standards and handling of the approval procedure in the U.S. is the responsibility of the American National Standards Institute (Ansi). It will be up to Ansi to consider the Codasyl documents on data base management for establishing a DBMS standard.

When speaking before professional and university groups in the U.S., Canada and Europe, I have found the question of DBMS standardization to be an area of general confusion, and bestowing upon Codasyl the ability to make standards only adds to this confusion.

Norbert John Kubilus

Fairfield, N.J.

Biting the Hand

As usual, Harry Newton's presentations are "entertaining" and not entirely informative and accurate [Communications Managers Urged to Fix 'Mess,' CW, April 10]. Invariably, attendees receive a potpourri of gibberish and motherhood statements, with the usual helping of truisms. Newton's kettle is now boiling over (and so are many communications managers) with his inflammatory statements about the "worst-managed disciplines in North American industry."

Newton should spend more time talking with the professional communicators in the business — which, incidantally, are in the majority — before he advises the telecommunications manager to make tha voice manager "look like a fool." Why not take the opposite attack of establishing a strong rapport and working relationship for both groups?

They will eventually join forces to work together toward common goals — to improve service and bottom-line performance, while embarking on a program that is in concert with the corporate planning effort.

Clearly, the message for Newton is: Why bite the hand that feeds you?

Nathan L. Freedman

New York, N.Y.

Information for Handicapped?

I would like to obtain information about employment opportunity for handicapped people in the computer industry. Work experiences involving people afflicted with cerebral palsy would be particularly pertinent.

Any information received will be evaluated and passed along to interested high school students at the Massachusetts Hospital School here. Pleasa address replies to me at 3 Margaret St., Canton, Mass. 02021.

Your cooperation will be greatly appreciated by the students at the school.

Peter C. Melvin

Canton, Mass.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
May 2, 1973

LONDON — In an attempt to improve both the image and practice of data processing, the British Computer Society published a computer code of good practice. At the same time, the U.S. proposed a "code of ethics" that its proposers, the Government Management Information Science Users' Group, said should be implemented for all state and local government data centers, particularly those handling sensitive police information.

— — —

TULSA, Okla. — Because computer usars were turning to independent equipment at an ever-increasing rate in 1969 and 1970, IBM was forced to assemble a special, secret task force to try to determine how to stem the tide and kaep users in the fold, a member of that task force testified here at the Telex Corp. vs. IBM antitrust trial.

Eight Years Ago
May 6, 1970

ATLANTIC CITY, N.J. — The 36th semiannual Spring Joint Computer Conference was expacted to be bigger and better than ever, highlighting business-oriented minis. Attendance was expected to reach 40,000.

— — —

WASHINGTON, D.C. — A federal judge ruled that the Army could "collect, store and circulate" information on lawful political activities of civilian dissenters. Meanwhile, the Army announced the elimination of anothar computer-aided data bank and clarified its previous announcements on computerized data banks.

Humans, Not Machines, Make Judgments

The Human Connection

By Jack Stone
Special to CW

One of the great success stories in the recent history of the retailing industry is that of Venture Stores, Inc., a division of May Department Stores headquartered in St. Louis. Ventore, which consists of a regional chain of 27 stores, has expanded its revenue base from zero to more than $250 million in less than nine years.

For me, the mass consumer market has always evoked an image of total automation of the merchandising function.

However, when I had the opportunity to interview Robert Reznikoff, a divisional merchandise manager for Ventore who is responsible for four of the corporation's major product lines, I found a decidedly human approach to the process of selling to the consumer marketplace.

Q. Bob, how do you define 'mass merchandising?'

A. I see this process as the tailoring of the assortment breadth and the inventory depth of products to the trends of consumer demands while maintaining consistently high values and fair prices.

Q. What has been your background and experience in the field?

A. I have a B.S. in economics from the Wharton School of Commerce and Finance of the University of Pennsylvania. I gained initial experience as a naval officer operating naval exchange activities. I helped manage a family-owned chain of clothing stores until I left to join Ventore when it started.

Q. When did you first become a DP user? Did you have success?

A. I began when I was with the family business. We had a sophisticated system that used a dynamic inventory forecasting model as the basis for automated warehouse replenishment.

The system did a great job in increasing the in-stock position from about 60% to 90%, but the sales didn't get high enough to justify the system. In other words, we had a management problem; we improved our control over the store inventory, but the increase in profits didn't materialize. So we dropped it.

Q. I understand you were one of the key users of Venture's inventory management system when it was in early development. Has this system performed better than the one you just described?

A. It's doing a grand job. Oh, it's not perfect and getting changes implemented is always slower than we want, but the original design has held up well over the years.

Q. What are the primary capabilities of the current system?

A. The first is the ability to generate a weekly stock status report. This report provides sales and inventory information for all the staple items which have sales subject to forecasting over long periods of time. The report gives us, for each store and for all stores together, unit sales for the last week, the last 90 days and the results for the same periods last year. It gives us the sales figures for 90 days forward of this date last year, plus figures for units on order, including old, current and future orders. It lists total units on hand and on order. We also get monthly summaries for management analysis.

Q. And the next major capability?

A. The system has an important facility that helps us plan for seasonal items. Merchandising managers may assign two-digit codes to the basic stock number of an item as a descriptor that has sales forecasting value.

In our line of dolls, for example, we have assigned codes — we call them "trend numbers" in our business — for each doll classification; soft body infant, new-born infant, drink and wet, toddler, talking, walking, TV dolls and fashion dolls. Then we can obtain sales histories studies on demand.

Q. Can you use these same reports to detect consumer fads? For instance, how do you know when to jump on such bizarre merchandising bandwagons as the "pet rock"?

A. Our system provides some help. We look for rapid sales, particularly on a week-to-week basis. But we, also must use industry newspapers, field surveys and even my kids, who come home with some market intelligence.

This situation also says something about the computer machine and the merchandising manager: The machine can handle data and make decisions, but only the human can make judgments about events such as the fickleness of the consumer.

Contracts, Responsibility Need Clarification

The Taylor Report
By Alan Taylor CDP

It's a long way from Washington, D.C., to Kansas and even further from there to Honololo. Yet in one day last month I had three communications that added up to a single story. Lee Lewellen, an experienced DPer from Honololo, wrote about the fact that the damage DP professionals have caused in the past through error, neglect and faulty knowledge is now being challenged.

From Kansas, a different style of background in computers produced a letter from Dennis J. Molanphy. He has a master's degree in computer science and; as a law student, is interested in the question of how users and lawyers should interrelate. Basically, he argued that lawyers should be consulted before contracts are signed rather than after a problem is found. This is a very conventional view, but one that has some considerable difficulties in the real world of DPers like Lee Lewellen. Finally, from Washington came the news that the Federal Trado Commission (FTC) has become involved in the question of those H3 accounts used by Saks Fifth Avenue [CW, Dec. 26-Jan.2] and also in another question brought up by one of our readers: the correctness of entering as an immediate debit an order from a Sear Roebuck and Co. catalogue outlet, even though delivery has not been made.

The question of the H3 accounts has been brought out here more than once, but the Sears situation, the FTC told me, is related to the word "purchase" on the agreements. Does the purchase occur at the time the order is placed or does it occur when delivery is made, or at least offered?

There is no question that people do not like having to pay for undelivered items or orders they may have cancelled.

The writers from Hawaii and Washington represent two sides of an argument. The Kansas suggestion, from the middle, is undoubtedly where these two sides will eventually converge. Sometime, somehow, DP will get the type of contract a responsible lawyer can recommend signing.

Lawyers Reject Terms

I took a set of contracts with the various standard words not hidden in the fine print, but placed in the nice bold "limitations of liabilities" section and showed them to some lawyers. The I heard their horrified claims that they would never permit a client to sign such terms. These weren't lawyers specializing in DP who know how these contracts come to be signed, but they were good, solid practitioners with clients who have been signing contracts for computers, software and services for years, but have had no idea as to what the terms of those contracts were. I did this simply to confirm in my own mind that reader Molanphy's ideas are still not practiced by most users.

At the moment, it is such a seller's market for hardware and software that the things reader Lewellen is complaining about (errors, neglect, negligence and inadequate purposeful acts) are normally accepted as creating damage, but are exonerated and overlooked in our contractual items.

Yet there are signs of a changing attitude.

The FTC, in the matter of the H3 accounts, is moving as far as it can within the law to make firms refund millions of dollars to people whose credit balances have somehow vanished or become inaccessible. The agency is basing its actions in this matter on the principle that a computer program, unlike the actions of an isolated clerk in some department, must reflect the absolute policy of a firm.

And more and more people are understanding that sometimes damages to outside parties or to a firm are not the result of negligence within an installation, but instead are the result of errors and negligence by the supplier, who is currently protected by the wording in many contracts.

However, close scrutiny of a number of contacts is producing a lot of understanding as to the weakness of the contractual terms and the power of the common law concepts of fraud, innocent misrepresentation and product liability.

In particular, people are finding that while there are many protections built into the contracts, there are also many attacks. Also, while there are many measures the supplier can take to reduce or eliminate his liability, there are so few challenges to the procedures that they are often neglected.

It seems to me the trend at the moment is to pull these facts out from under the rug and admit even within a corporation that the current practice of putting millions of dollars at risk and exonerating suppliers from negligence is basically an unstable one.

At the moment the writers and the challengers of the contracts are working on a semantic level to discover what a person may or may not be exonerated from. But the important point is that these actions, with their wins and losses, are bringing out an understanding of the basic corporate irresponsibility in the face of the current seller's market.

There is no question that the reason DP professionals' errors, neglect and faulty knowledge have been overlooked by corporations in the past is that the DPers, if challenged, could have effectively pointed to the fact that their training came from the very suppliers the corporations had exonerated from responsibility. That would be too embarrassing to the corporation when it is trying to hold a system designer's nose in the dirt while having accepted such terms without a lawyer's approval (and even more embarrassing if a lawyer has given approval).

Little by little, the development of a less powerful supplier's market will give rise to an equal standard of responsibility for all DP experts and suppliers.

When this occurs, Molanphy's concept of having contracts that are received and approved ahead of time, the ideas from Washington as to the responsibility of users and Lewellen's ideas about responsibility for negligent work will coalesce into a responsible situation for everyone's benefit.

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Abacus Works Well for Hex Calculations

Reader Commentary

By K.C. Toh
Special to CW

The letter from Guy B. Chase Jr. on using fingers for hexadecimal calculations [CW, Feb. 20] was interesting. However, everybody appears to have forgotten an obvious multidigit hex calculator that has been around for a very long time.

The Chinese abacus is a digital calculating device that represents digits of numbers by columns of beads. Each column has seven heads, two in the upper band and five in the lower band. Each bead in the lower band represents one and each bead in the upper band represents five.

In each band the beads may be moved up or down. The representation for zero is both upper band beads up and all five lower band beads down. A "1" is represented by moving one of the lower band beads up. Similarly, a "6" is represented by moving one of the lower band beads up and one of the upper band beads down.

When both upper band beads are down and all upper band beads are up, their representation is "15" or, for hex buffs, E.

Since each column can represent a hex number between 0 and E, the abacus is extremely easy to use as a hexadecimal calculator.

To add one hex number to the value already represented on the abacus, the operator merely moves a correct number of additional upper band beads down and/or lower band beads up. In the event that he is required to move more than five lower band beads up in total, he carries one upper band bead down and moves the five's compliment number of beads down.

This may sound complicated, so examples are in order.

Suppose the numher "3." is already on the abacus and you would like to add three to it. Moving three beads from the lower band up is not possible because there are only two left. So the operator moves an upper band bead down and, at the same time, two lower band beads down.

If he wants to add "A" to this number, he has to move two upper band beads down, which again causes a "carry," but this time, to the next digit. After this, he would move one bead up from the next digit (which would be the equivalent of adding "E") and then move the upper band bead upward (which would have the effect of subtracting "5") and then move one of the lower band beads down (which would have the effect of subtracting "1.") The result is 10 (hex).

Of course, if one had to do so much mental arithmetic, the system would not be workable. However, the use of the abacus can become a conditioned process.

It goes without saying that any equipment that can be used to add can also be used to multiply by repeated adds. However, knowing the hexadecimal multiplication table will reduce the need for repetition at the same digit location.

K.C. Toh is regional marketing manager for the Computer Systems Division of the Borneo Co. in Kuola Lumpur, Molaysia.

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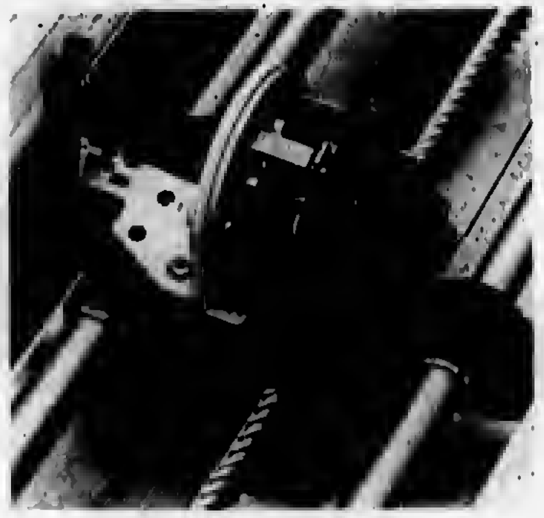
Three ways to print. The Character Compress/Expand Modes let you print more data on a page and emphasize points with headlines and titles. You can get as many as 132 characters on an 8-inch line, or 227 on a 14-inch line.

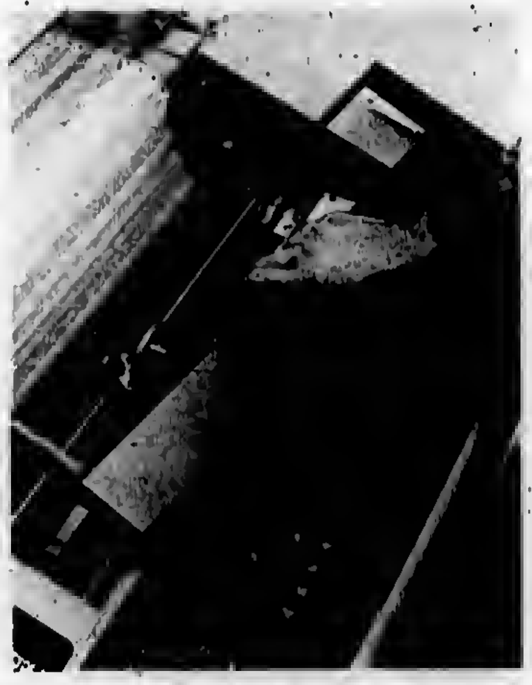
High-quality print, with six copy resolution. A 7 x 9 dot matrix (versus the usual 7 x 7) gives you clear, crisp printouts, right down to the sixth copy and meets the 128-character USASCII standard. And the extra two dot rows allow truc underlining and descenders without character blurring.

Programmably interchangeable character sets. The HP 2631 can be made to print alternate character sets without reconfiguring the printer.



Long lasting, quick change print head saves service calls. The 9 wire print head is conservatively rated at a 100 million character life-span. It's also self-aligning. When you finally replace the head, you can do it yourself in a couple of minutes.

Long-life cartridge ribbon for a clean change. With a life span of at least 10 million characters, this innovative drop-in cartridge takes the mess and trouble out of ribbon changes.



Self-test for quick status checks. One key tells you if the printer is ready to go. If it isn't, the self-test feature helps you isolate the problem, reducing the time and cost for repairs.

Run everything under program control. All the features described and more can be programmably controlled. The software can take you in and out of the various modes. Or you can make a change yourself using one of the front panel switches or keys.

In a network or as part of a standalone system, HP now makes it simple to get the hard copy you need. If you'd like to see our printer or printing terminal in action, call the Hewlett-Packard sales office listed in the White Pages and ask for a computer systems representative. Or send us the coupon.

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Be on the Lookout

DP Criminal at Large: End-Around Carrie

By Frederick T. Theobold Jr.
Special to CW

As you probably realize, it is necessary for all of us in the DP industry to be always on guard against those clever but unscrupulous people who practice computer crime. All data scientists who are honest folk must stick together and concertedly oppose those of us who are egregiously flagitious.

The security and well-being of every computer system in this country is currently imperiled by the machinations of one of these criminals. At large is one of the most cunning and ruthless data criminals since the inventor of the abacus.

You may have heard of this criminal by her real name, which is Caroline Enden. But more likely you know her by her favorite alias: End-Around Carrie.

Reader Commentary

It is not known exactly when End-Around Carrie initiated her life of crime, but she certainly began quite young. She graduated at the tender age of 18 and soon thereafter began practicing a form of prostitution.

She wrote RPG programs at a Honeywell installation in Shamoken. Her perversions were apalling. She coded statistical analysis routines in Snobol.

It is believed that Carrie has only once in her life held an honest job. She worked for a while at a hamburger joint in Cressen. During the period of her employment, the customers were wont to complain of the paucity of meat in the sandwiches.

One of the firm's auditors demanded that the manager conduct a parody check. The sharp-eyed manager soon discovered the cause of the problem: Add-Around Carrie was taking a byte of each customer's Big Macro.

The manager reported this to the owner, and it wasn't long before Carrie was DUMPed.

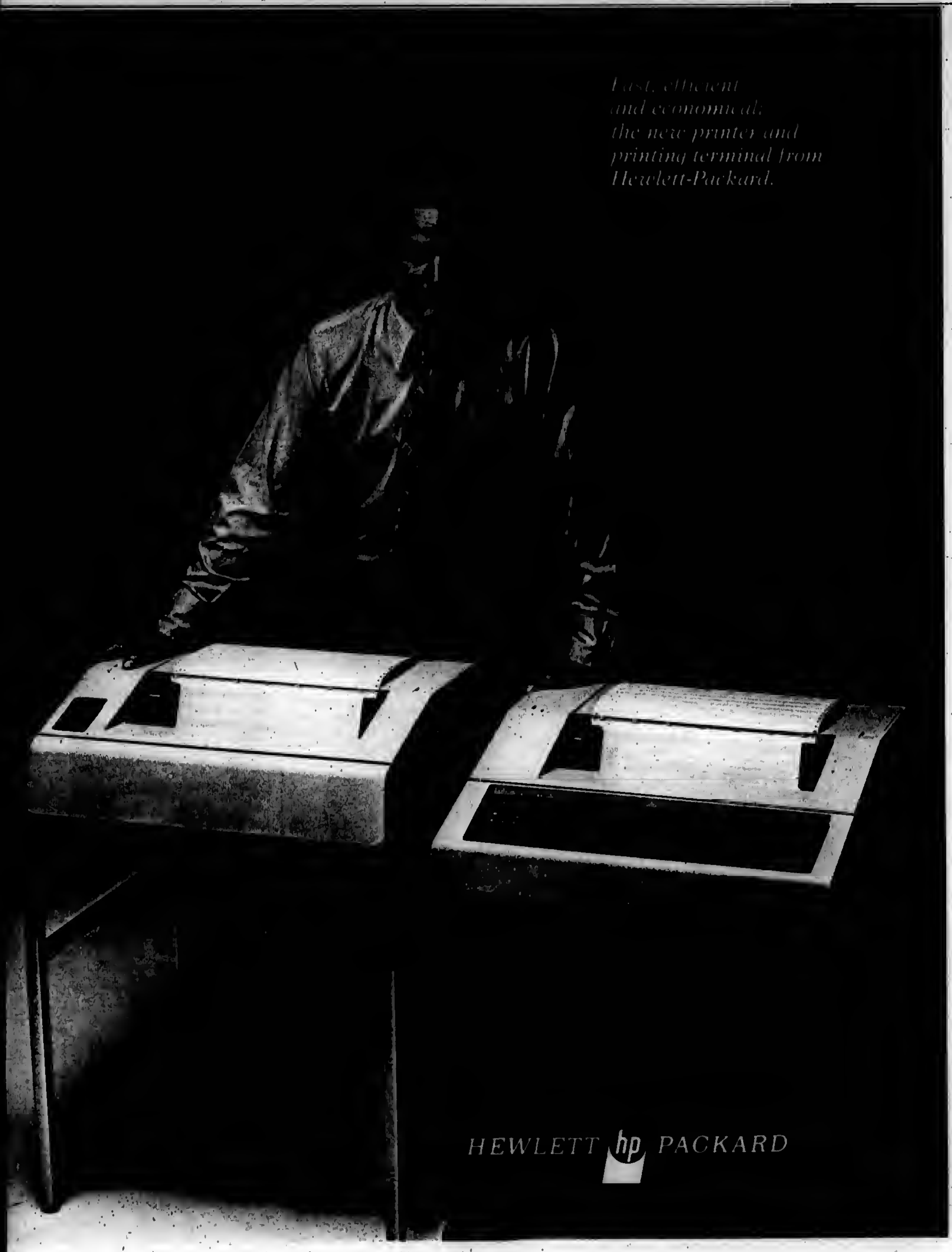
Whereabouts Unknown

What happened to Carrie after she left Cressen, no one knows for sure. The authorities suspect her of all kinds of larceny, but so far they have no hard proof. She is wanted for questioning in connection with many different offenses, which at last count numbered ***FLOATING POINT OVERFLOW***.

When last heard of, Carrie was operating a swindle in which she sold outmoded and hopelessly obsolete software to DP managers at exorbitant prices. On a Monday in 1970, she approached a manager in New York, offering to sell him an Ansi-Cobol compiler.

The jerk paid five bucks for it. On Tuesday, the jerk discovered that the compiler was written in Zippy-Quik source language. Obviously, he needed a Zippy-Quick compiler before he could use his Ansi-Cobol compiler.

(Continued on Page 36)



Sealed proposals will be received by the City of Chicago until 11:00 A.M. CDST Monday, May 15th, 1978 for:

International Business Machines IBM 3155, Serial #10490 Frame 1 CPU-Central Processing Unit, Frame 2 PDU-Power Distribution Unit. Control Data Corporation CDC33155, Serial #0125 Two Meg Storage Memory System to be dismantled and removed by successful bidder.

International Business Machines Model Feature S20470 One Dynamic Address Translation (D.A.T.) Box currently on order from IBM by City of Chicago, Delivery October. 15, 1978.

If interested, contact Anthony Luzzi, Chief Storekeeper (312) 927-5393 - 5422 for invitation to bid.

DPers: Look Out for End-Around Carrie

Reader Commentary

(Continued from Poge 35)

His staff was unable to help him because they had never heard of Zippy-Quik. And he couldn't get this second compiler from Carrie because he was unable to reach her. Her phone was INOP, and her address did not fall on a full-word boundary.

On Wednesday, the jerk was approached by an elderly gentleman who offered to trade a Zippy-Quik compiler for the jerk's limousine. The jerk's relief was profound, and the deal was consummated.

The elderly gent turned out to be End-Around Carrie in disguise. The jerk turned out to be L.E. Donnegan Jr. The Zippy-Quik compiler turned out to be written in Ansi-Cobol source language.

By now you have probably guessed why I am personally so eager to put the finger on this rogue: I have been one her victims. Last year, I took over an installation where keypunching of transaction data had experienced serious schedule slippage. The system's master files were months in arrears, and I had to do something fast.

Carrie came to me in disguise, looking for work and bragging that she was the world's foremost expert in updating and posting. I hired her at once but, shortly after she started work, I caught her by surprise, without her disguise.

I recognized her immediately, hauled her up before a justice of the peace and charged her with cycle stealing. She then made good on her earlier rodomontade about posting. She posted bail with the SKIP bit set. That was the last I saw of her.

Reward Offered

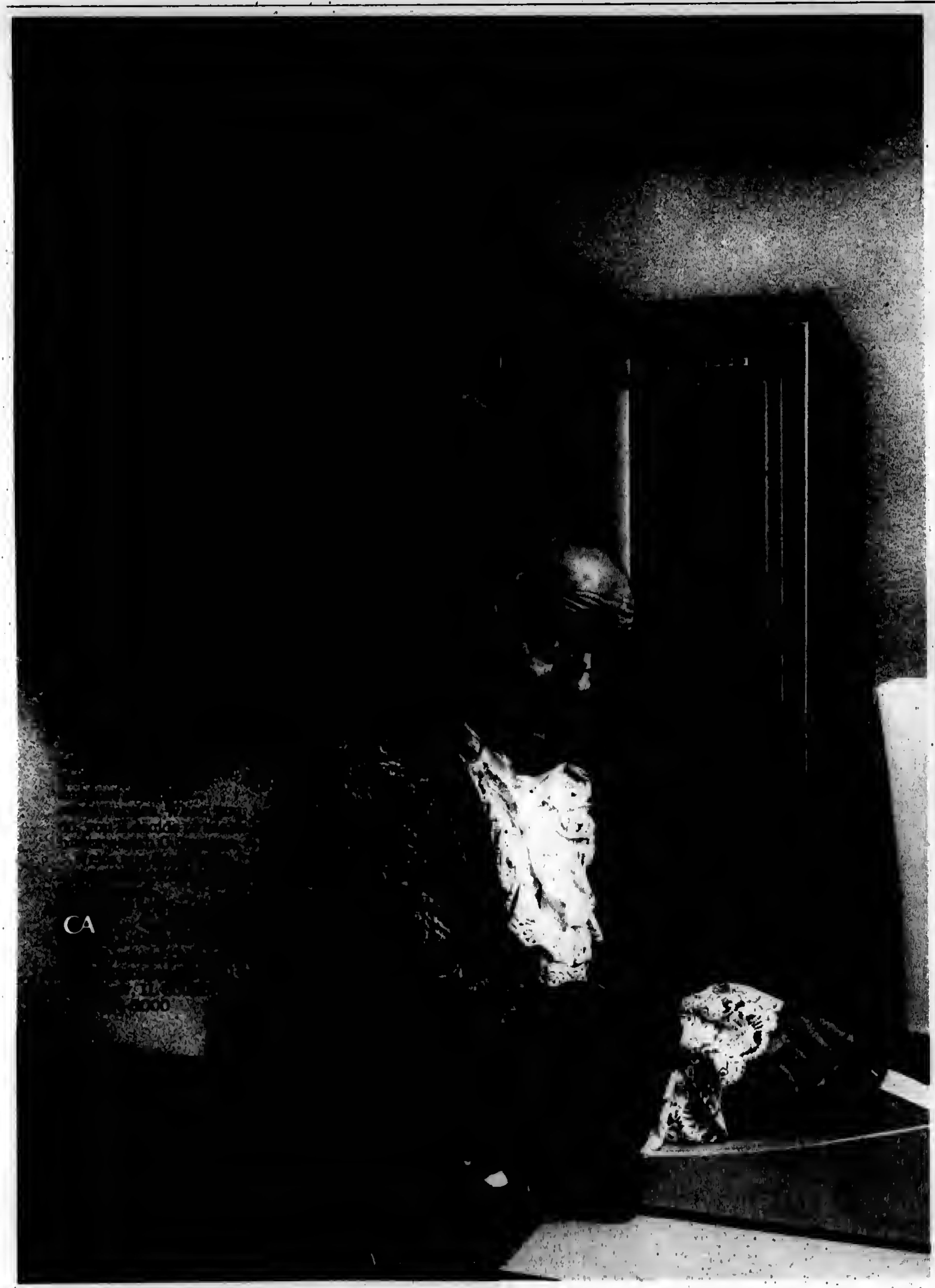
I'm sure you can see why Carrie's audacity and cunning make her one of the most feared criminals now at large. It will come as no surprise to you that the authorities would dearly love to REWIND CARRIE WITH LOCK and throw away the storage key.

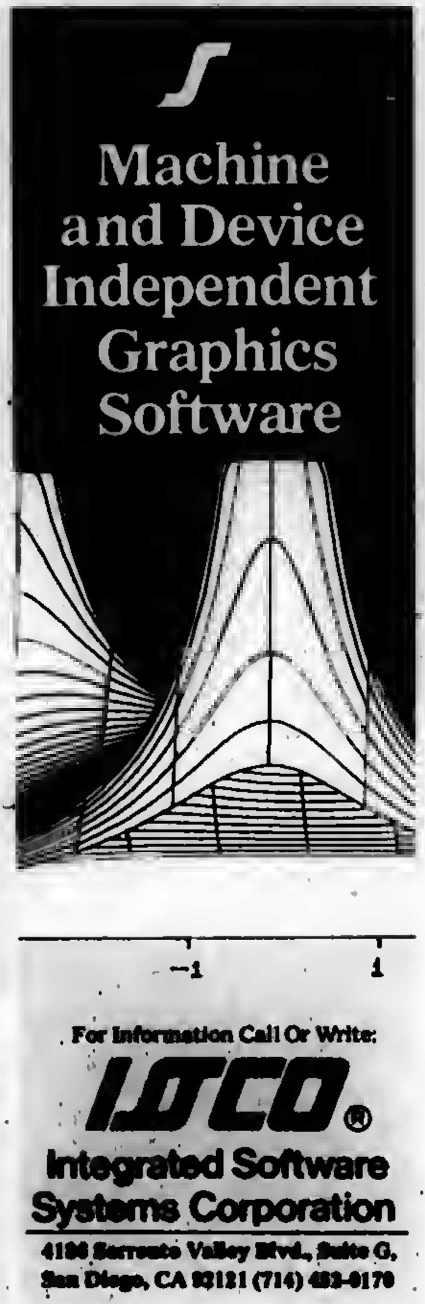
If you spot Carrie, you must notify the authorities immediately. As a reward for information leading to her arrest and conviction, IBM is offering a 360/45.

Optionally, the claimant of the reward may specify a different computer system of similar power. Like the Altair 8080.

Any information you may have on End-Around Carrie, her activities, or her present whereabouts should be mailed without delay to DataSnoop, Inc., 256 Channel St., Floating Point, N.J. 65536.

Only you can prevent computer crime.

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MUNICH — Policies issued by Allianz Insurance Co., the largest European insurance company, protect 5.6 million households in West Germany alone — 25% of the population. Allianz also serves thousands of customers in France, Spain, Italy, Brazil, Saudi Arabia and the U.S.

An insurance claim is filed, on the average, every 15 seconds, making an extensive and efficient DP system a necessity for prompt service.

Allianz maintains corporate DP headquarters here and DP production centers in Munich, Stuttgart, Frankfurt, Cologne and Hamburg. All centers are equipped with IBM 370/158s; the teleprocessing network is controlled by Tcam. More than 900 terminals are installed throughout the system.

All systems, programs and jobs are developed and tested at the main DP center here, where 150 people are employed in all phases of application programming, hardware planning and installation, documentation, operations and job preparation.

The entire library from each branch production center, plus new programs and jobs developed in Munich, are stored on a library disk. Once a week, the latest updates are dumped to tapes and sent to the branch production centers.

Direct Access Sought

Two years ago, new programs and updates to existing programs were being entered through a remote data center connected to the CPU by an IBM 2944 channel extension unit. More than 100 programmers used this facility, following conventional batch procedures for coding, card typing, card punching and job control preparation.

Since maintenance alone accounts for 50% to 60% of the programming effort, management realized it would be much more efficient if programmers could have direct access to the CPU through a terminal for program development, testing, updates and maintenance. Accordingly, Allianz set up a group composed of system programmers, instructors and application programmers to test leading time-sharing terminal systems. One of them was Roscoe from Applied Data Research, Inc.

"Because our CPU was already being utilized 80% to 100% by teleprocessing and batch jobs and because we could not expand our hardware, our greatest problem was the performance and CPU load of a terminal system for programming support. We found Roscoe best," according to Alex-

(Continued on Page 40)

'Diadem' Service Aids Forecasts Of National Economies, Markets

EL SEGUNDO, Calif. — The Diadem economic forecasting service for investment, financial and marketing strategists has been added to Computer Sciences Corp.'s (CSC) Infonet remote computing network.

The service models the economies of selected nations, allowing for transborder trade flows, and such major industrial markets as the automotive, energy and chemical sectors, CSC said. Diadem uses these models to generate both quarterly and annual forecasts.

At the national level, users can predict the effect of such changes as the introduction of new government policies, according to CSC. Diadem is also said to allow forecasting of demand, growth, prices and interest rates.

At the industry and market levels, Diadem users can predict production costs and the direction of their markets, evaluating the impact of new policies and conditions and deriving the relationship between their industry or markets and such economic factors as wage levels and material costs, the firm added.

At the company or product level, Diadem is said to allow forecasting of sales volume and the costs of raw materials, labor and financing. It also assists in the planning of production, inventory and purchasing requirements, CSC noted.

Diadem addresses the economies of the U.S., Belgium, Canada, France, Italy, Japan, the Netherlands, the UK and West Germany. The package was developed in London by Economic Models, Ltd. (EML), a firm CSC recently acquired.

Diadem is available at various levels of service. Full service costs $17,500 annually and includes EML's quarterly forecasts and interpretive reports; admission to relevant seminars and training services.

CSC is headquartered at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

Text-Processing Standard?

WASHINGTON, D.C. — Sanctioned by the American National Standards Institute, the X3J6 technical committee on text-processing language held its first meeting recently in Arizona.

The committee's task is to develop a language, based on the American Standard Code for Information Interchange (Ascii) standard (X3.4-1977), to manipulate sequences of text strings, according to the committee chairman, Charles D. Card of Univac.

The proposed standard will encompass the description, recording, recall transformation, searching, manipulation and display of text. The committee hopes to have a complete draft by late 1980 and an approved standard by early 1982.

Interested members of the academic, user and producer communities are invited to join the effort. Contributions of technical papers before the next meeting — now scheduled for June 27-29 — will be welcomed, Card said.

Computer-based text processing overlaps with word processing and computer graphics. Word-processing equipment is expected to be interfaced to or use the proposed language. Interchange techniques with computer graphics are expected to emerge, although not within the scope of the standard, according to Card.

Human factors of the language will outweigh technical generality, he added. The standard will be described in terms that do not require a mathematical background beyond that expected of a typical American high school commercial course graduate, he claimed.

Technical contributions should be sent to the Standards Department of the Computer and Business Equipment Manufacturers Association, which will host the June meeting at 1828 L St., N.W., Washington, D.C. 20036.

Data Base Guide Keys on Business

PRINCETON, N.J. — "Data Base Design: The Service Analysis Approach," recently published by Performance Development Corp. (PDC), outlines a structured methodology for researching the business requirements a data base system must satisfy.

Costing $12 ($5/each for additional copies), the report can be ordered from PDC, Building M, 1101 State Road, Princeton, N.J. 08540.

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Tape Management Improved With 'UCC One' Upgrade

DALLAS — Version 4 Level 4 of the UCC One tape management system software from University Computing Co. (UCC) is said to enhance the package's ability to protect data in IBM 360 and 370 environments.

Originally developed to improve the label checking of tapes provided by IBM, UCC One ensures that the correct input tapes are used and that valid tapes are not inadvertently used as output media, a spokeswoman explained.

The system builds a data base in order to track which tapes can be used as "scratch" tapes without depending on external paper labels on individual tape reels, she added.

The current release "greatly enhances the management control" portions of the system and also extends the reports the user can get from the data base, she said.

In addition to the generalized report writer which has been a part of UCC One from the beginning, Version 4 Level 4 allows users to create their own printouts to focus on situations not covered by the standard reports.

A flexible batch system is now available that allows updates of the data base from user sources normally outside the control of UCC One. Other significant facilities include Vsam catalog support and a correspondence routine that compares the tape management catalog with the OS/VS catalog, the spokeswoman noted.

An interface that allows tape verification and protection during OS Label Create/Destroy operations has also been added, and secondary file support has been extended. An expanded capability for certifying tape volumes and determining which need cleaning, is also available, she said.

The updated package costs $12,500 or $480/mo, but these figures are scheduled to increase in mid-May, UCC noted from 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

Tektronix 4051 Users Get Development, Pert Support

SUNNYVALE, Calif. — A program development and debugging package and program evaluation and review technique (Pert) software have been introduced by Leland C. Sheppard for use with the Tektronix, Inc. 4051 graphics system.

The Documenter-II development and debugging package is said to provide formatted listings and cross-references of 4051 programs on any of several output devices.

The Event Scheduling System (ESS) is useful for any organization with projects to schedule and deadlines to meet, the firm said. As is standard with Pert methodology, ESS employs the critical path method to determine optimum scheduling of tasks.

ESS modules build and maintain a data base for a given project and generate charts and reports on any of several output devices.

Costs range from $300 for a single copy of Documenter-II to $1,500 for a large installation facilities license. ESS costs range from $900 for a single copy to $3,600. Included with both packages, are program source code and documentation on cassette, user instructions and the first year's maintenance.

Leland C. Sheppard is at Department W, P.O. Box 60051, Sunnyvale, Calif. 94086.

Multiplexer Gains RDOS Link

IRVINE, Calif. — Educational Data Systems, Inc. (EDS) has developed a Data General Corp. RDOS-compatible software driver for its Model 310 Mighty Mux multiplexer when it is linked to a DG Nova or Eclipse.

The package will support 128 RS-232C or current-loop ports operating independently at standard rates between 110- and 9,600 bit/sec under DG's standard or mapped RDOS, according to EDS.

With the software in place, users can "greatly enhance" I/O throughput by utilizing economical direct memory access synchronous and asynchronous serial line boards, expandable in eight-, 16- and 24-port increments to the maximum configuration, the vendor said.

EDS' software eliminates the "relatively heavy" RDOS character interrupt processing overhead, a spokesman claimed. This provides a "tremendous" increase in available processing power since the CPU is freed of all character-level I/O servicing, he added.

The RDOS driver is available free to all users of EDS' Model 310 Mighty Mux, he said from 1682 Langley Ave., Irvine, Calif. 92714.

Univac Updates 'QLP-1100' For Gains in Applications

ROSEVILLE, Minn. — The applications potential of Univac's Query Language Processor (QLP-1100) was "markedly increased" recently with the introduction of Release 3, which includes procedural capabilities and a macro facility, according to a spokesman.

QLP operates in conjunction with the mainframer's 1100 series Data Management System (DMS 1100) and is available as part of the OS/1100 software, he noted.

The procedural language facility enables programming-oriented end users to perform complex analyses, manipulations or updates against the data base. Utilizing the block structured approach, the added IF . . . THEN . . . ELSE and DO loop commands for instance, support procedure logic control, the spokesman added.

Data Manipulation

COMPUTER and PRESENT verbs are available to permit data manipulation and an OBTAIN command has been introduced to support relational retrieval of data within query procedures, he said.

The option to use conversational query language commands in procedural contexts is also provided, the spokesman pointed out.

The macro facility in Release 3 enables key users to define complex query sequences or procedures which can later be invoked by other end users in simple application-oriented terms. As a result, users have the means of expressing their data base operations in terms with which they are familiar, he said.

Simple English

The enhancements complement the conversational command language and report-writing capabilities provided in earlier releases of QLP 1100. Ad hoc data base inquiry and update requests can be expressed in the simple English of the conversational command language, the spokesman noted.

Nearly all data base reporting needs have been handled by the report writer modules, the spokesman said. On the other hand, the Release 3 features can handle data base applications not possible with the previous releases.

Small Counties Gain Tax Help

DAYTON, Ohio — A property tax processing and billing package aimed at small municipalities or counties having less than 30,000 tax parcels has been introduced by NCR Corp.

The NCR 499 Billing System creates two master files — tax billing and tax rate — and analyzes the data stored in these files in order to generate bills, reports and notices.

The package was designed for use with an NCR 499 small DP system — comprised of a processor with 20K bytes of memory, three tape cassette units and a continuous forms handler — in contrast to the firm's recently announced more comprehensive Interactive Tax System that is based on its I-8200 and intended for towns and counties with up to 40,000 tax parcels [CW, April 17].

The NCR 499 Tax Billing System costs $600 and is said to be compatible with other government-oriented applications for the 499, including appropriations accounting, payroll, utility billing and general ledger systems.

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Because the DECwriter III uses many of the same components and subassemblies that have proved so reliable in our DECwriters, it's, in a very real sense, already a mature, field-tested product.

But what you'll get that's different is speed. 1200 baud, 180 cps speed. Along with 1K buffer capacity.

That means you receive data four times faster than conventional printers. And phone line charges can be reduced by as much as 75%. The 1200 baud speed of the DECwriter III also means you can combine the functions of a line printer and a CRT. Which saves you money and available office space without losing a bit of efficiency.

But the DECwriter III is more than fast and efficient, it's also very flexible.

For example, you can set operating modes—including four baud rates—at the touch of a finger. Plus, optional forms handling capabilities, including margins and tabs which can be set with typewriter-like ease. And because you probably handle different size forms, it can handle different size forms—up to six parts and 132 columns.

The DECwriter III.

A new 1200 baud interactive terminal with a very successful look about it.

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'Wylbur' Updated

SAN FRANCISCO — Version 4.0 of the Wylbur text-editing/on-line program development system now available from On-Line Business Systems, Inc. reportedly supports local and remote IBM 3270-compatible terminals.

The software also includes enhanced network control and line error-handling capabilities that allow an installation to update the network dynamically. A user exit facility also simplifies implementation of installation-unique requirements, according to a spokesman.

System console support allows the operator to communicate with and use Wylbur, while improved tab support includes logical tabs for terminals without hardware tabs. Version 4.0 costs $17,500 from 115 Sansome St., San Francisco, Calif. 94104.

Package Supports On-Line System

(Continued from Page 37)

ander Metz, chief system programmer. "It is a system with a small CPU load, simple language, a good data set organization and data security."

"During our SVS test evaluation period, we found Roscoe's overhead was less than 1% per terminal while the other system we evaluated required up to 4.5% per terminal," he recalled.

At Allianz headquarters, 110 users now have access to Roscoe through 45 terminals for systems and application programming, job preparation, information retrieval, term and project planning and monitoring, as well as documentation.

We have even convinced our life insurance subsidiary to use Roscoe, despite the fact that it was already using another terminal system — the same one we evaluated and rejected," Metz noted.

"With Roscoe, our programmers see the results of their efforts immediately," Metz said. "And they enjoy their work so much more that more work gets accomplished. After we installed Roscoe, we saw the number of jobs rise very quickly from 400 to 800 per day.

"We have prepared Rosprocs which prompt the user so a small change now requires only a very small effort. That means many more people can use the computer without special training or skills.

"Even without Rosprocs, Roscoe is simple to use because so much can be done through function keys on the terminal," Metz said.

"I don't believe there is any other system like Roscoe that can serve 45 terminals with such good response time. This has been very important to us because, if I give a terminal system to a user and he has to wait even 15 seconds, his mind wanders, he loses his train of thought and he doesn't work well.

"With Roscoe, the response time is so short delays are not noticeable," Metz explained.

Allianz has decided to install Roscoe at its five production centers. It will be used for faster job preparation and error correction.

"We also want to have Roscoe for our accounting system — to change, to insert, to correct. Up to now, we have had to insert changes manually; we want to do this with Roscoe," Metz said.

"We have no system to monitor everything our programmers do, but people, especially in our department, have said the programs we sent them were of better quality after installing Roscoe," he added.

'I Think Fred's Been Debugging Long Enough.'

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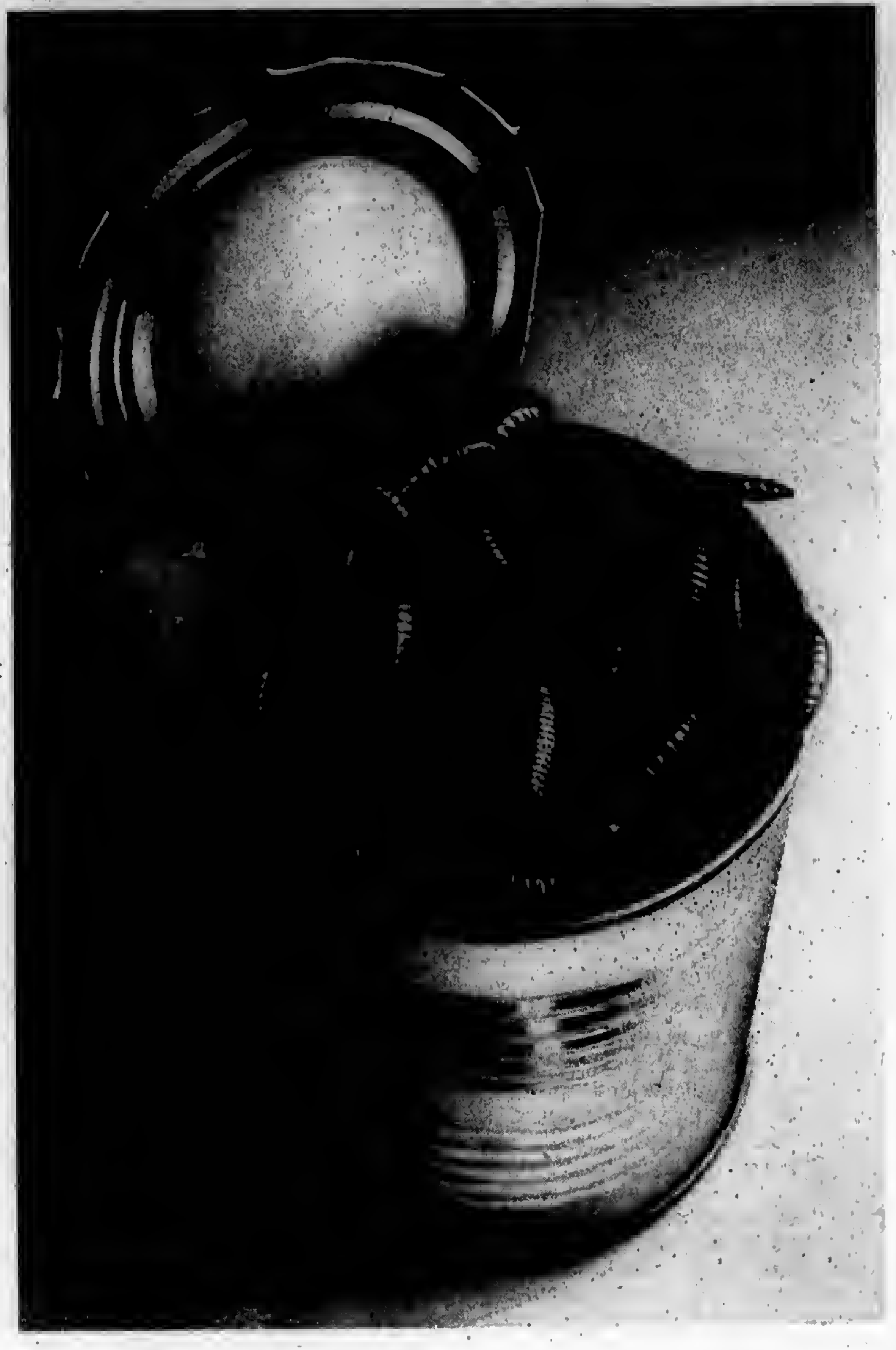

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Manufacturers Aided

COSTA MESA, Calif.— Designed to run on Data General Corp. Nova 3 minicomputers, Production Master from Applied Business Systems (ABS) is said to allow a manufacturer to maintain cost and material control of component items and finished goods whether they are standard, "semi-custom" or custom products.

Production Master is particularly suited to small- and medium-scale firms manufacturing "large ticket" items. It starts with order entry, during which operators at CRTs can interactively modify the standard bill of materials for a product in order to customize it to the customer's requirements.

After that, the system takes over to produce all the documentation needed to get the order into and through production and released to the customer, with appropriate reports to the manufacturer's management to keep the system running smoothly, the spokesman said.

The minimal configuration needed to support Production Master is a 64K-byte Nova 3 with 10M bytes of disk storage, one CRT and one printer running single- and multiuser Extended Basic under mapped or unmapped RDOS.

The single-user license fee is $5,500 or $525/year. OEM and dealer one-time licenses for multiple CPU use are also available, ABS said from Suite B-6, 3303 Harbor Blvd., Costa Mesa, Calif. 92626.

DOS/VS Job Streams Built By Enhanced 'Flee-Flim'

COLUMBUS, Ohio — An enhanced release of a replacement system for IBM's DOS/VS linkage editor and library maintenance functions, Flee/-Flim Version 5 from Goal Systems Corp. is said to be more flexible and more efficient than earlier releases.

An added major component called GSERV is primarily a jobstream generator that allows 20-level nesting of procedures, unlimited JCL substitution and spooler independence; it can be used as a powerful procedure library facility, a spokesman claimed.

The entire set of Flim source statement library update commands can be used to make temporary changes to a GSERV procedure or permanent changes to the DOS/VS procedure library, he said, in addition to its normal updating of the source statement library.

The library member rename feature has been extended to allow whole families of modules to be renamed and the names restructured, the spokesman added.

The linkage editor replacement (Flee) has been enhanced to produce a more meaningful linkage-edit map, he said, noting that all addresses are now shown in both absolute and partition-relative values.

The multiple CPU optional feature of the package, which allows sharing of system-resident and private libraries between real or virtual machines, has been extended to allow any mixture of shared or nonshared libraries.

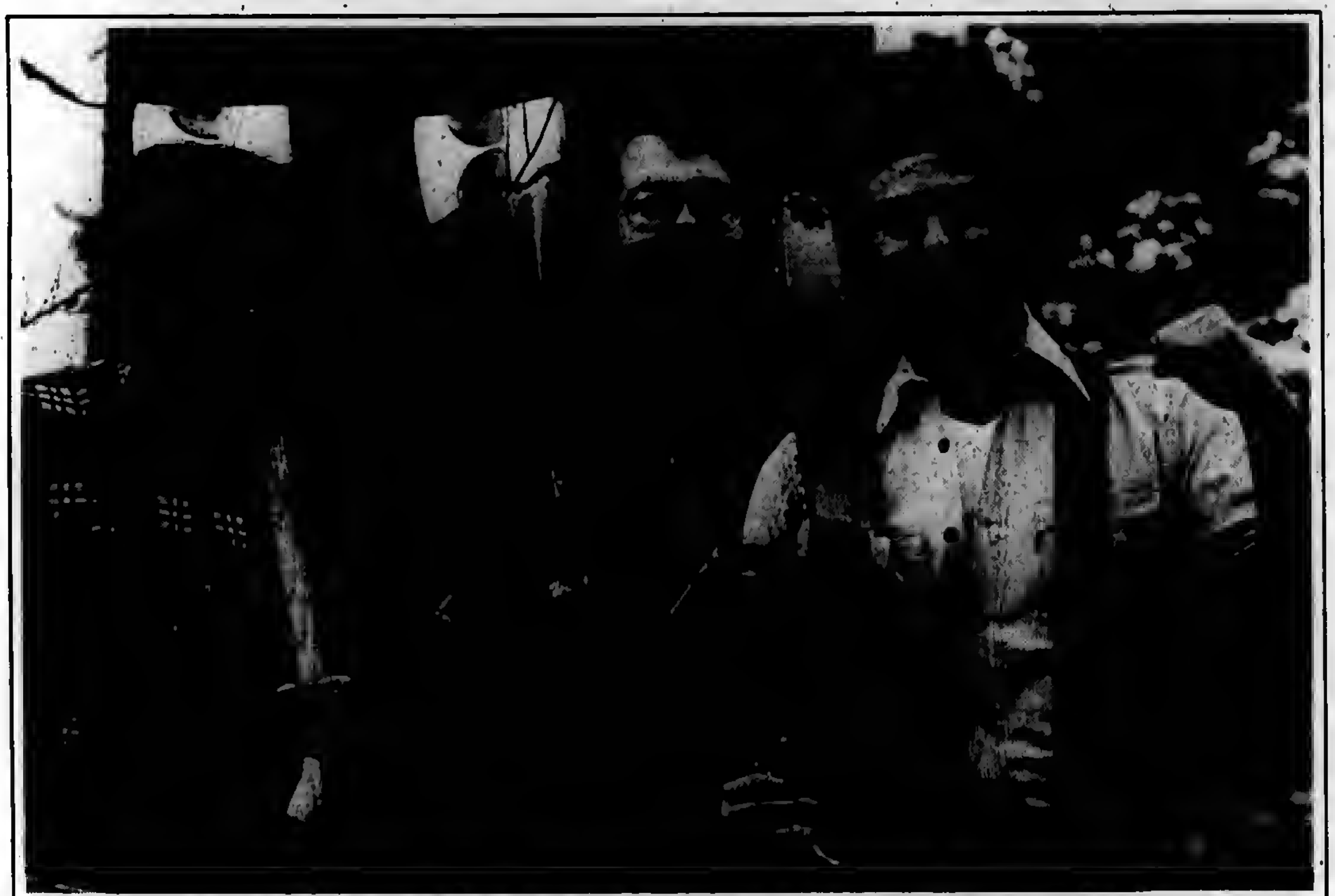
The package is available for $65/mo or $702 on an annual lease. Goal can be reached through P.O. 29481, Columbus, Ohio 43229.

Reports Added To 'DOS Jars'

McLEAN, Va. — Johnson Systems, Inc. has extended the standard reports provided with its DOS Job Accounting Report System (DOS Jars) so users now have 36 instead of 27 formats that can be generated by name, a spokesman noted.

The "working set" of reports are grouped by functions ranging from financial management to resource planning and including performance evaluation, throughput analysis, configuration analysis and program/programmer monitoring, he said.

Running under either DOS or DOS/VS, DOS Jars cost $4,000 or $240/mo. A lease/purchase plan is also available, the company noted from 8400 Westpark Drive, McLean, Va. 22101.



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Through Intelligent Nodes

Packet Nets Give Terminal Independence

By **Jeff Winters**
Special to CW

One of the main advantages of a packet network that provides terminal-to-computer and computer-to-terminal communications is terminal independence. The network must support all types of low- to medium-speed terminals. The same criterion holds for the other end of the circuit: The network should be able to talk to any type of computer (host). In effect, the user should be able to use any kind of terminal to communicate with any kind of host.

Tymnet provides terminal independence through the locally accessed intelligent nodes, where a minicomputer handles the terminal characteristics. The network consists of nearly 300 mincomputer nodes that are interconnected by leased synchronous communications lines ranging in speed from 2,400- to 9,600 bit/sec.

The minicomputer nodes fall into two categories: remote and bases (Tymcoms). Broadly speaking, the bases act as the interface between the hosts and the network, while the remotes double as the interface between the terminals and the network and as nodes in the network.

A user calling a remote types a character to identify the kind of terminal he is using. Most major terminals are supported.

The remote analyzes this character to determine the transmission rate, character set, carriage return delay time and other parameters. It then assigns two software routines to the line (port) on which the user is coming in: one for input and one for output (some terminals use a slower character rate for the keyboard than the printer). These routines handle all idiosyncrasies of the terminal, including conversion to and from Ascii if the terminal is non-Ascii. In this way, the network can easily accommodate new terminal types as they become available.

With the remote handling the direct communication with the terminal, the network is free to do what it does best: transmit data. After receiving the terminal identifier, the remote asks the user to log in, and the user enters a user name and password. The remote passes this information on to the network supervisor, which is a special node that monitors network topology, failures and load conditions and that establishes optimal paths for circuits.

The supervisor validates the user name and password against a master user directory and then determines which host should be acessed.

When this is accomplished, the supervisor recedes to the background and host-user interaction begins. When the user leaves the network, the supervisor is informed and it can then reassign the freed-up facilities.

Character's Route

The way this actually works is illustrated by tracing a data character's route through the network. For example, suppose the user's path is from the remote (Node A) to Node B and from Node B to the base (Tymcom) interfacing the host computer.

When the user strikes a terminal key, the terminal serializes the character and feeds it into an acoustic coupler. The coupler sends it over a telephone line to an asynchronous modem on the remote. The remote then reassembles the character and places it into the outgoing buffer assigned to the user and then assembles a packet (record) to be sent to Node B.

This packet contains a header, data from one or more buffers and two different checksums of the packet. Any packet can contain data for several different users traveling from Node A to Node B.

This packet is then sent out on a synchronous line to Node B. Node B checksums the packet and sends an acknowledgment, if the data is correct, back to the remote. If there is any discrepancy, the packet is retransmitted. Node B disassembles the packet and distributes the incoming data, placing each user's characters in the appropriate outgoing buffer. Node B then assembles a packet to go to the base.

The base disassembles the packet and distributes the data, putting user's characters into the appropriate ports going into the host. Data coming from the host to the terminal follows the same procedure in the opposite direction.

The network and the hosts on the network need not be aware of the idiosyncrasies of the terminal, because the remote handles the translation of speed, full- or half-duplex characteristics, character set and delay times of the terminal.

Jeff Winters is a product support specialist with Tymnet, Inc., 10261 Bubb Road, Cupertino, Calif.

Phone Pricing Has Cost U.S. $32 Billion Since '70: CCMI

By Ronald A. Frank
CW Staff

RAMSEY, N.J. — A telecommunications research firm here has charged that current telephone pricing policies have cost the U.S. economy almost $32 billion in increased costs of goods and services since 1970.

The analysis of telephone pricing was done by the Center for Communications Management, Inc. (CCMI) to examine the relationship between business and residential rates for telephone service.

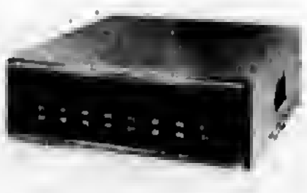
Business has traditionally paid more for telecommunications services because of the "value of service" concept based on the hypothesis that business can more readily absorb rate increases than the individual subscriber because of tax considerations.

But instead of absorbing the increased rates for voice and data facilities, business is passing along the increases to its customers in the form of higher prices for goods and services, the CCMI study concluded.

Since 1970, regulatory agencies and the phone companies have "tacitly agreed" that business should bear the primary burden of rate increases. This strategy has been moderately successful for the phone companies, the study pointed out, because the residential consumer "perceives that he has been protected from higher telephone bills."

Under the existing rate structure, each $1 of rate increase applied to the "nonconsumer segment" eventually pushes up consumer prices by almost $2.24, the study claimed. If telecommunications rate increases has been spread evenly between business and residential users, the economy would have been spared a $32 billion increase since 1970, the study said.

The findings are part of a two-volume, 475-page report called *An Economic Impact Analysis of Telecommunications From 1970-1978*. It is available for $3,500 from the Center for Communications Management, Inc., Box 324, Ramsey, N.J. 07446.



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CDC Beefs Up Support on Net OS Software

MINNEAPOLIS — Control Data Corp. has announced enhanced software features for the company's Network Operating System (NOS) and Network System/Batch Environment (NOS/BE) that support the CDC Cyber 170 series of large-scale systems as well as older Cyber 70 and 6000 series systems.

Communications capabilities of both operating systems have been expanded with the release of Intercom 5 for NOS/BE and Network Products for NOS. These now support a range of asynchronous, teletypewriter-compatible terminals at line speeds up to 9,600 bits/sec and Mode 4 protocol at 19.2 kbit/sec, CDC said.

Both operating systems also support Hasp multileaving workstations at line speeds up to 19.2 kbit/sec. The NOS Network Products are also said to support a variety of processing modes, including an interactive facility, remote batch and transaction processing and user-written terminal applications that can be tested using a software stimulator.

The data security and privacy features of NOS have been expanded, the company said, and, through the addition of a private file type, controlled access to user passwords and full user validation of diagnostic software.

CDC said that a number of hardware features also have been added to NOS including support of CDC 677 and 679 magnetic tape subsystems with 6,250 bit/in. high-density data recording; and support for the full-tracking capability of CDC 844 disk subsystems that can provide Cyber 170 users with improvements in data throughput performance of 5% to 30%.

Software products available under NOS and NOS/BE are PL/I, a Fortran interactive debug package, a terminal independent graphics subsystem and a concurrent data manager. A new text editor is also available under NOS, the firm noted.

These features of the NOS and NOS/BE operating systems are now available to new Cyber 170 system customers with deliveries beginning in June and to existing system customers at that time, according to the firm.

The CDC software products are available for an initial payment plus a monthly fee or for a one-time charge. The Network Products option costs $120 plus $690/mo or $27,600; Intercom 5 is priced at $120 plus $680/mo or $27,320; and the data manager costs $530 plus $630/mo or $25,730. Other software is priced similarly with complete information available from local CDC branches.

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POS System for Small Retailers Links DEC Mini, NCR Terminal

COLUMBUS, Ohio — Point of Sale Business Systems, Inc. has developed a retail management system for the smaller retailer that interfaces the Digital Equipment Corp. PDP-11/03 minicomputer with the NCR Corp. Model 250 point-of-sale (POS) terminal for processing as well as automated data entry.

The PDP-11/03 has 32K words of memory, and the system includes two DEC RL01 disk drives with 5M bytes each of memory, one DEC VT52 CRT and one DEC LA180 line printer, a company spokesman said.

Sales transactions can be entered manually into the NCR 250 or automatically via an optional optical character recognition (OCR) reader. The system outputs information to create the OCR tickets, according to the firm. The system reportedly provides inventory control, sales analysis and a complete billing system.

Main program options are said to include sales analysis, on-hand and dollar value report, on-order report, minimum stocking level report, salesperson productivity report, type-of-sale report, customer billing statement and general ledger interface.

Other software packages available, the firm said, include general accounting applications and custom applications such as a gasoline and fuel oil billing system, a tennis club billing system and construction payroll.

Base price for one application system, including hardware, is $40,000. Point of Sale Business Systems, Inc. can be reached through P.O. Box 20064, Columbus, Ohio 43220.

Periphonics Cuts T-Comm 7 Prices

NEW YORK — Periphonics Corp. has cut prices of the T-Comm 7 front-end processing and audio response system by 33%, the firm announced.

The pricing concept includes a six-month warranty which, in effect, affords new T-Comm 7 users the benefit of six months maintenance at no charge on any system ordered after April 10, Periphonics said.

The cost reduction "across the board" on all T-Comm products lowers the average price of a T-Comm 7 system to $95,000 — down from the original $140,000 figure. T-Comm 7s will now range from $60,000 for a basic system to approximately $147,000 for the most sophisticated model.

Periphonics Corp. is at 75 Orville Drive, Bohemia, N.Y. 11716.

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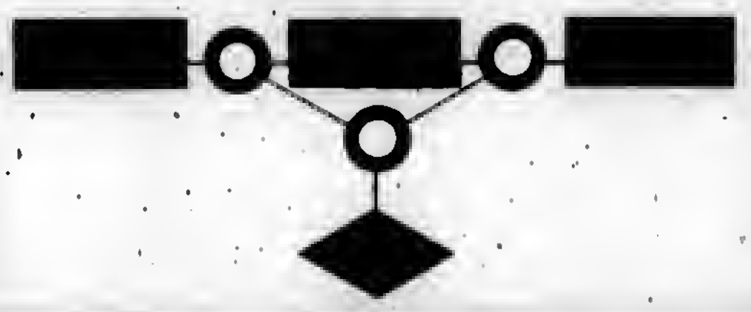

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PIX-II Software Gives Remote Device Priority

LARGO, Fla. — Paradyne Corp. has announced a software enhancement to its PIX-II virtual data link that reportedly allows users to assign priority access parameters to remote devices in mixed interactive and remote job entry configurations.

The software allows the user to enter simple control words, via a remote console, that group interactive devices such as IBM 3270-type CRT terminals into a high-priority subset and to similarly group batch-type devices, such as printers, card readers and tape systems, into a lower priority subset, a spokesman explained.

All these devices are supported on a single physical link for reduced telecommunications line costs. Since all data communications functions, including the prioritizing capability, are handled by the PIX-II system itself, there is no teleprocessing software overhead on the mainframe, the spokesman noted.

PIX-II is a minicomputer-based data communications system that allows IBM 360 and 370 users to link multiple remote devices to a central host over a single communications line and to implement Synchronous Data Link Control protocol without teleprocessing software on the mainframe. The system consists of a Local Control Unit (LCU), which attaches to the byte multiplexer channel of the host, and Remote Control Units (RCU) at dispersed sites, which can support multiple IBM and/or Paradyne devices such as interactive CRT terminals, printers, card readers and tape drives.

The software enhancement will be released to PIX-II users in September. Its price will depend on the type and number of attachments.

LCU pricing begins at $475/mo on a five-year lease, which includes a 4,800 bit/sec modem and maintenance. RCU prices begin at $390/mo, also with a 4,800 bit/sec modem and maintenance.

Paradyne is at 8550 Ulmerton Road, Largo, Fla. 33541.

CRT Compatible With DEC VT-52

PENSAUKEN, N.J. — Datamedia Corp has announced an alphanumeric CRT it said is compatible with the Digital Equipment Corp. VT-52.

The Elite 3052A offers formatting capability, eight levels of screen enhancements and a detached keyboard, according to a spokesman.

The unit is a buffered VT-52-compatible terminal with a single-page CRT memory that displays 1,920 alphanumeric characters in a 24-line by 80-character format. It offers a series of features for VT-52 users, according to Datamedia, that include:

- A range of operating modes — on-line, printer controller, hold screen, autocopy, format, format modified and transparent — to meet a range of applications requirements.
- Host control of the block transmit function in local or remote environments.
- Switch-selectable EIA or 20mA current-loop interfaces.
- Buffered support of host-to-printer data transfers.
- Ten user function keys for access to programs, formats, etc.
- Eight-level video, which required no memory address space.
- Fifteen transmission rates up to 9,600 bit/sec, selectable from keyboard.

The terminal, priced at $1,700, reportedly offers operating features that require no programming for interactive applications, data entry, information retrieval or any related data communications requirement.

Datamedia also announced a price reduction on its earlier 3025A CRT. The earlier CRT now costs $1,700.

Datamedia is at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

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Commercial Banks, S&L Share Kansas EFT Net

TOPEKA, Kan. — A group of seven commercial banks in Kansas has teamed up with the state's largest savings and loan (S&L) association to share an electronic funds transfer (EFT) system that supports point-of-sale (POS) banking transactions through a central switching center here.

More than 40,000 banking customers in four cities in the state currently have access to the network.

The two systems in the EFT network are the Zip Card System and the Moneymatic System. The Zip Card System was developed by Merchants National Bank and the Moneymatic System is operated by Capitol Federal Savings and Loan Association, both here in Topeka.

National Sharedata, the Western Union Teleprocessing, Inc. division which manages the DP operations of Merchants National Bank, designed and implemented the Zip Card System for the bank.

First Such Interface

The EFT switching network is the first to be interfaced in this fashion, tying in the computer facility of a commercial bank with the computer facility of an S&L and accommodating POS banking transactions, according to a spokesman.

The switching network links National Sharedata's IBM 370/145 with Capitol Federal's IBM 370/138. National Sharedata's Topeka computer center ties in with 16 Diebold, Inc. Model 610 automatic teller machine (ATM) terminals located in Topeka, Emporia, Lawrence and Manhattan.

Capitol Federal's Moneymatic computer system ties in with 37 IBM 3608 POS terminals located in various supermarkets in the state. These remote terminals are connected to Capitol Federal's facility by Western Union communications lines.

The Zip Card System, operational virtually around the clock, also permits banking customers to conduct banking transactions at unmanned "Zip machines" located in bank lobbies and other sites away from their banks, including three major universities.

"With the seven banks sharing the network now, there are more than 40,000 accounts representing nearly 70,000 Zip cards in the hands of customers who can use either Zip machines or moneymatic terminals," according to Oliver H. Hughes, chairman of the board and chief executive officer of Merchants National Bank.

To use the Zip system, customers are provided with a plastic Zip card with embossed lettering showing the customer's name, cardholder number and name of the bank. Insertion of the card activates the ATM so customers can make deposits or withdrawals, transfer funds, make loan payments, request their account balances or leave messages for the bank concerning their accounts.

"For security, a personal identification number [PIN] has been assigned to each customer and is known only to the customer," according to Steve Michell, vice-president of National Sharedata and manager of the Topeka computer facility for Merchants National. "It takes both the plastic card and the punching in of the PIN to complete a transaction."

IDS Expands Minitech Line With Tester of EIA Cables

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has expanded its Series 8500 minitech modules with the Model 8580 EIA cable tester.

The Model 8580 is a portable EIA cable tester that indicates opens, shorts and miswired conductors in connectorized cables up to 50 feet, IDS said. An EIA 25 conductor cable is tested by coupling both ends to rear-panel connectors and rotating a front-panel switch through each of its 25 positions while pressing the "Cable Test" momentary switch.

Four rear-panel connectors allow the 8580 to test cables with either male or female connectors at either end.

Faulty conductors are indicated at the front panel by three red LEDs that light for each of the different fault conditions; a buzzer sounds an alarm. The 8580 lights a green LED when the cable conductor matching the current switch position is in good condition.

The unit is housed in a desktop aluminum case, sized for use both in the field and in the technical control center, the spokesman said. It is powered by a long-life dry cell or by an optional ac adapter/charger unit and Nicad batteries, the firm noted.

The Model 8580 costs $395, IDS said from 100 Nashua St., Providence, R.I. 02904.

PTS-100 Gains Impact Printer

NORWOOD, Mass. — Raytheon Data Systems, Co. has introduced a 45 char./sec printer for use with its PTS-100 line of programmable terminal systems.

The Model 3408 is a microprocessor-controlled impact printer designed for use in applications requiring typewriter-like output quality. It features a servo-controlled daisy wheel-type font — either Courier or Pica — which produces "sharp fully formed" characters on one- to six-part forms, the company claimed.

In addition, the Model 3408 features switch-selectable form feed in increments from one line to 14 in., a full Ascii character set and a 132 char./line by 6 line/in. format.

The Model 3408 is supported by Raytheon Data Systems' PTS-100 communications-oriented processor, which can support up to 32 CRT terminals and up to 24 low-speed interfaces, a spokesman said.

The 3408 prints a predetermined parity error character in place of a character received with parity error.

The Model 3408, available for immediate delivery, is priced at $6,555 and rents for $191/mo and $176/mo on one- and two-year lease/maintenance contracts respectively. Raytheon is at 1415 Boston-Providence Tnpk., Norwood, Mass. 02062.

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Univac Adds CPU, Data Entry System

• 90/40 Makes Formal Debut

By Frank Vaughan
CW Staff

BLUE BELL, Pa. — Univac has formally announced its medium-scale 90/40, which fills part of the gap in the mainframer's 90 series and provides an upgrade path for users of the older 9000 series CPUs. The system had been described to more than 400 members of the American Univac Users Association at a recent meeting [CW, April 17].

The 90/40 extends the range of the present 90/25 and 90/30, a spokesman said, noting that the 90/40's 500 nsec cycle time (for each 2-byte half word) and a different instruction access method give the system an improvement of approximately 30% over the 90/30's processor speed.

The disk-oriented system's processor, is under microprogram control and is organized with an 8-bit byte and 2 byte/fetch. The CPU has 16 registers for program functions, 16 for supervisor functions and four for floating-point arithmetic.

The 148-instruction set includes 44 floating-point instructions, the spokesman said.

The system comes with 512K bytes of MOS semiconductor memory and can be expanded to 1 Mbyte in 128K-byte increments. The minimum disk storage is 200 million bytes on two drives of the firm's 8430 disk subsystem.

Disk storage capacity can be increased to a maximum of more than 3 billion bytes. The 8430 drives are field-expandable to the 200 million-byte Model 8433 drive units, the spokesman claimed, pointing out that the 90/40 also supports dual-access capability for 8430 and 8433 disks.

(Continued on Page 53)

The 90/40 (above) is the largest Univac system that uses the OS/3 operating system. The 512K-byte CPU can be expanded to 1M byte in 128K-byte increments. The UDS 2000 (below) is a key-to-diskette system that can be used in a distributed data entry environment.

• UDS 2000 Joins Lineup

By Howard A. Karten
CW Staff

BLUE BELL, Pa. — A user-programmable, microprocessor-controlled key-to-diskette system aimed particularly at distributed data entry users has been introduced by Univac.

The Universal Distributed System 2000 (UDS 2000) is intended for use mainly in distributed or decentralized DP and is equipped with an Advanced Micro Devices, Inc. 2901 microprocessor containing 32K bytes of memory.

The memory can be expanded to 64K bytes in 8K-byte increments and gives the system the ability to use a subset of Cobol for some simple programs, according to a spokesman.

Three communications protocols — binary synchronous, Univac's Uniscope 100 terminal line protocol and Univac Data Link Control (UDLC) — give the system the ability to be used alone or as a remote entry or communications terminal, the spokesman noted.

The basic UDS 2000 consists of a master workstation with 32K bytes of memory, a 9-in. dot matrix display CRT with a 512-char. display, a keyboard and a floppy disk drive. Optional attachments include the previously announced Univac 0786 character printer and the Univac 0781 line printer.

Two optional I/O devices announced with the system are the Model 0875 9-track tape drive, available in 800 bit./in NRZI or 1,600 bit/in. phase-encoded versions, and the Model 8421 free-standing diskette drive.

The basic system can be expanded to a total of four workstations, a maximum of four drives (disk or tape, in any combination) and two optional printer subsystems, according to the spokesman.

System Software

Several software offerings are available with the UDS 2000. An interactive program performs a dialogue with the user to determine the format used for data entry; this can then be saved for reuse, eliminating the need to enter it again. Each of the keystations can reportedly use a different format program, Univac said.

A limited subset of Cobol is also available, priced separately, and the Cobol compiler includes diagnostics used in program development, the company noted.

Other software reportedly includes reformatting programs, tape and diskette-to-diskette utilities, tape- or disk- to print utilities, a communications utility and a control

(Continued on Page 53)

Add-On Fits IBM 30 Series

BEDFORD, Mass. — Cambridge Memories, Inc. has introduced add-on memory for IBM 30 series CPUs.

The Stor/3000 models 31, 32 and 33 are fully compatible with the IBM 3031, 3032 and 3033 respectively, a spokesman claimed, adding that the Stor/3000, is the same basic memory system Cambridge has been selling for the 370/158 and 370/168 CPUs.

The memory, based on 4K static MOS elements, is slaved to the IBM CPU, so its speed matches the needs of the 30 Series CPU, he claimed. It can also use IBM's single-bit error-correction and double-bit error-detection logic, he added.

Stor/3000 comes in 2M-byte increments and will "probably" be available up to a 16M-byte maximum, the spokesman said, observing that the firm will sell each 2M-byte increment for "approximately $170,000," Lease prices have not yet been established, he said.

Deliveries are expected in the third quarter of this year from the firm at 12 Crosby Drive, Bedford, Mass. 01730.

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LOS ANGELES — "Although our computer system remained in the same room over the past four years, the numerous hardware additions and system reconfigurations we undertook during that time cost us over $80,000 in electricians' fees for the conventional, hard-wired power hookups we were using," Rodney Fragodt, manager of computer operations for William O'Neil & Co. here recalled. "The portable power center we now have would have eliminated nearly all of that expense."

William O'Neil is a research firm of investment advisors that publishes weekly analyses of stock market activity. A large-scale Burroughs Corp. B6700 is the heart of the firm's analytical and publishing operations.

"Last September we moved into our present facility — and because of our previous experience with high reconfiguration costs, we decided to provide our computer room with a moveable power system instead of using conventional hard-wired conduits," Fragodt explained.

The movable power system, a Data Processing Power (DPP) Model AD-125 Powermobile, provides a means of distributing power to the equipment through cables from a free-standing central unit about the size of a typical peripheral. Connected to utility power by a junction box under the floor, the unit includes a transformer to provide the various voltages needed.

"The Powermobile really made a difference in the ease of moving in to our new facility," Fragodt recalled. "When the floor was ready, we just rolled the unit in and connected the junction box, which took about an hour.

"The manufacturer had already prepared the various flexible cables to our specifications. All I had to do was place the hardware units where I wanted them, pull up two or three tiles at a time from the floor, throw the flexible cables underneath and connect them.

"If I had been running permanent conduit, I'd have had half of the floor ripped up, with electricians all over the place making permanent connections, and my computer system would have been down three or four days longer," he added.

Small Actual Cost

"The actual cost of the 125 KVa Powermobile — about $15,000 — was roughly equal to what a typical permanent-conduit installation (including one isolation transformer) in a facility this size would have cost in initial outlay," Fragodt estimated.

In this particular case, however, the need for a second isolation transformer to protect a sensitive peripheral from voltage transients would have boosted the cost of the hard-wired installation well above that of the Powermobile.

"We use a sensitive microfilm graphics machine, the Information International, Inc. FR-80, to provide microfilm output of our stock market analysis charts, and this unit requires its own isolation transformer if it's used in the same system with noisy peripheral equipment such as a line printer," Fragodt explained.

"If we'd used the hard-wired approach, this would have meant buying a $5,000 isolation transformer for the FR-80 in addition to the one needed for the system as a whole.

"Using the movable power system approach, there's no need for that separate trans-

(Continued on Page 51)

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RAM Fits Criterion CPUs

COSTA MESA, Calif. – The Ram-Stor 8000, a random-access memory (RAM) Module designed to be interchangeable with memory modules for NCR Corp. Criterion CPUs, has been introduced by the Computer Enhancement Corp.

The module is both hardware- and software-compatible with the Criterion CPUs, according to Computer Enhancement, which also claimed it is in compliance with "NCR's policies regarding foreign attachments."

However, an NCR spokesman, said "we don't know what [Computer Enhancement] means by 'NCR's policies regarding foreign attachments.' Like other vendors, we can assume no responsibility for what happens if foreign attachments are made to our Criterion systems."

The Ram-Stor's hardware and software compatibility with Criterion models 8450 through 8570 is achieved by using 4K-bit chips; compatibility with the larger 8580 and 8590 models is achieved using 16K-bit chips, a spokesman said.

Prices for the modules start at $7,000 from the firm at 3189-E Airway Ave., Costa Mesa, Calif. 92626.

Hard-Wire Fees Saved

(Continued from Page 50)

former. Every piece of gear in the computer room, including that FR-80, is running off the Powermobile unit – with no noise problems."

$80,000 Lost

When Dinesh Patel, vice-president, and Fragodt first approached top management about the savings a movable power system could provide, the initial reaction was one of disbelief.

"I think financial executives often can't see the direct advantages of a unit like this," Fragodt pointed out, "because they don't see the future growth that's coming and all that goes on in the course of two or three years with equipment moving in and out. So much of this cost is just 'absorbed' — and it's not any big number that sits in an account book and jumps out at you.

"Fortunately," Fragodt said, "I had kept good records of all of the electrical contractors' expenses involved in system expansions and reconfigurations during the four years we were located in the Tishman building in Westwood, Calif.

"Initially we installed a B5500 system, that we had been using at another Los Angeles location. Once that was in, we decided to add a minicomputer to augment our capabilities. Then we decided to upgrade to a B6700, and the mini was pulled out.

"For six months we ran the 5500 and B6700 in parallel and then pulled out the B5500. Then, finally, we reconfigured the B6700 to expand it and make better use of our space.

Every Change Costs

"Every one of these changes required electricians to rip out and reinstall permanent conduit — and the total four-year expense came to over $80,000.

"If we'd had a portable power center rather than using permanent conduit during those moves, the savings would have been astronomical. To add insult to injury, when we left these locations we had to pay to have the permanent conduit ripped out," he continued.

Because of the vast quantity of stock market data which must be gathered, analyzed, charted and published for subscribers on tight weekly deadlines, O'Neil could not afford to have its system down longer than absolutely necessary — even while moving.

"So when we moved last September," he said, "it had to be done on a very tight schedule. If we'd gone the permanent-conduit route, the three or four days we'd have lost while the electricians were laying the cable would probably have cost us several thousand dollars in processing time at a backup site."

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Image Processor Does Arithmetic

SUNNYVALE, Calif. — Stanford Technology Corp. has announced an image-processing system capable of performing four arithmetic operations and a range of Boolean operations on digitized graphic data. The Model 70 can interface with most of the minis now being marketed, according to the company.

The system can perform arithmetic operations at a rate of 10 million/sec, the company said, and is compatible with National Television Standard Code (NTSC) formats on both input and output. In addition, the Model 70 has three pipeline processing channels, one for each of the primary colors, which are selectively fed by any or all refresh memory channels, the firm explained.

Image-processing computers operate on pictures that have been converted to digital format, the firm said. This allows digital computers to process the data in various ways; for example, blurred images (in digital form) can be manipulated so as to clarify them or before-and-after pictures can be mathematically compared. The process was originally developed for use in satellite transmission of data, a company spokesman added.

Other features of the Model 70 reportedly include a hardware histogram generator, display of graphic overlays and cursors in up to 32,000 colors, a maximum of 12 channels of image refresh memory and multiple independent CRT monitors. In addition, a programmable processor is used to control and direct a large variety of system operations and to provide internal access to the complete array of the system's operational modules, the spokesman said.

The company said it has also developed software which lets the user link the system and a host computer.

Model 70 prices range from $30,000 to $150,000, depending on capacity and options. Stanford Technology is located at 650 N. Mary Avenue, Sunnyvale, Calif. 94086.

Line Compensators Bow

SAN DIEGO — A family of ac line compensators designed to attack the problem of low ac line voltages has been introduced by the California Instruments Co. here.

The LR series line compensators permit fully regulated output with input voltages ranging from 84 Vac to 132 Vac. They were designed to quickly recover to regulated output with an input line reduction up to 75% of nominal, the company said.

The units were developed for instrument rack mounting and come with cooling fan, circuit breaker and high/low voltage indicators. They are available in power ranges up to 5 kva and are capable of accepting input voltages of 115-, 208-, 220-, 230- and 240 Vac.

Prices range from $995 to $4,195. The company is at 5150 Convoy St., San Diego, Calif. 92111.

Univac Key-to-Diskette System Bows

(Continued from Page 49)

program that runs the whole system and must be generated when the system's configuration is changed.

The master workstation has a 96-character keyboard with national character fonts available for the Scandinavian countries, France, Italy, Spain, the Netherlands, Germany and the UK; a 128-character set in Katakana (a Japanese character set) is also available. The keyboard itself can be supplied as a typewriter, a keypunch or a keypunch/adding machine, Univac said.

The system can reportedly interface to a CPU via the use of the Univac Direct Connection Module (DCM) to transmit data directly or can transmit from a diskette or magnetic tape subsystem. Transmission speeds are 2,000, 2,400, 4,800 or 9,600 bit/sec in half-duplex mode, over switched or non-switched lines, the spokesman said.

The UDS 2000 does not require a raised floor or special environmental considerations, he said, and first deliveries are slated for August.

Purchase price for an entry-level UDS 2000 system, with 32K bytes of memory and one keystation, is $9,798, or $208/mo for rental and maintenance on a 5-year lease. A version with three keystations and a 200 char./sec printer costs $25,262 from the company at P.O. Box 500, Blue Bell, Pa. 19422.

90/40 Debut Now Official

(Continued from Page 49)

The 90/40 uses the same OS/3 operating sytem as the smaller models in the 90 series. OS/3 provides multiprogramming of up to seven jobs concurrently, I/O spooling, job scheduling and a data management system.

Other existing software products offered for the 90/40 include the Information Management System 90 (IMS 90), which permits on-line data entry; Data Base Management System 90 (DMS 90), which performs the typical data base functions; and Information Collection System 90 (ICS 90), which supplies a preformatted, fill-in-the-blanks approach to data input..

The 90/40 multiplexer channel will accommodate up to eight I/O subsystems and has a 99 kbyte/sec throughput rate. The two selector channels will also handle up to eight I/O subsystems per channel with a 1M byte/sec throughput rate for each channel, the firm said.

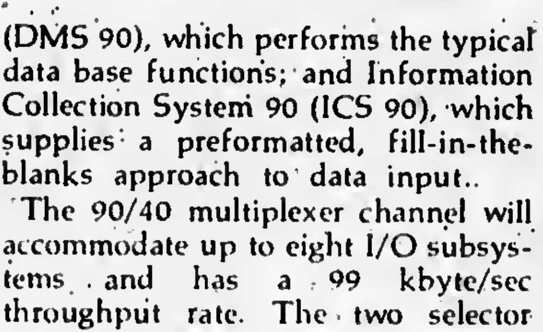
The communications adapter will handle 12 half- or 24 full-duplex lines with speeds of up to 56 kbit/sec.

Optional peripheral devices include 500-, 600- or 1,000 card/min readers; a diskette reader with speeds ranging to 1,500 record/min; 75- to 160 card/min punches; 300-, 500-, 750-, 900-, 1,400- or 2,000 line/min printers; and CRTs with 16 lines of 64 char./line.

A basic system with 512K bytes of main storage, disk control and a communications adapter sells for $304,272 and rents for $7,089/mo on a five-year lease with maintenance.

First deliveries are expected to begin next month, the firm said from P.O. Box 500, Blue Bell, Pa. 19422.

[redacted]



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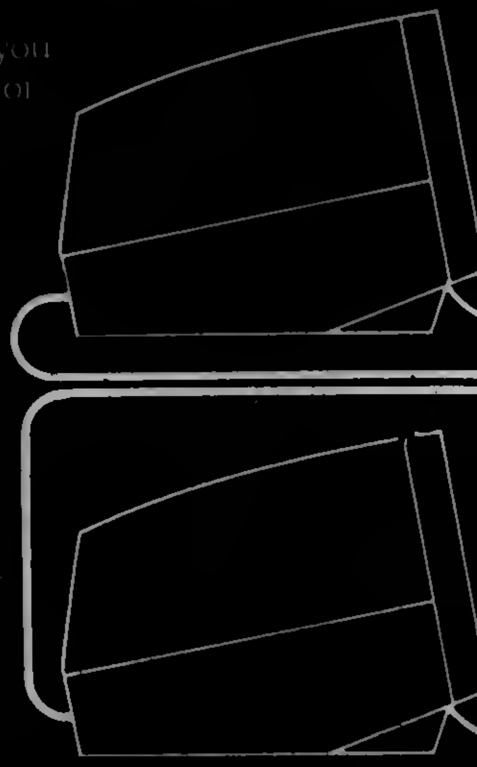

Mohawk Data Sciences announces System 21/50, the latest member of the Series 21 family of distributed processing systems.

System 21/50 doubles the power and doubles the capacity of Systems 21/20 and 21/40—but retains the pricing breakthroughs that have made Series 21 a worldwide solution to data entry, stand-alone operations and distributed processing requirements.

A System 21/50 performs multiple functions, uses high level language, and does the local office processing you need right now. And the System 21/50 grows with you. With main memory up to 128K. With disk storage to 20 megabytes. With printers from 45 cps to 600 lpm. And with magnetic tape drives and communications options as you need them.

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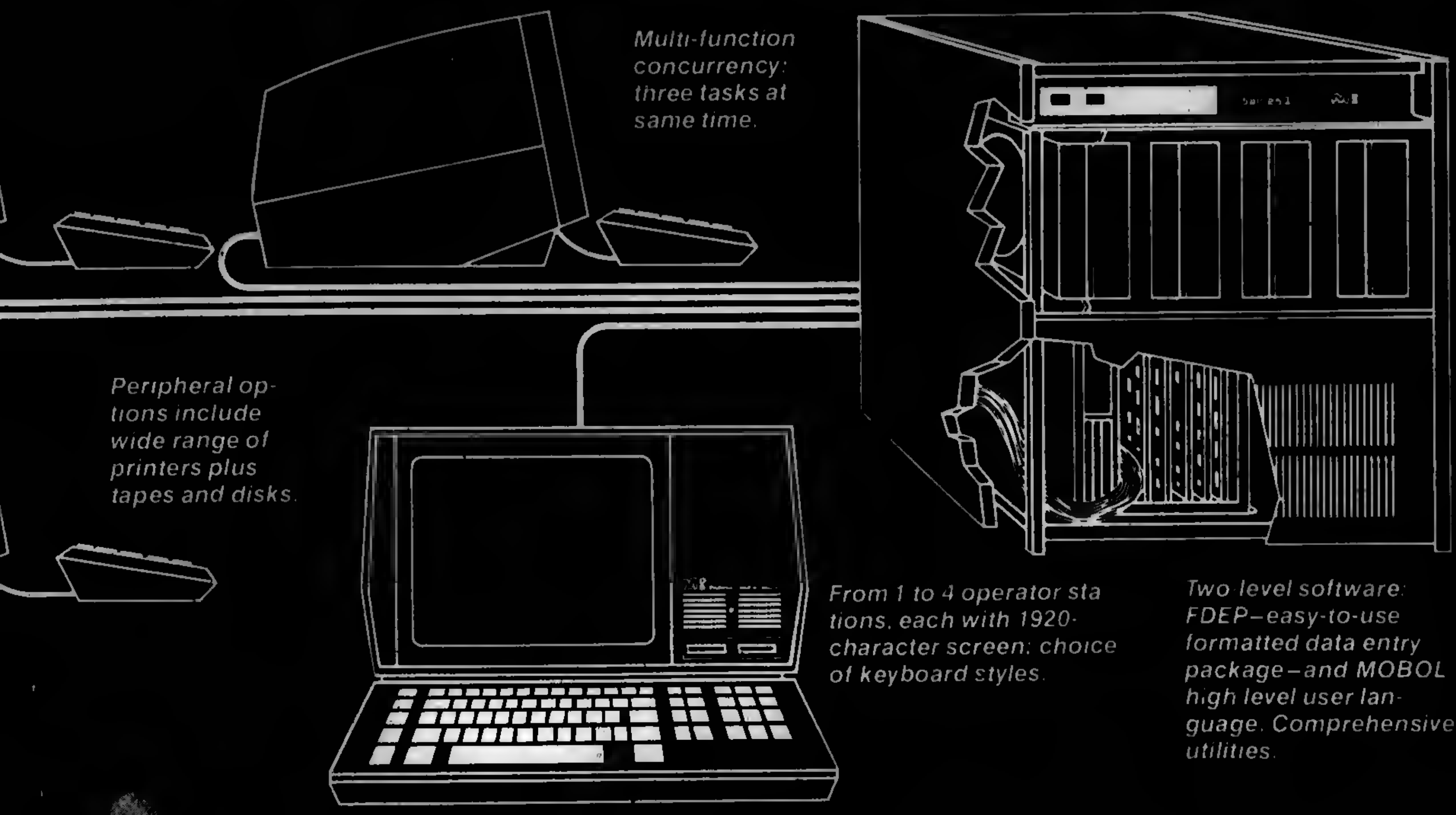

Multi-function concurrency: three tasks at same time.

Disk storage capacity range: 2.5 megabytes to 20 megabytes.

Main memory expandable from 64K to 128K bytes.

Storage hierarchy includes single or multiple diskette drives plus hard disk.

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NEW YORK Mid-Atlantic Computer Expo	May 9, 10, 11 New York Coliseum
DETROIT Great Lakes Computer Expo	May 23, 24, 25 Cobo Hall
BOSTON New England Computer Expo	May 30, 31, June 1 Northeast Trade Center

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Mini Bits

DEC RF-11/RS-11 Gets Memory Replacement

SANTA ANA, Calif. — A core memory replacement for the Digital Equipment Corp. RF-11/RS/11 fixed-head disk system can accommodate eight memory modules and hold .5M- to 2M bytes of storage, according to the product's developer, Standard Memories/Trendata.

Buscomm DS-11 interfaces to processor systems through a DEC Unibus interface and is software-transparent to all DEC operating systems and diagnostics that support RF-11/RS-11 disk systems, a Standard Memories spokesman said.

Features with the unit reportedly include on-line/off-line switch, built-in self testing, selectable transfer rates to one million word/sec, selectable block transfer mode and user-assignable configuration controls, which the company claims minimizes downtime.

A typical Buscomm DS-11 memory system incorporates a memory controller, memory modules, display card, power supply and chassis.

A .5M-byte unit costs $15,790; a 1M-byte configuration, $26,790; a 1.5M-byte configuration, $37,790; and a 2M-byte configuration, $48,790.

All the configurations and technical data are available from Standard Memories/Trendata at 3400 W. Segerstrom Ave., Santa Ana, Calif. 92704.

RDOS Revision Supports Rolm Floppy Disk System

SANTA CLARA, Calif.— A recently introduced revision of Rolm Corp.'s Real-Time Disk Operating System (RDOS) supports the company's Model 3383 floppy disk system, according to company officials.

Revision 6.50 reportedly provides 11 enhancements to Rolm's previous RDOS features.

These enhancements include a redesign of the Fortran IV multitasking library to boost execution speed, the addition of macro commands to improve linkage to the outside when operating within files and added support for the asynchronous data communications multiplexer, a Rolm spokesman explained.

RDOS 6.50 is available free with the purchase of a Rolm Milspec computer system consisting of a Rolm processor with a 16K- to 32K core memory, real-time clock, terminal and a removable-medium storage unit, the spokesman said.

The product is available immediately on diskette, magnetic tape or magnetic disk cartridge. Rolm is located at 4900 Old Ironsides Drive, Santa Clara, Calif. 95050.

NCC Slows Mini/Micro

Show Has Few Unveilings

By Jeffry Beeler
CW Staff

PHILADELPHIA — Although still five weeks away, this year's National Computer Conference (NCC) cast a lengthening shadow over last week's Mini/Micro '78 exposition here and turned what otherwise might have proved a lively event into little more than a warm-up for "The Big Show" starting June 5.

Many of Mini/Micro's almost 100 exhibitors, especially the peripherals and memory suppliers, readily admitted they could have introduced major products here. But with NCC in the background, most vendors elected to keep secret projects under wraps a while longer and save major announcements for maximum impact in June.

Another factor that inhibited activity at Mini/Micro was a more familiar bugaboo — the weather. A day of haze and intermittent rain did for visitor attendance what the proximity of NCC did for vendor announcements.

After a relatively heartening turnout of 2,310 visitors during the first day of the three-day event, attendance declined noticeably during the second day, although no precise figures were immediately available. Furthermore, one of the show's administrators held out little hope of dramatically higher attendance during the final day.

A source here blamed the modest turnout partly on the show's location. For the first time in years, Mini/Micro took place nearly 3,000 miles from its usual home in California.

The temporary move reportedly represented an attempt by organizers to prevent the show from becoming lost in the crowd of other conferences slated this year for the Anaheim, Calif., area, and they may have succeeded in their goal.

But in so doing, the organizers sacrificed much of the promotional muscle they might otherwise have enjoyed, and the attendance figures for the show reflect that fact, they conceded.

Variety of Visitors

Although Mini/Micro '78 might not have exerted as much drawing power as its administrators had hoped, it still managed to attract visitors representing a wide spectrum of professional interests and backgrounds.

Some attendees, such as a physician wandering among the long rows of exhibitor booths, admitted they had no immediate plans to automate their operations and were

(Continued on Page 58)

Canned vs. Custom Software: Novice Users' Quest Explored

By Jeffry Beeler
CW Staff

PHILADELPHIA — You are a corporate executive who has recently decided to outfit his firm with its first small business system. Not long after beginning the search for the right combination of hardware and software, you find yourself posting the same installation question that has vexed countless other first-time users for years: "What kind of applications software package should I get — off-the-shelf or customized?"

Two executives with firms that frequently deal with small systems novices addressed the canned-versus-customized-software issue during a seminar at the recent Mini/Micro '78 conference here.

Both Charles Muhle, director of marketing support at Basic/Four Corp. and David Brill, president of Brill Associates stopped short of explicitly endorsing one or the other type of package as the best solution for all small systems applications. User needs vary too much for one remedy to be universally applicable, they noted.

But the two speakers did outline some general software information and selection tips they said could help increase users' awareness of the potential strengths — and weaknesses — they can expect with both types of program packages.

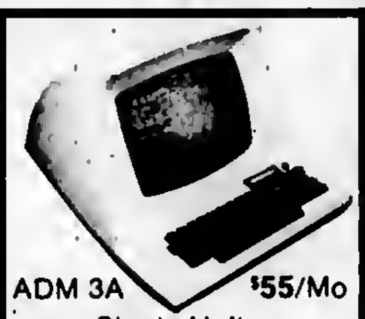
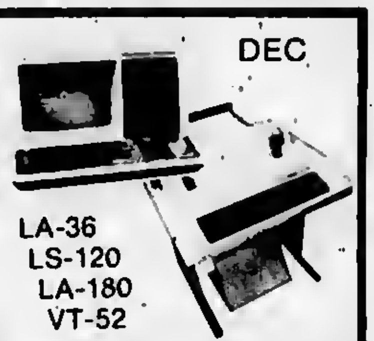
Preferred Approach

Muhle predicted a growing preference among small systems users for canned applications packages. Although custom-written software has attracted many buyers during the years and will probably continue to do so for some time, most small businesses have neither the expertise nor the financial wherewithal to contract for such an alternative, he explained.

Muhle likened the selection of an applications package for a typical small business system to buying a new house. Instead of designing and building a dwelling tailored exactly to their domestic needs, most prospective homeowners elect to peruse the market until they find a model that strikes their fancy.

In most instances, they never find a home that perfectly satisfies their tastes and requirements. Instead, they make a few minor

(Continued on Page 60)

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Overshadowed by June NCC, Mini/Micro Has Few Unveilings

(Continued from Page 57)

sampling some of the most interesting displays simply to satisfy personal curiosity.

Most of the visitors, however, arrived at the show with a more specific objective in mind.

Michigan Attendee

John Holtzman, director of Village Green Management Co., traveled all the way from Southfield, Mich., to evaluate hardware for a system he is considering installing to speed his firm's financial and accounting operations. Holtzman, a self-confessed computer novice whose company manages more than 6,000 apartments, said he hopes to buy a micro and "play with it awhile, then figure out how to adapt it to our company's needs."

George Steelman visited Mini/Micro '78 for two reasons. As manager of the technical staff at the Palm Beach County, Fla., DP department, Steelman came here to inspect peripherals he hopes to add to his organization's communications network, which currently supports 80 on-line terminals. As co-owner of Sky, Inc. — a small microcomputer OEM that primarily serves the hobbyist and small business market — he came to evaluate processors for possible addition to his firm's product line.

'Some Disappointment'

Steelman said he had met with considerable success in his first goal and had found several terminal models that could fit easily into the Palm Beach County communications network. As for the second objective, he admitted some disappointment, primarily because some of the microcomputer suppliers he had hoped to meet never exhibited at the show.

Karen Rapkin, account executive with a New York City advertising agency, attended Mini/Micro '78 to gather background and marketing information for one of her firm's clients — Sharp Electronics Corp., which plans to enter the microcomputer business. Rapkin spent most of her time here attending some of the show's 24 seminars, which she said provided helpful hints about how to enter the computer manufacturing field.

She also visited a number of the exhibitor booths to find out about hardware availability in the microcomputer business and to help formulate her client's emerging marketing strategy.

HP1000 Memory Gets Price Cut

CUPERTINO, Calif. — Hewlett-Packard Co. has announced a 38% decrease in the prices of semiconductor main memory for its 1000 series computers.

With the reductions, the cost of the company's memory has dropped from five cents to 3.1 cents per byte, according to Richard W. Anderson, general manager of HP's Data Systems Division.

The price cuts mean that a 128K-byte, 560-nsec memory board that once cost $6,400 now sells for $4,000, Anderson said.

The reductions will especially affect large memories like the 512K-byte unit for M-series computers, HP officials added. Previously priced at $33,450, the M-series now costs $21,750.

Add-On Fits LSI-11

CRANBURY, N.J. — A 16K by 18 core add-on memory for users of Digital Equipment Corp.'s LSI-11, LSI-11/2 and PDP-11/03 is now available from Dataram Corp.

Claimed by its developer to be the largest LSI-11-compatible add-on currently available on the market, the DR-115 accesses in 425 nsec and cycles in 1.15 microsec, Dataram officials said.

Also available in an 8K by 18 configuration, the unit comes on a DEC quad board and operates with 5V and 12V, the spokesman added. DR-115's 18-bit word length reportedly allows either parity or nonparity operation.

In its 16K by 18 configuration, the product costs $1,630; in its 8K by 18 configuration, $1,325.

Dataram is located at Princeton-Hightstown Road, Cranbury, N.J. 08512.

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Mini Provides the Wind

Yacht Club Sails Into Smooth Financial Waters

By Ann Dooley
CW Staff

SAN FRANCISCO — A minicomputer system that is used to handle all the general ledger work and membership information is encountering smooth sailing at the St. Francis Yacht Club here.

The club uses a Basic/Four Corp. Model 400 system, which it purchased two years ago after a fire destroyed the accounting machines used to balance the accounts of its 1,865 members.

St. Francis contracted with Interactive Computer Systems (ICS) of Costa Mesa, Calif., a software company, to reconstruct the club's membership files and handle all the accounts using the Model 400.

While ICS was compiling the lost records, Ernest Friez Jr., club manager, looked at several other systems, but finally decided to stay with the Basic/Four system. He chose the Model 400 primarily because its vendor offered an existing software package for yacht clubs, he recalled.

Since St. Francis installed the system, the time to process accounts receivable has been cut by two-thirds and the time to process the payroll for 50 employees has been reduced by half, Friez said.

The system handles a general ledger program including all the usual accounting functions, according to club accountant Trudy Schmidt. The yacht club is planning to add inventory control of food and beverages, as well as handicap statistics for the sailboats and other statistical work related to the club's regattas.

The club is also planning to add a second terminal to ease the workload on the yacht club's existing input unit, which is in constant use, according to Schmidt. In addition to the 24K-byte CPU, the system incorporates a 10M byte disk drive, a CRT terminal and a medium-speed matrix printer to generate hard copy.

Data Bases

The system contains membership information including children's names, boat numbers, purchase history and other pertinent member data. Employee records stored in the system include payroll data, date hired, home address and other statistics, Schmidt said.

The system selects checks to be paid; performs payroll; generates trial balances, financial statements and budget statements; and prints mailing labels, she noted.

Once a member's charge and cast transactions are recorded in the register and checked to make sure they balance correctly, the totals are put on a control sheet and entered by batch control into the system.

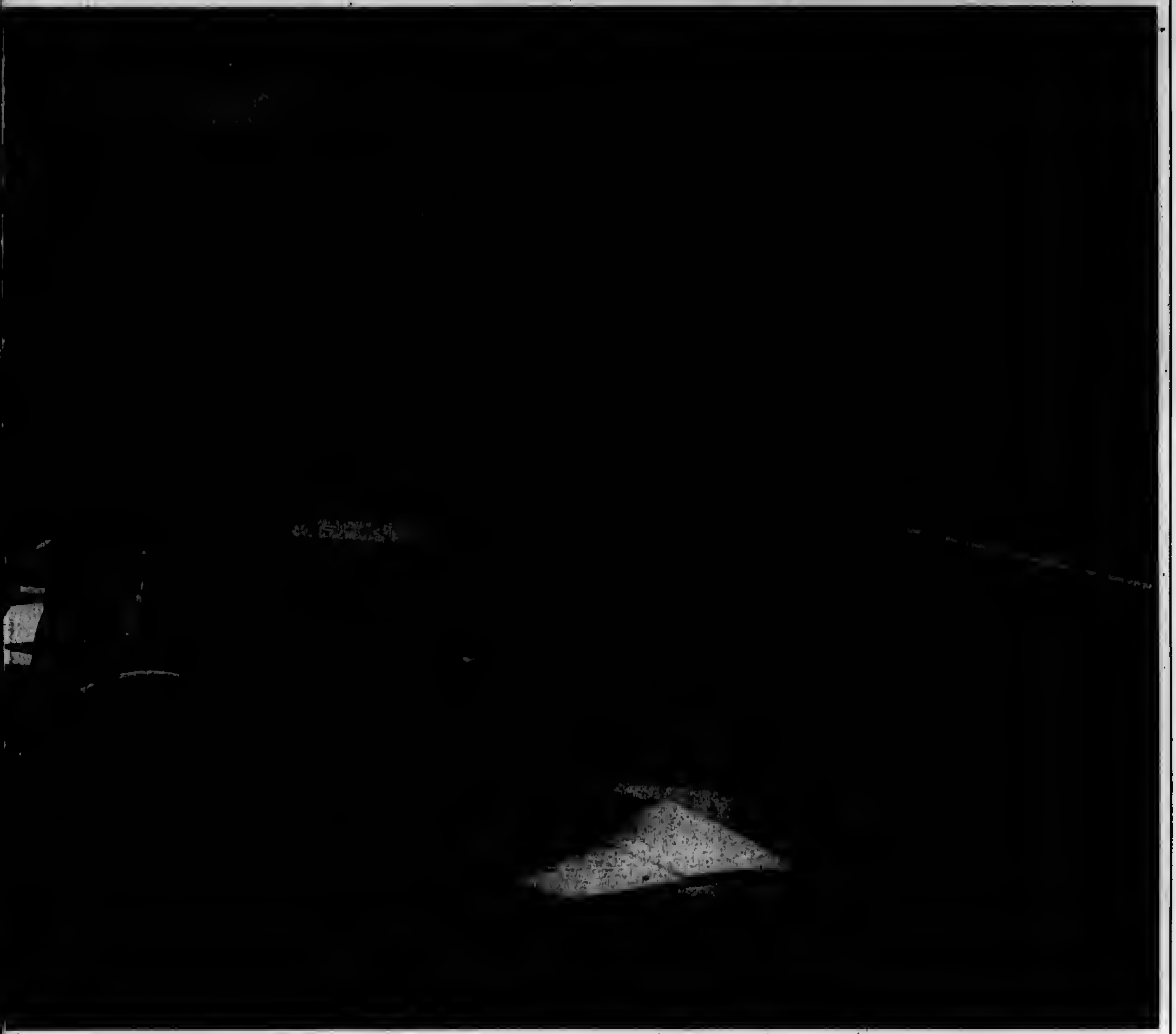
The information entered includes the bill number, dining number and the number of persons served, as well as other necessary billing information.

The system is programmed to break down billing totals by the type of expenditure (lunch, dinner or special event charges), add sales tax, include guest charges and update the total posted for each member's account. It provides a complete batch total automatically and updates the general ledger account.

In addition, the system updates all paid cash sales, produces a report indicating the balance owed by the member and updates all members' accounts.

The system also produces a summary indicating the number of sales, the average meal sale and a complete month-to-date sale total, Schmidt said.

Further, the system is programmed to select which checks to pay by due date, discount date or cycle time and runs a selection report to verify the choices, Schmidt said.



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Panel Explores Novice User's Software Quest

(Continued from Page 57)

sacrifices here and there in an attempt to secure an abode that meets most of their major requirements. Later, when the buyers occupy their new house, they can make minor additions or improvements as they see fit.

The same principle applies to most prospective buyers of small business applications software, according to Muhle. Few users develop a package from scratch. Rather, they evaluate the range of software already available in their respective industries and then choose a product, he noted.

If necessary, they later modify the package to make it more nearly suit the applications requirements peculiar to their individual companies.

If the Suit Fits . . .

Brill responded to Muhle's metaphor with an analogy of his own. Most clothing store patrons, he said, can buy an off-the-rack suit and obtain a decent fit with only minor hemming and stitching.

Some people, however, have such unusual physical attributes that no amount of alteration to an off-the-rack suit will accommodate their needs. Such buyers require custom-tailored clothing just as some businesses demand custom-written applications software, he explained.

Brill conceded that canned software usually costs less and proves quicker and easier to implement than its custom-developed counterpart. "But that advantage applies only if the software fits," he said.

Software development, Brill continued, typically consists of three major phases: system design, programming and installation. With a customized package, design usually occupies about 25% of the total development time; programming, about 55%; and installation, the remaining 20%.

With a packaged system, by contrast, users can typically cut their design time by 10%; programming, by 30%; and implementation, by 5%, Brill said. "The quicker development times associated with canned applications software, however, will be somewhat mitigated by the vendors' 90- to 120-day delivery lead times for hardware," he warned.

Wirewrap Boards Fit IBM Series/1

ORANGE, Calif. — Custom interface design requirements for the IBM Series/1 are reportedly facilitated by two wirewrap boards introduced here recently by MDB Systems, Inc.

Models MBI-49-WW72 and -WW64 provide 72 20-pin or 64 16-pin integrated circuit (IC) positions, and users can develop various other IC size combinations, MBD officials said.

Both boards include pins in the user wirewrap portion and come with pads for discrete components, the spokesman added. Available with two 40-pin ribbon-cable edge connectors, the products accommodate any .3-, .4- or .6 center dual in-line packages, MDB explained.

The Series/1 boards are said to occupy one chassis slot in an IBM CPU and come with power and ground that are prewired to each standard socket position.

Both boards cost $495 from MDB systems at 1995 N. Batavia St., Orange, Calif. 92665.

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Features Programmable I/O

National Semi Has Rack-Mounted MPU

SANTA CLARA, Calif. — National Semiconductor Corp. has introduced a rack-mounted 8-bit microcomputer that reportedly incorporates programmable serial and parallel I/O, complete busing and three expansion board slots.

The RMC 80/10 has six general-purpose registers, an accumulator, a 16-bit program counter and a 16-bit stack pointer, according to a spokesman. The registers can be used singly or in pairs and the program counter allows direct addressing of 64K bytes of memory.

The stack pointer permits storage and recall of register contents while servicing interrupts and subroutines, the firm added.

The unit is based on a BLC 80/10 MPU with 1K of on-board random-access memory (RAM) and four sockets for up to 4K bytes of programmable read-only memory (Prom). Two of the Prom sockets can be used for an optional system monitor for loading, debugging and executing programs.

The monitor permits reading and punching of paper tape, display and change of memory register contents and execution of program segments.

All RAM and Prom operations are performed at the 1.95 microsec maximum processor speed, the spokesman said.

Programmable Communications

A programmable communications interface can be added to the unit to provide either synchronous or asynchronous serial I/O with jumper-selectable rates from 110 bit/sec to 19.2 kbit/sec as 20mA current-loop or RS-232C signals.

The system software selects the mode and inserts data, control characters and parity bits, according to the vendor.

In addition, 48 lines can be software- or firmware-programmed to any unidirectional or bidirectional I/O configuration, the spokesman said. Ten sockets on the board permit the user to select proper terminators and drivers for each application.

The 80/10 memory is expandable to 64K bytes; an optional combination board supplies an additional 48 programmable parallel lines and an additional serial RS-232C communications interface.

National Semi RMC 80/10

Input power for the unit is transformer tap-selectable for 100V, 115V, 200V and 230V at 47 Hz to 63 Hz with a total power consumption of 36.2W without expansion board options, National Semi said.

In single quantitites, the RMC 80/10 is priced at $1,345. National Semi is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Zilog Development System Built for Z80

CUPERTINO, Calif. — Zilog, Inc. has introduced the ZDS-1/40 development system, a stand-alone hardware and software design tool to support the development of Z80- and Z80A-based microprocessor systems.

The ZDS-1/40 is said to achieve real-time emulation by using two microprocessor circuits — a Z80A MPU inserted into the prototype system and a second Z80 MPU inside the development system. This two-chip method reduces the problems inherent with connecting the user's system to a development system and allows emulation to clock frequencies of 4 MHz a spokesman said.

Zilog is offering the 4 MHz emutator two ways: with the ZDS-1/40 development system or as a factory-installed Zilog Real-Time Emulator option (ZRTE) to upgrade users' existing ZDS/U development systems to accommodate 4 MHz components.

Hardware features the ZRTE include a thick-film hybrid version of the Z80A MPU circuit with the same timing and characteristics of the Z80A MPU. Through the use of a 6-ft flat cable, the ZRTE inserts directly into the user's system, enhancing noise immunity, the spokesman claimed.

Other ZRTE features reportedly include memory mapping and protection in 1K-byte segments; user memory refresh, even when emulation is suspended; verification of user clock integrity; detection of memory access to nonexistent or write-protected blocks; and disk-based software.

System Features

A standard ZDS-1/40 development system includes 32K bytes of main memory, with a capacity of up to 65K bytes on a single board, allowing more room for additional I/O options.

In addition, according to Zilog, the ZDS-1/40 offers users:

- The RIO operating system with relocating assembler, linker, text editor and logical file structure.
- Floppy disk drives; each providing storage of up to 300,000 bytes on removable diskette.
- A programmable breakpoint module to permit the monitoring and testing of specific address, data and control bus states to stop program execution or to create a scope sync.
- Programmable real-time storage module to allow the recording of address, data and control bus lines for selected operations (memory read, memory write, instruction fetch, I/O read and I/O write).
- I/O Ports. Users can access all I/O ports when user mode and user clock is selected.

The disk-resident software for the emulator is a command package for effecting real-time, in-circuit emulation for the user's prototype system, the spokesman said.

The software package provides both user initialization commands and user debug commands. With the user initialization commands, the user can set the mode of emulation (interrupt mode and write-protect break) and display and edit. the memory map.

The user debug commands allow the user to set and display user memory; set and display the current state of the emulator; get image files from disk and load them into user memory; save user memory on to disk as image files; start and monitor execution of user programs; input from or output to an I/O port; and display and edit the emulation status, Zilog said.

The ZDS-1/40 costs $11,690 and the ZRTE option costs $2,750. Detailed specifications and applications information are available from Ron DeJong at Zilog, 10460 Bubb Road, Cupertino, Calif. 95014.

Objective Design Unveils Trio: PCG, Cardframe, 'Star Wars'

TALLAHASSEE, Fla. — Objective Design, Inc. has extended its line with a trio of products: a programmable character generator (PCG) for Z80-based systems, an S-100 cardframe construction kit and a "Star Wars" simulation game program.

The PCG can be used with video boards incorporating Motorola Semiconductor Products, Inc. 9 by 7 matrix generators. The card is made operational in the user's system by removing the character generator read-only memory (ROM) from the video board, plugging it into the socket on the PCG and then running a 24-pin connector from the PCG to the empty character generator socket, a spokesman explained.

Users can create individual characters, store them in on-board random access memory (RAM) and access the characters directly from the keyboard, he noted.

The S-100 construction kit comes assembled into a cardframe with room for 22 cards, the spokesman said. The kit contains front and rear prepunched panels, support bars, structural bars, motherboard supports, a set of 10 card guides and a power supply.

The game program is an adaptation of the "Star Wars" movie battle against the Death Star. Under player control, ships move in three dimensions to simulate space flight, the firm claimed.

The game, which requires Objective's character generator for operation, is written in 14K of 8080 Assembly language. The program code is offered on tape cassettes.

The PCG is priced at $165.95 as a kit and $215.95 assembled; the cardframe kit costs $154.50 with a power supply and $89.50 alone. The game program, with rules and instructions, costs $7.50.

Objective Design can be reached at P.O. Box 20325, Tallahassee, Fla. 32304.

Exorcisor Users Get Expander Board

CANTON, Mass. — Datel Systems, Inc, has a 32-channel analog-to-digital (A/D) multiplexer expander board for users of Motorola Semiconductor Products, Inc. M6800 Exorcisor systems.

The ST-6800ADX32S board has an analog signal performance which includes a 1 msec settling time for the multiplexers and channel-to-channel throughput time of 20 msec, the firm stated.

Inputs are protected for continuous 35V inputs and break-before-make switching offers 1,000M ohm channel-to-channel and input impedance, a spokesman added.

On-board addressing permits a channel expansion of up to 128 channels with additional boards, he said.

The board is priced at $295 from Datel at 1020 Turnpike St., Canton, Mass. 02021.

S-100 Bus-Compatible

Comptronics MPUs Based on F-8

WOODLAND HILLS, Calif. — Comptronics, Inc. has unveiled two products designed for hobbyist applications and based on Fairchild Camera and Instrument Corp.'s F-8 microcomputers.

The F-8S100 is an F-8 MPU board that is compatible with the S-100 bus and comes with a 3850 MPU and 3853 static memory interface, a spokesman said.

The unit provides sockets for 2K of erasable programmable read-only memory (Eprom), two processor I/O slots and connections for six I/O ports.

The board has 64 bytes of scratch-pad random-access memory (RAM) and a fully buffered data bus, the firm noted.

The KD80 is an F-8 microcomputer with keyboard and a six-digit display. It has an audio interface and speaker compatible with the on-board KD-Bug (3856) music routine, 2K of expandable RAM and 1K of Eprom with four additional 2708 sockets, the spokesman for the firm added.

The F-8S100 sells for $239 as a kit or $279 assembled. The KD80 costs $375 as a kit and $425 assembled. Comptronics is located at 19824 Ventura Blvd., Woodland Hills, Calif. 91364.

Hybrid D/A Converters Need No Adjustments

BEDFORD, Mass. — Hybrid Systems Corp. has a series of digital-to-analog (D/A) converters that it said are preadjusted and available in four voltage range outputs.

The DAC336-8 line features ladder networking, output amplifiers and input storage registers, the firm said. The IC design of each converter is pretrimmed to approximately .05% with a 4 msec least-sigificant bit (LSB) settling time and a .5 LSB maximum linearity.

The units draw 200 mW of power, operate in temperatures from -55°C to 125°C and are contained in 16-pin glass dual in-line packages (DIP), a spokesman for the firm noted.

Two Models

Two models are offered, the DAC336-8 for commercial/-industrial uses and the DAC336B-8, packaged in a metal hermetic DIP for Class B processing.

The units are priced at $24 and $44, respectively, from the firm at Crosby Drive, Bedford Research Park, Bedford, Mass. 01730.

Prices Cut On Intel RAMs

SANTA CLARA, Calif. — Intel Corp. has reduced OEM prices for its 2115A/-2125A family of 1K-bit static random-access memories (RAM) by as much as 35%.

The price cuts, which became effective April 7, reduce the chip prices to as low as $3.95 each.

It is not known if the price reduction will affect single-quantity prices from independent retailers.

Intel's 2115A/2125A RAMs are used as equal-speed, lower power replacements for bipolar RAMs, a spokesman explained from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Motorola M6800 Users Gain Basic Compiler

DES MOINES, Iowa — Microware Systems Corp. has introduced an applications-oriented language compiler compatible with Motorola Semiconductor Products, Inc. M6800 microcomputers.

A/Basic has an extended syntax including string, logical, real-time and interrupt-processing capabilities, Microware said. The output of the two-pass compiler is actual machine language that can be loaded into read-only memory (ROM) or random-access memory (RAM) and run without any runtime subroutine package, the firm claimed.

The compiler requires at least 8K of RAM and either an audiocassette unit or floppy disk. Its $50 price includes a line-oriented text editor, RT/-Edit, that is written in A/Basic and can be recompiled to user specifications.

Microware can be reached at P.O. Box 954, Des Moines, Iowa 50304.

'Posis' Extends MPU Use

INDIANAPOLIS — The Data Group, Inc. has an interactive software program which is said to allow 8080/Z80-based microcomputers to be used as point-of-sale and inventory control systems.

The Posis system can store up to 9,000 inventory items and can generate a variety of management reports based on a business' inventory transactions, a spokesman stated.

Features include identification and password security checks at key points in the program and an audit trail summarization of each transaction, he added.

Posis converses with the user in English and provides step-by-step guidance through each transactional procedure, the firm noted.

The program is priced at $750 from Data Group 5947 E. 82nd St., Indianapolis, Ind. 46250.

'Now That's What I Call a Floppy Disk!'

STANDARD — Established unit of measurement, or reference instrument or component, suitable for use in calibration of other instruments. Basic standards are those possessed or laid down by national laboratories or institutes, e.g., BSI, NPL, Ansi, others.

STRING — 1. In a list of items, a group of items that are already in sequence according to a rule. 2. A set of records which is in ascending or descending sequence according to a key contained in the records.

SUBROUTINE — 1. In computer technology, the portion of a routine that causes a computer to carry out a well-defined mathematical or logical operation. 2. Usually called a closed subroutine. One to which control may be transferred from a master routine and returned to the master routine at the conclusion of the subroutine. 3. Refers to either part of a master program or routine that may be "jumped" or "branched" to or to an independent program in itself but usually of smaller size or importance. 4. A subroutine is a series of instructions to perform a specific task for many other routines. It is distinguishable from a main routine in that it requires as one of its parameters a location specifying where to return to the main program after its function has been accomplished.

SUBSCRIPT — Integer numerals or symbols attached to a quantity to indicate its location in an array such as a matrix below a set name to identify a particular element or elements of that set. 2. An indexing notation; elements of that set.

SYMBOLIC CODE — Refers to a specific code designed to express programs in source language; i.e., by referring to storage locations and machine operations by symbolic names and addresses which are independent of their hardware-determined names and addresses.

TELETYPE — Trademark of the Teletype Corp. Usually refers to a series of different types of teleprinter equipment such as transmitters, tape punches, reperforators and page printers utilized for communication systems.

THROUGHPUT — 1. Relates to the speed with which problems, programs or segments are performed. Throughput can vary from application as well as from one piece of equipment to another, although they are the same brand and even model. 2. The total useful information processed or communicated during a specified time period.

TIME-DIVISION MULTIPLEX (TDM) — A device or process that transmits two or more signals over a common path by using successive time intervals for different signals.

From Microcomputer Dictionary & Guide by C. J. Sippl and
D. A. Kidd. Used with permission of Matrix Publishers, Inc.
207 Kenyon Road, Champagne, Ill. 61820

COMPUTERWORLD

Micro Bytes

Micro Networks Offers Converters

WORCESTER, Mass. — An analog-to-digital (A/D) converter from the Micro Networks Corp. features five user-selectable analog input ranges and the choice of an internal or external clock.

The MNADC85 has an 8 microsec conversion time and is available in both 10- and 12-bit linearities, a spokesman said. The unit was designed to operate over a temperature range of -25°C to 85°C.

The converter is contained within a 32-pin, hermetic dual-in-line package (DIP) and sells for $138 in 100-unit quantities from the company at 324 Clark St., Worcester, Mass. 01606.

Tool Removes DIP Chips

POMONA, Calif. — A hobbyist tool from the Pomona Electronics Division of International Telephone and Telegraph Corp. was designed to remove 14- and 16-pin dual in-line package (DIP) integrated circuit chips.

The Model 4386 is fabricated from a glass-filled nylon material that will withstand 240°C at a relative humidity of 40%, a spokesman claimed.

The tool is priced at $1.85 from the company at 1500 E. Ninth St., Pomona, Calif. 91766.

Brochure Available

DERBY, Conn. — Descriptions and specifications of four circuit design test instruments are outlined in a brochure offered by E&L Instruments, Inc.

The brochure describes E&L's Adam modular breadboarding system, and is free from E&L at 61 First St., Derby, Conn. 06418

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Symposium to Discuss Benefits of Micros

GAITHERSBURG, Md. — The current and future benefits of microcomputer technology will be discussed at a symposium on "Microcomputer-Based Instrumentation" that will be held at the National Bureau of Standards (NBS) here June 12-13.

The sessions will focus on four major areas, each highlighted by an overview presentation, and will cover microcomputer technology, applications to scientific instrumentation, microcomputer interface standards and applications to industrial process control, an NBS spokesman said.

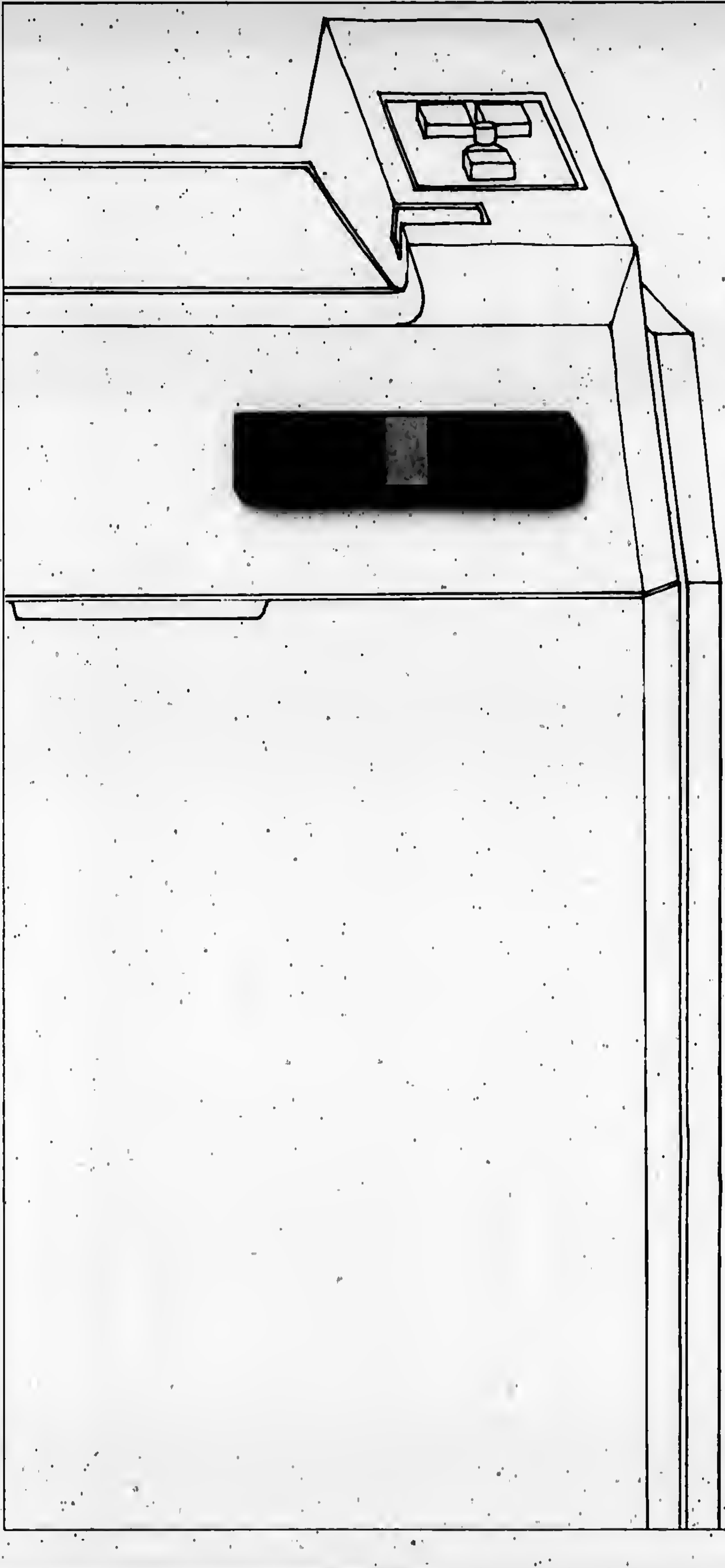
The symposium, jointly sponsored by NBS, the Institute of Electrical and Electronics Engineers (IEEE) Computer Society and the IEEE's Instrumentation and Measurement Group, will mark the opening of a series on "Challenges in Science and Technology."

The symposium series is intended to encourage a cross-fertilization of ideas from many disciplines, the spokesman said. Participating scientists with diverse backgrounds will assess current trends and future needs.

Major papers at the June symposium will discuss:

- Microcomputers for biomedical and clinical applications.
- Microprocessor-based, satellite-controlled clocks.
- Fault tolerance in distributed architectures.
- Microcomputers in the linear world.
- Automation of analytical instrumentation.

Information on sessions scheduling and registration can be obtained from Bradford M. Smith, Room A130 Technology, NBS, Washington, D.C. 20234.



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Mini Maker, COI Square Off

Fraud Ruled in 1968 DEC Tape Patent

By Marcia Blumenthal
CW Staff

LANHAM, Md. — A recent finding of the U.S. Patent and Trademark Office that Digital Equipment Corp. fraudulently obtained a patent for bidirectional tape in 1968 is fueling the fire of counter suits between the billion-dollar Goliath and the opposing David, Computer Operations, Inc. (COI) here.

The combat started in 1974, when DEC advised COI it was infringing on DEC's 1968 patent for a bidrectional tape coding system and suggested COI pay royalties.

Ignoring that suggestion, COI filed a suit claiming DEC's patent was invalid because the technology was in public domain and alleging DEC had obtained the patent fraudulently. In particular, COI accused DEC of not disclosing prior technology and of offering the product for sale more than a year before applying for the patent, as required by patent law.

DEC countered with a patent infringement suit against COI, a publicly held firm which manufactures a line of tape drives. The product in question in the suit currently represents about 40% of COI's $1.4 million annual revenues, the firm said.

In commenting on the patent office ruling, a spokesman for DEC stated, "We are very disturbed about the glib use of the word 'fraud,' which suggests to most people malicious intent to deceive." The company claims the issues involved are of a technical nature, not moral.

In fact, after COI filed its suit, DEC applied for a reissue of the patent in order to reaffirm the validity of the original patent, DEC noted.

The patent office's refusal, three weeks ago, to reissue the patent upheld the accusations of fraud made by COI in its lawsuit. However, findings of the patent office are advisory, not legal.

Now the cases must be settled in the courts. Stephen E. Silverman, president of COI, is buoyant about the patent office's ruling, viewing it as an omen of an ultimately favorable court decision for his company.

Disclosure Factor

The most serious allegation at issue centers around the "disclosure of prior art" requirement in applying for a patent. This requirement stipulates the applicant must describe all inventions leading up to the present discovery.

DEC asserts that the prior art section of its original application did contain a description of Linc tape, developed at MIT, which was similar to the currently marketed Dectape but lacked the essential bidirectional coding feature which is the crux of the DEC invention.

Countering DEC's claim, COI's Silverman pointed to pretrial discovery actions (part of the pending lawsuits) during which DEC, under oath, stated Linc tape was the most relevant prior technology. However, Silverman contended that DEC's original patent application and the subsequent reissue application did not mention Linc tape in the prior art section.

In addition, according to COI, the people working on Linc tape at MIT later joined the staff of DEC, convincing management to develop Dectape. The engineer who invented Dectape is Thomas Stockebrand. He and Kenneth H. Olsen, president of DEC, are named in the patent office's ruling as participants in the fraud.

Another major issue is that DEC's patent was invalidly granted because, contrary to patent law, DEC applied for the patent more than one year after offering the product for sale. Therefore, Silverman charged, COI is really not infringing on the DEC patent because DEC, by failing to apply for the patent within the appropriate time frame, let the technology pass to the public domain.

Not so, DEC has responded, explaining that patent law requires the product to be in actual commercial form within one year prior to the patent application. The product DEC delivered to a customer in late 1963 was still in the experimental stage and was not fully operational until early 1964, leaving plenty of leeway to apply for the patent, the firm said. DEC applied for the patent in November 1964.

The case is still in the pretrial stages, and the trial is not scheduled to start for about three years.

Debate on Transborder Privacy Producing Charged Atmosphere

By G. Russell Pipe
Special to CW

BRUSSELS, Belgium — The dust has settled since the recent European Parliament hearing and Transnational Data Regulation Conference here, but a more charged atmosphere between data processors and government officials has emerged.

Such "open forums" as the parliamentary subcommittee and Online Conference saw a lot more candor and a certain amount of outrage than emerged at last fall's Organization for Economic Cooperation and Development (OECD). The assessment of the situation, however, seems increasingly pessimistic.

One DP executive summed up the trend by saying, "We definitely face a heavy regulatory environment." Many businessmen have concluded:

- Privacy, economic protectionism, national sovereignty and telecommunications policy are becoming closely related.
- Taxation of cross-border commercial data traffic could become a significant issue to multinationals.
- Governments and international bodies are setting policies without any meaningful business representations, nor are their products and services adequately understood.

Analysis

The European Parliament is generally committed to a binding directive on data protection, so its hearing sought evidence on what such a law for the European Economic Community (EEC) should contain. Extending privacy rights to companies is currently a hot topic in Europe, since such a provision was dropped from the recently approved French privacy law.

An IBM Europe spokesman contended that such a provision would give government agencies "a right to control the flow of much commercial information even when there are no implications for the privacy rights of individuals." But France's Louis Joinet indicated his country feels its initial

(Continued on Page 68)

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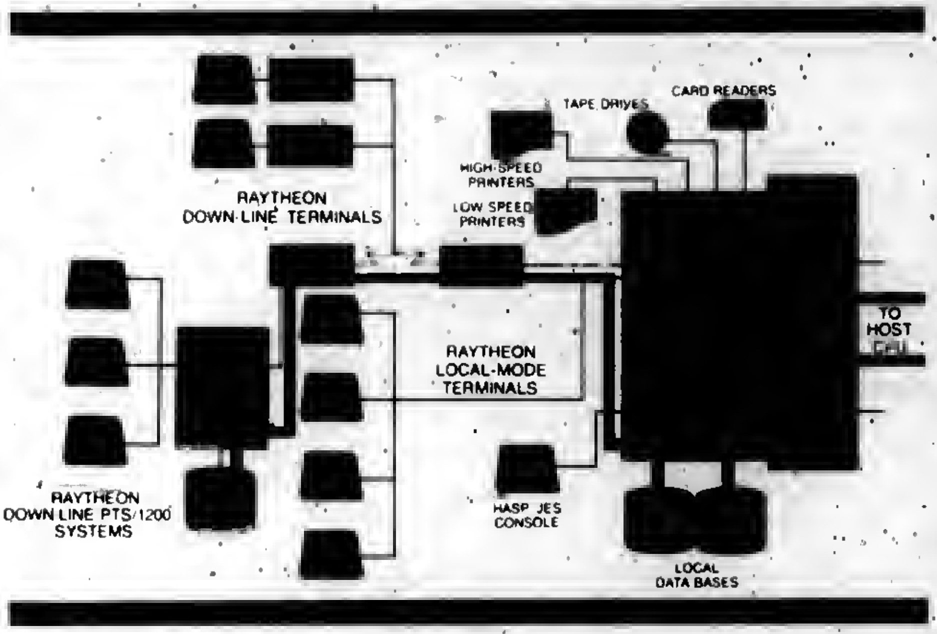
The Raytheon Checklist. A distributed processing user's best friend.

The term distributed processing is new enough that many people, both users and manufacturers, mean many different things when they talk about it.

Rather than try to add another definition to the many now existing, Raytheon Data Systems has prepared this comparative checklist of the major functions that might normally be considered attributes of any distributed processing system. Regardless of the distributed processing system you eventually select, there are a number of capabilities you will want that system to possess. Obviously, the more features the system has, the greater its capacity to do all the work you have planned now—or might need tomorrow.



Shown above is a typical schematic of a PTS/1200 distributed processing system with a hierarchy of local data bases, multiple terminals in multiple applications, all linked by one or more protocols to a central mainframe

Our checklist itemizes many of the most important features you should consider. They are not the only features, but we think they are the most important.

And—to make the point that Raytheon's PTS/1200 MARK·I and MARK·II systems are extraordinarily powerful distributed processing systems—we've taken the liberty of itemizing their capabilities in each of the columns shown. Do that with other vendors' equipment, and we think you'll choose Raytheon.

Then check prices. The MARK·I is lowest.

After you've looked at the variety of products on the market, you'll also want to see what each costs.

We can tell you about Raytheon's pricing. The PTS/1200 MARK·I is the lowest. By low, we mean up to 30 per cent below the most popular alternative models. The PTS/1200 MARK·II costs a little more, but is more than twice as powerful as the MARK·I. You won't be able to compare its cost directly with other equipment, because no other equipment can come close to matching its performance.

Solving the installation and productivity problems that these users encounter takes patience, skill and the commitment of an experienced vendor. It takes going beyond a standard product, and finding customized solutions, and often products, to meet a user's requirement.

Most of all, it takes doing it. Over and over and over again. Raytheon has done it over and over and over again.

Fast, easy installation and growth is vital.

Not shown in the checklist is another vital aspect of distributed processing systems—immediacy of installation and ease of expansion. The Raytheon PTS/1200 MARK·I can be installed in less than a day, with no change to host hardware, or systems or applications software. You become productive right away. And when you want to grow, you simply add capacity—within a single system, or by adding additional systems or devices. Every PTS/1200 is compatible with every other—and with your host mainframe system and protocols in almost every case.

Look hard at experience too.

Beyond the hardware, the price and the easy compatibility, there is the experience factor. The vendor with experience can save the user without it a lot of grief.

Raytheon is the world's largest non-mainframe supplier of intelligent terminals and distributed processing systems. Some of our customers use more than 2,000 Raytheon terminals in data networks located at more than 300 locations either domestically or around the world. Many others have one or several PTS/1200 distributed processing systems at work in remote locations, linked on-line to a central mainframe.

A typical four-station MARK·I system with a 64K-byte controller, 10 MB disk, and one 165cps printer leases for $850 per month, including all software and maintenance.

The 54-Point Checklist

Feature	Typical Configuration	Importance of Feature	Product Capabilities PTS/1200	Brand X	Brand Y	Brand Z
INTELLIGENCE	✓ Dependent totally on host processor ✓ Stand-alone (non shareable) intelligence in each station ✓ Small-cluster (shared by 1-8 stations) ✓ Large-cluster (shared by 1-24 or more stations)	Intelligence is based upon the amount of available programmable memory a system possesses. Its purpose is to facilitate local application development and execution. The larger the available memory, the better the applications freedom.	N/A All resources shareable by all stations 64K to 128K bytes 64K to 128K bytes			
CONTROLLER	✓ Word size ✓ Number of operator stations per controller ✓ Number of peripheral attachments per controller ✓ Availability of high level languages ✓ Ability to perform multi-tasking	The controller is the central processor of a distributed system. Its power in terms of word size, attachment capacities, programmability and ability to perform multiple tasks concurrently is the key limiting factor in its ultimate performance.	16-bit 1-8 stations or 1-24 stations 1-4 peripherals, or 1-20 peripherals Yes MACROL, COBOL in the future Yes Up to 32 tasks concurrently on one controller			
TERMINALS	✓ Variety of screen sizes ✓ Variety of keyboard options ✓ Availability of user-definable function keys ✓ Ability to provide operator prompting ✓ Ability to attach remote terminals on phone line	The terminal is the point of operator interface and should be capable of being comfortable to use, easy to use, and easily matched to one or many different applications through customizing.	960 or 1920 3270 typewriter, data entry 16 program function keys plus any key programmable Yes by screen, audio and light indicators Yes			
PERIPHERAL ATTACHMENTS	✓ Number of attachments per controller ✓ Low speed printer devices ✓ High-speed printer devices ✓ Card reading devices ✓ Magnetic tape transports ✓ Printers word processing quality	The ability to attach a variety of peripheral equipment of various speeds and capacities is a measure of the range of work a system can do	1-4, or 1-20, any combination 45-165 CPS; 3 models 300 LPM and 600 LPM 300 CPM 600 and 1600 BPI Yes			
COMMUNICATIONS PROTOCOLS	✓ Asynchronous ✓ Synchronous ✓ Binary Synchronous —Batch —Interactive ✓ Synchronous Data Link Control (SDLC)	The ability to support more than one protocol—at the same time on the same system—adds immeasurably to the number of tasks and number of networks a system can work in without additional user development effort	Yes, TTY RS-232 Yes Yes — Yes Yes, in 1979			
INTELLIGENT 3270 OPERATIONS	✓ Local format storage ✓ Local printing ✓ Ability to access and update local data bases ✓ Transactions stored locally batched for transmission to host ✓ Field verification at each terminal location ✓ Application program decides when to go to host	This feature assures that the system can work immediately and easily with the most popular terminal devices in use today, and extend the performance of those devices in a variety of ways	Yes Yes Yes Yes Yes Yes			
EMULATION CAPABILITIES	✓ 3270 interactive (dumb) ✓ 3270 interactive (intelligent) ✓ 2780 batch ✓ 3780 batch ✓ SDLC batch/interactive ✓ HASP remote job entry ✓ Non-IBM protocols ✓ Specialized protocols	Emulators are software tools that permit a system to operate as a look-alike under other vendors protocols and procedures. Their advantage is to permit direct and immediate attachment to networks using a specific device protocol	Yes Yes Yes Yes Yes, in 1979 Yes Yes Yes			
DATA BASE STORAGE	✓ Multiple disk storage capacities ✓ Memory management software ✓ Ability to expand to very large local storage	Local data base storage under sound memory management techniques assures powerful local filing, easy off-loading of large central files and elimination of unnecessary communications to and from host.	Yes, from 10 to 320MB Yes Yes, to 320 MB per system			
SOFTWARE LANGUAGE	✓ Assembly language ✓ Strong macro command repertoire ✓ High-level compiler language(s) ✓ Easy-to-learn and use ✓ Numerous screen manipulation and interactive programming aids ✓ Parameter-driven aids where required	Language is the facility that makes it possible to tap the power of the basic system by allowing applications to be written easily. Simple but rich high-level language that can be learned easily by programmers or used by non-programmers extend a system's reach that much further	Yes, not needed by user personnel Yes; 150 instructions MACROL now COBOL in 1979 Yes. Yes Yes, for formal creation and source data entry			
NETWORK ENHANCEMENTS	✓ Concurrent communications operation ✓ Downline control of multipoint networks ✓ Remote program development support for mainframe in any language ✓ Teleprinter network on terminal lines ✓ Downline program debugging ✓ Downline terminal loading ✓ High-speed data transmission rates		Yes, batch and interactive at same time Yes; up to 10 drops per controller Yes Yes, on same lines at same time Yes Yes To 9600 BPS			

Raytheon—50,000+ terminals in use now.

When you select Raytheon, you are selecting a total single-source supplier who has installed more than 50,000 intelligent terminals. A supplier with a worldwide field maintenance organization that is linked together by its own distributed processing network that keeps track of every equipment outage for every customer. A supplier that does not need to offer third-party leasing, because it maintains its own self-financed leasing company. And a supplier whose customer list includes a very high percentage of the world's largest industrial, commercial, financial, insurance and government data systems users.

Raytheon. The company to pick when you've completed your distributed processing checklist.

Tell me more about the Raytheon PTS/1200 distributed processing family: CW5178

☐ MARK-I
☐ MARK-II

Tell me more about some of the features shown on The Checklist. I'm especially interested in:

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2. ______________________
3. ______________________
4. ______________________

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OECD Planning Guidelines

Special to CW

PARIS — A new working group here is preparing guidelines on transborder data flows of personal data for the 24 member countries of the Organization for Economic Co-operation and Development (OECD).

The OECD project is seen as significant because it involves non-European countries, such as the U.S., Canada, Japan and Australia. In addition, economic implications surrounding the free flow of data will be the central focus.

Finally, the second stage of the project involves guidelines for all types of international data traffic.

However, unlike the Council of Europe's draft treaty, which would be binding on all member countries, the OECD guidelines are seen as only recommendations.

A two-day organizational meeting was held here early this month, where Justice Kirby, chairman of the Australian Law Reform Commission was elected chairman. William Fishman of the U.S. Office of Telecommunications Policy was chosen as a vice-chairman.

A subgroup was appointed to prepare the first draft guidelines in order to meet a July 30, 1979 deadline. The results of the group's work is to be forwarded to the OECD Council, composed of ambassadors from the member countries, for approval.

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Charged Atmosphere Left After Transborder Meetings

(Continued from Page 65)

posture was right and history will show this to be the case.

Frits Hondius of the Council of Europe observed that legal persons have privacy rights under Article 8 of the European Declaration of Human Rights.

Whether transborder data flows have created urgent problems is a matter of opinion. Alan Benjamin, secretary general of the British Computing Services Association, doesn't think so. There were many more contrary views at the hearing and the conference which followed.

Governments See Problems

Jan Freese, director general of the Swedish Data Inspection Board, opened the proceedings by stating, "In reality the free flow of data is not really free. Most technologies have been regulated; perhaps we have to regulate flows to keep them free."

Giving his impression of the issue, Gerhard Stadler of the Austrian Federal Chancellor's Office said international regulations are needed and can bring advantages "so countries can get a grip on imports and exports of sensitive data." Stadler also noted that "freedom of information is not mentioned in the Gatt, European Free Trade Association or European Community treaties, so it is subject to negotiations and rule-making such as are currently taking place in many countries."

The European community, according to Christopher Layton of the Science and Technology Directorate, needs a DP policy, including privacy protection rules, "to ensure fair competition among the nine countries within the U.S., Japan and other countries."

Outsiders' Role Decried

Rossiter Langhorne of the Manufacturers Hanover Trust, London, complained that financial institutions pay a lot of taxes in the countries where they operate but seem to have little access to government policymaking circles.

An American DP executive observed, "We are kept shadow boxing outside the real bastions of power," referring to the seemingly closed-door nature of national policy formulation and similar walls barring businessmen from deliberations in the European Community, Council of Europe and the OECD.

A siege mentality even may be setting in as some Americans have begun to refer to the "European theatre of operations."

Phil Onstad, speaking for the U.S. Association of Data Processing Service Organizations, urged countries and organizations to avoid unnecessary inhibition to transborder data flows. But the question is how to get a meaningful setting to deterine where the parameters should be drawn.

William Fishman of the Office of Telecommunications Policy spoke of the multi-faceted nature of these issues and warned protectionism must be avoided. A Honeywell-Bull spokesman referred to a mammoth misunderstanding of the problem — "because the free flow of legitimate business information doesn't threaten economic or social interests of exporting countries."

To get this dialogue going and involve more American businessmen, several of the U.S. participants suggested the European officials should come to the U.S.

Since an informal atmosphere is preferred by most of the European principals, the invitations recently extended by the Online organization of Uxbridge, England, to speak at an expanded follow-up conference in New York City November 28-30 have been quickly accepted.

It is widely recognized, of course, that informal discussions, regardless of their usefulness, are stop-gap measures. The U.S., in particular, is facing the need to respond to a 1978-1979 schedule of international conferences and working groups which are hammering out rules for transnational data flows.

The conference format, nevertheless, allows Ameican businessmen into the arena which should result in important inputs and support to U.S. policymakers.

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Small Business Needs Relief, Quantor Tells SEC

WASHINGTON, D.C. — Small companies will cease to be industry's major source of innovation unless they are given relief from the growing tangle of government regulations that limit their ability to obtain financing, a computer industry official recently testified here at a special Securities and Exchange Commission (SEC) hearing on the problems of small companies in raising capital.

Charles Askanas, chairman and president of Quantor Corp., said the business environment is increasingly influenced by policies and laws that impede capital accumulation. The result will be fewer new companies formed in the years to come.

"There will be no small companies formed unless there are rewards consistent with the risk," Askanas said. He remained optimistic that "people who are strong enough to start and manage small technological companies which depend on innovation and creativity can — and will — continue to contribute to industry progress."

Askanas' firm markets equipment used to convert computer data to microfiche. Quantor, which was founded in 1969, became publicly held in 1970. In 1977, the company reported profits of $1.6 million on revenues of $23.5 million.

Noting his small company competes successfully against industry giants, Askanas urged the SEC to spearhead actions that will aid small companies in raising capital.

Jeopardizing Factors

Askanas said that one factor jeopardizing the future of small companies is the Tax Reform Act of 1976, which raised the effective maximum capital gain rate, thereby eliminating the capital gains advantage for the people who historically have been investors.

In addition, Askanas cited the Pension Reform Act of 1974 (Erisa) as another factor discouraging investment in small companies.

While Askanas acknowledged that certain elements in Erisa were needed, he said "pension fund managers are now tending to be very conservative and are investing in 'blue chips' only. This has been a disaster for small companies, since a major source of investment funds has disappeared."

Other obstacles to capital formation, according to Askanas, are inflation which encourages short-term speculation and makes long-term high-risk investments more difficult, and the elimination of fixed commissions, which has resulted in reduced income for securities brokers and subsequently diminished interest in smaller companies.

Askanas also pointed to the problems of small companies going public, particularly in view of the high registration and underwriting fees.

Disclosure Requirements

In the area of disclosure, Askanas noted that the current requirements provide a competitive advantage to the larger companies, as well as creating prohibitive reporting costs for the smaller companies.

Using Quantor as an example, Askanas described the plight of the small company: "We are the only small, independent manufacturer in the computer output microfilm [COM] field. It is very difficult for us to find out information about our competitors' performances in the COM systems business, since it is such a small part of their revenue."

He noted, however, the industry giants can find whatever they want about Quantor by reading the 10-K report. Therefore, required financial reporting standards operate as a competitive disadvantage to Quantor.

To encourage small high-technology companies and provide them with adequate financial bases, Askanas proposed the following:

- The SEC should proceed to implement Form S-18, but it should allow local filing to reduce the time and costs involved.
- The periodic reporting requirements for companies with annual revenues of less than $100 million should be substantially reduced.
- At a mimimum, the 10-K report should be modified so the information required does not put small companies at a competitive disadvantage because of the extent of the required disclosure.
- The commission should exempt local offerings in states where there is a strong local Blue Sky Commissioner and when the company qualifies under the Blue Sky laws.
- The commission should encourage Congress to modify Erisa to stimulate pension fund investment in small companies.

Askanas also urged the commision to encourage Congress to reduce the tax on capital gains.

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Aims at Improved Print Quality

Daisy-Wheel Maker Enters Matrix Printer Area

HAYWARD, Calif. — Why would a company with 70% of its business tied to daisy wheel printers suddenly begin extolling the virtues of a matrix printer?

Because, according to Ridley Rhind, vice-president of marketing for Diablo Systems, Inc., "We learned that users who drive 'daisy' printers at 30-, 45-, 55 char/sec would gladly use a matrix that went at 100- to 200 char./sec if they could attain reasonable print quality."

Armed with this knowledge, Diablo recently began marketing the Model 2300 matrix printer with three capabilities that reportedly improve print quality.

The Model 2300 double-strikes each upper and lower case character to produce more fully formed character impressions at speeds of 100 char./sec, Rhind noted.

Another feature is the new "ballistics" print head with a 7 by 9 wire matrix that prints denser characters than normally attainable on the more commonly used 5 by 7 matrix heads, Rhind continued.

Third, under either program or operator control, the 2300 can mix up to five different fonts during a single printing job. Rhind claimed no other printer has that capability.

The 100 char./sec higher quality matrix is an acceptable alternative to the Hytype II daisy printer for most low-speed printer applications, including word processing work where "letter quality" is a requirement, according to Rhind.

"The value equation is simple," he said. "Double your output at less cost, with perhaps a 20% sacrifice in fineness of impression. It makes economic sense for a user."

Diablo's push towards matrix printers may seem out of place, but, according to Rhind, "The total market for daisy products is bigger than any one company can serve and is growing very fast. Matrix printers offer an increasingly attractive option in many such applications. We don't see our matrix lines impacting our daisy lines; we see extraordinary growth in both areas."

As worldwide markets evolve, Diablo sees daisies, matrices and ink-jet devices becoming established products within a variety of speed-range markets.

Cost breaks in printing or disk mechanisms will not be as dramatic as cost reductions in electronic components, Rhind predicted. Therefore, improving product reliability, flexibility and utility in the different speed and capacity ranges will be a market requirement.

Diablo's printer business, which began with initial shipments of Hytype I daisy printers early in 1973, currently accounts for more than 70% of the company's annual sales, Rhind said, with OEM disk drive operations and a recently developed OEM small business system — the Diablo 3200 — accounting for the remaining 30%.

All product lines are internationally distributed.

Executive Corner

- Vincent S. Lamb Jr. has been elected chairman of the board at Scientific Systems Services, Inc. Lamb has also been appointed president and treasurer. The board also appointed William A. Grimm as director of the firm.
- William J. Alznauer has been named vice-president of international operations at Perkin-Elmer Data Systems Group.
- Brij Prasad has been elected vice-president of manufacturing at Adage, Inc.
- Bruce Bambrough has been elected chairman of the board, president and chief executive officer of Compuscan, Inc.
- William S. Bivens has been appointed director of corporate development at Digital Systems Corp.
- Don Tighe has been appointed vice-president of engineering at Powertec, Inc. Susan Croy was appointed manager of industrial relations.
- Donald W. Lessard has been named vice-president of manufacturing at Kybe Corp.
- Daniel A. Hosage has been promoted to senior vice-president at Datapoint Corp.
- Robert E. Kunkle has been elected president of Diva, Inc. Ronald S. Harmon has been elected executive vice-president of engineering and manufacturing.

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Anticipates Continued Growth

Apple Vying for Share of Home DP Market

By a CW Staff Writer

CUPERTINO, Calif. — As soon as low-cost computers were available in configurations designed for use by consumers, with programming features and language that nontechnicians could use, the personal computing market began to grow rapidly, according to Apple Computer, Inc., one of the firms vying for a share of that blossoming market.

With more than 100,000 units sold, the personal computer market is finally being recognized as much larger than the original hobby market, a spokesman stated, observing that there have already been forecasts of $2 billion in sales by 1985.

Apple, which introduced a self-contained personal computer (Apple II) in June 1977, believes the personal computer will make home life better for middle-income families. The spokesman said such systems will provide for better financal decision making and tighter control over family finances, better protection against fire and theft, better environmental control with attendant energy cost savings and more free time for all family members.

Additional benefits, he predicted, will include better educational opportunities, lower cost communications, immediate access to all family records and increased family interaction through the entertainment aspects of the systems.

At present, the vast majority of nonbusiness computer users are still considered to be hobbyists, Apple noted, because until self-contained machines like Apple II came along, home computers required some technical understanding to assemble and program them. Now, the self-contained machines can be taken home, unpacked, plugged in and put to work.

Largest Share

Considering all purchases of nonbusiness computers, estimates are that hobby computers accounted for 67% of all sales in 1977, Apple noted. The home computer, requiring no technical knowledge or assembly, accounted for only 3% of that market, with other markets accounting for the remaining 30%.

This is expected to change dramatically in 1978, Apple said. Home computers will take 17% of the market while the hobbyist sector will account for 35%. The home market will dominate the scene by 1982, accounting for 56% of all sales of personal computers, Apple predicted.

These figures do not include computer systems sold for entertainment purposes, which are generally considered part of the personal computer market even though they offer only preprogrammed games.

The true home computer, by comparison, provides the capability for entertainment in addition to its other possible uses. This entertainment segment of the consumer market accounted for about 18% of total personal computer sales in 1977 and will account for about 29% by 1982, Apple said.

Apple was founded in January 1976 by Steven Jobs and Steven Wozniak for the purpose of developing and marketing personal computers. The firm's first product, Apple I, was essentially intended for the knowledgeable hobbyist. Apple received equity financing from Venrock Associates, Capital Management, Inc. and Arthur Rock this March.

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May 29th—Preview Issue: A complete rundown of the companies, products and services, keynote speakers and technical sessions you'll see at NCC. Plus — a guide of things to see and places to go in the Anaheim area. This issue will help you make the most of your time at NCC. (If you forget to bring your copy of *Computerworld* you can pick one up free at our booth — while they last.)

June 5th—Show Issue: Our Show Issue will include all the late breaking stories, program changes; intended product announcements and behind-the-scenes show details leading up to NCC. (It will also be available at our NCC booth.)

June 12th—Wrap-up Issue: Cohesive analysis and summary of the significant events of the '78 NCC. This issue will give details on product announcements and will review the content of program sessions, experts' observations and keynote speeches. The important events of NCC will be summarized here.

If you're a manufacturer or marketer in the computer field, don't miss these ad closing dates for *Computerworld's* NCC issues:

Preview Issue: (May 29th)—Color and Insert close: May 12; black & white close: May 19.

Show Issue: (June 5th)—Color close: May 19; black & white close: May 26.

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Market Increase For POS Units Seen in Europe

NEW YORK — The European market for point-of-sale (POS) terminals, electronic cash registers (ECR) and related equipment will bring in revenues of about $5 billion during the next 10 years as European retailers shift to electronic systems, according to a recent study by Frost & Sullivan, Inc.

Two major sectors of the market are the POS systems segment, consisting of input devices used to gather data as part of a total merchandising system, and an ECR market, for sales analysis capability at low cost.

The report predicted the ECR market will bring in $3 billion during the next 10 years, while POS systems' revenue will hit the $1.3 billion mark and related equipment such as scanners and communications devices, including modems and interfaces, will account for a little less than $1 billion.

Opportunities for expansion will exist as mechanical cash registers phase out by 1982 and present electronic systems with life cycles of less than 10 years, become obsolete toward the latter part of the 10-year forecast period, Frost & Sullivan said.

The study, which separately analyzed the markets in 16 western European countries, revealed that the type and proportion of retail stores in each country and their equipment needs do not follow any set pattern, thereby complicating marketing strategies for firms interested in pursuing European prospects.

The report is available from Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

EMM Officer Turns Around Caelus Operation

ENCINO, Calif.— Managers at Electronic Memories and Magnetics Corp. (EMM) have been pumping new life into its Caelus division by reorganizing or eliminating unprofitable product lines.

Involved in the founding of Caelus Memories in the 1960s, EMM became committed to the disk drive and disk media business by purchasing Caelus in 1971. More than three years ago, EMM assigned the operation to Vice-President Ed Farris with a charter: make it profitable or get rid of it. Farris has a reputation for turning around some "doubtful" properties.

Prior to Farris' arrival, the Caelus drive operation had not moved with the changing market and lost out on the growth experienced by some of its competitors. Upon taking over, Farris established separate divisions and profit-and-loss status for the disk drive operation (now Peripherals Products Division) and the media operation (Media Products Division). He then evaluated three possible courses of action for the drive division:

- See what the market would bring for the operation and sell if the price was right.
- Make the changes necessary to make it profitable.
- Close it down if neither of the other options were feasible.

Farris brought in Fred Wolff, a longtime EMM associate known at the company as an austere operations manager. Together they evaluated the operation and started making changes. They pared down the general and administrative management, cutting out a layer they felt they could do without.

Wolff then started making changes in the manufacturing operation, designing a more efficient, streamlined plant to increase output without increasing labor content and introducing some assembly techniques. Concurrently, he took a careful look at the inventory that was being carried and made reductions and changes.

Sale to Ball

EMM had a separate R&D facility which was developing a specialized disk drive (compatible with the California Computer Products, Inc. Trident). This represented a significant overhead cost to the division.

Farris sold R&D and the product line to Ball Computer Products. Ball needed the product for its systems operation and couldn't wait for a startup operation to get off the ground; EMM needed the reduction in overhead costs.

Wolff found that in order to survive in a market dominated by a few suppliers, he had to improve the quality of product to ensure competitive pricing and a reasonable delivery. He found several products that weren't worth keeping and dropped them.

Growth also became dependent on having the latest generation of product. Farris made a detailed market study and then got the corporation to back his development of a new generation of drives in 1977 for delivery in 1978.

These drives will increase the company's product capacity range to 76M bytes. They use up to three fixed disks and a removable cartridge. Wolff is projecting volume shipments in late 1978.

EMM has attracted a cross-section of customers — from large OEMs to small, highly specialized systems houses. Another EMM division, Commercial Memory Products, has taken delivery of a number of drives for its small business system (the System 800).

Bottom Line Moves Up

As a result of all these moves, the bottom line in fiscal 1977 showed a net profit of about 8% on revenues of more than $4 million for the Peripheral Products Division.

Farris is very bullish for 1978. With the backlog in disk drives, he could almost double revenues in a year, he said.

He also noted the company is shipping drives at a record rate. "We feel that we're in a position to become aggressive in our marketplace. We've got the products, production capacity and commitment to make it all work — profitably," he added.

However, he doesn't rule out the possibility of selling out if the right price were offered. "You have to look at each deal on its own merit," he pointed out.

Three divisions once on the "doubtful" list now report to Farris. They are all profitable, representing collectively about 30% of the company's 1977 revenues and a significant contribution to the bottom line.

Contracts

MSI Data Corp. has received an order from Data Systems Corp. for 200 Source 6600 data entry terminals. The order is valued at approximately $750,000.

Beehive International has signed a two-year contract with Western Union Data Services Co., Inc. to supply a variety of terminals. The contract is valued at between $280,000 and $2,000,000 depending on the number of terminals ordered.

Imlac Corp. has received an OEM agreement in excess of $400,000 from Hughes Aircraft Co., Industrial Products Divison, Carlsbad, Calif., for interactive computer display systems. The systems will be used in the Hughes AM-1 automatic marking system for the garment manufacturing industry.

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- QM-1 customers have emulated commercial, militarized, avionic and special purpose computers. They range from micros to fourth generation Large Scale General Purpose Systems.
- Users are not limited to one system identity; they can emulate as many kinds of computers as they like, even run multiple emulations of different systems concurrently.
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- Emulators on the QM-1 are running one hundred times faster than simulators on more expensive systems.
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- The QM-1 is ideal in a computer science environment for instruction and research into hardware and software architecture.

Prices range from $190K for a minimum system configuration, capable of running Nanodata supplied software, to upwards of $700K for a multiprocessor. A "typical" customer configuration sells for $280K and includes emulators of the PDP 11, Data General NOVA, IBM 360, etc.

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So Gains Won't Be Devoured

Tax Planning Essential to Sellers of DP Firms

By Brian J. McGowan
Special to CW

This is the second of two articles on the income tax consequences of purchasing or selling a firm in the DP industry. This article covers the consequences from the seller's viewpoint; last week's dealt with the buyer's perspective. Neither part is meant to be an exhaustive treatise but rather a general summary of appropriate provisions in the Internal Revenue Code.

The seller of a data processing/software firm has only two general choices. He can sell the stock of his corporation or he can sell all of the assets and liquidate his corporation.

Although the seller can sell his corporation's assets and not liquidate the corporation but retain the corporate shell investment, for purposes of this article, we will presume that he desires to liquidate his corporation.

The seller is driven by obvious goals: he wants to avoid seeing his sale proceeds become a full course meal for the Internal Revenue Service (IRS). This requires thorough and timely tax planning.

The sale of corporate stock is a relatively simple tax transaction for the seller. The seller simply compares the selling price for the stock with his tax basis — the difference being capital gain or loss which must be reported on his personal tax return. Tax basis determination is a seller's investment in his corporation. If the seller receives the consideration in a lump sum, the entire gain must be reported in the year of the sale.

While everyone knows capital gain treatment is desirable since the U.S. taxes only one-half of the gain, many sellers are not aware of an extremely expensive change to capital gains made by the Tax Reform Act of 1976. Although 50% of the gains still go untaxed for normal income tax purposes, this same forgiven amount is now subject to what is known as the minimum tax, which packs a 15% tax wallop in addition to the normal tax.

Congress, in a moment of largesse, recognized the damage this tax would cause and permitted a deduction equal to the greater of $10,000 or one-half of the taxpayer's regular income tax liability.

For example, assume that a seller has a gain of $100,000 and a regular tax liability of $15,000; 50% of the $100,000 gain escapes tax, but is exposed to the minimum tax. After the seller takes the maximum deduction of $10,000, the remaining $40,000 is subject to the 15% minimum tax — an additional $6,000 tax.

Installment Alternative

An alternative to selling stock for a lump sum is to sell the stock on the installment method. Assuming specific statutory ground rules are followed, the effect to the seller is to spread the gain over a protracted period, avoiding the "bunching" effect of reporting the gain in one year.

A side benefit is to minimize, if not anesthetize, the minimum tax by spreading the capital gain over a number of years, each year being entitled to the $10,000 or 50% tax liability deduction.

So far we have discussed a taxable sale of stock. A seller can defer tax on the gain by disposing of his stock in a stock-for-stock exchange rather than selling his stock for cash (assuming the buyer is a corporation). While a seller still experiences an economic gain measured between the tax basis of his stock and the fair market value of the stock received in the exchange, no gain is recognized for tax purposes until he ultimately disposes of his new stock.

The seller can minimize his tax liability by judiciously timing the sale of his new stock.

Liquidating Corporation

Instead of selling stock, the seller can sell the assets of the corporation and liquidate his corporation, receiving a final cash distribution. The most frequently employed method of accomplishing this is to sell the corporate assets and liquidate pursuant to Section 337 of the Internal Revenue Code.

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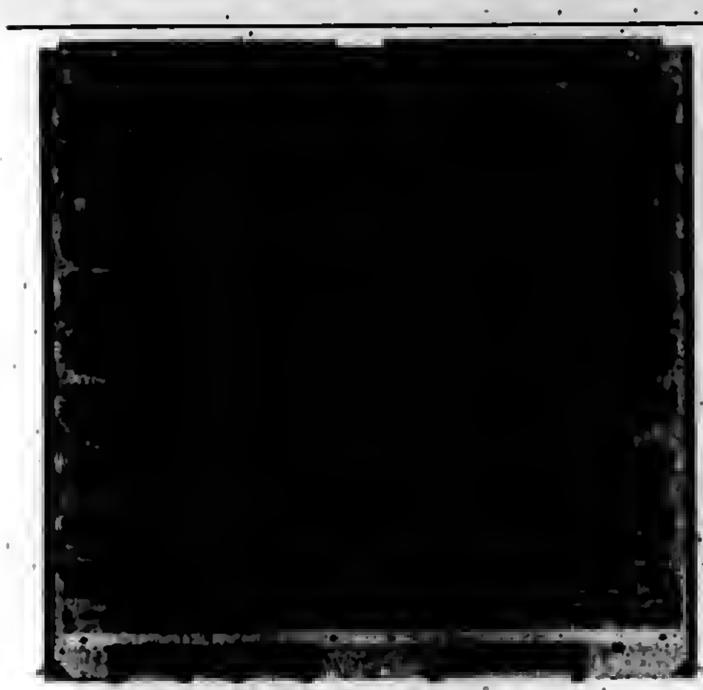
A former IRS agent, McGowan is now chief financial officer for Sun Information Services, Co.



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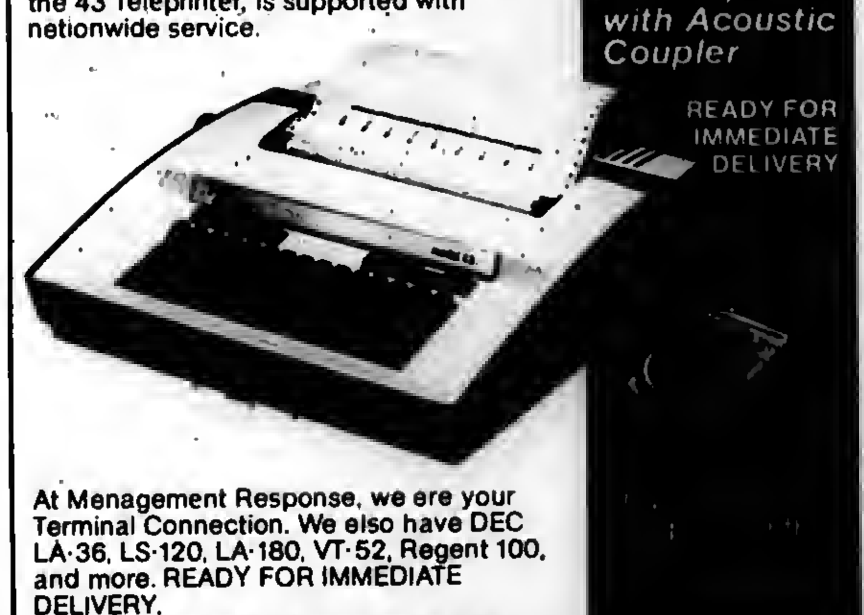

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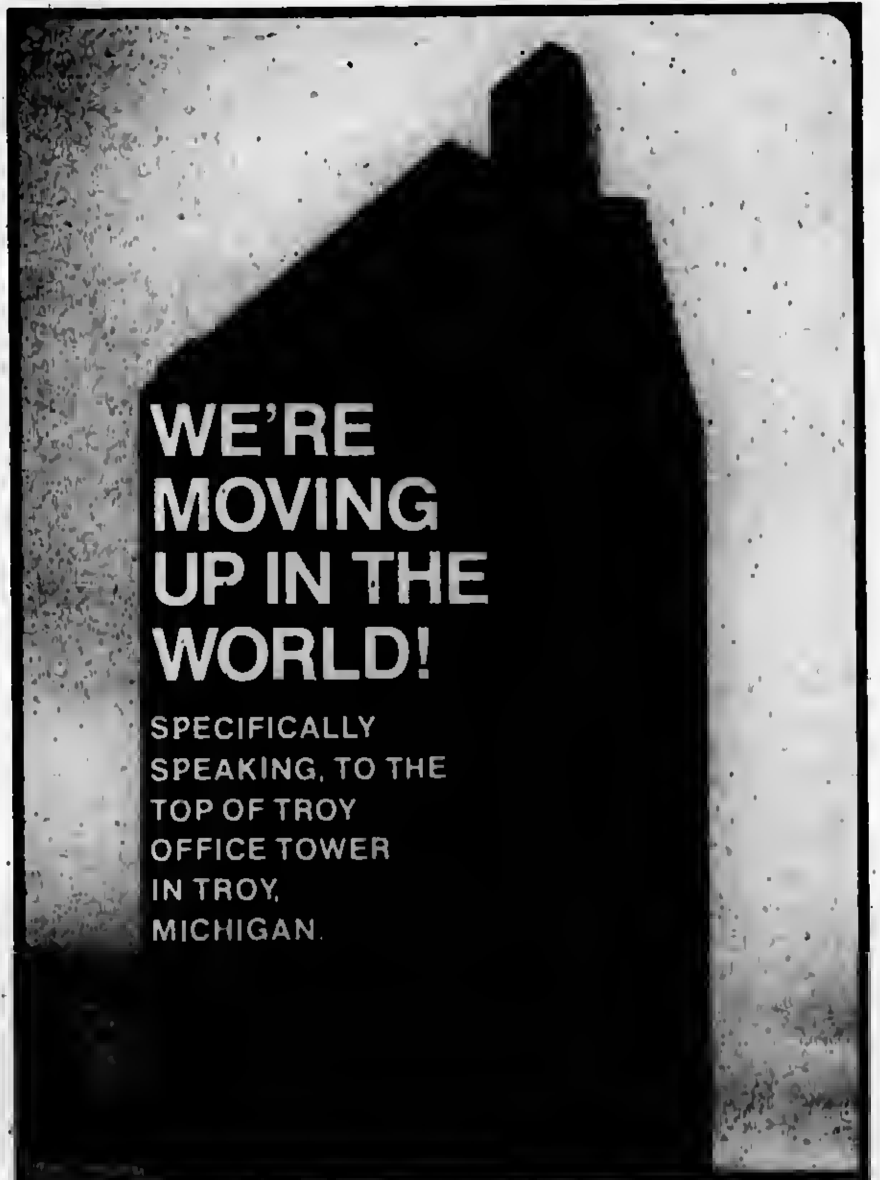
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Financial News

Memorex Net Rises

SANTA CLARA, Calif. — Memorex Corp. reported earnings for the first quarter at $14.4 million or $2.14 a share. The figures include extraordinary income of $5 million from a tax loss carried forward.

Comparable performance for the same period in 1977 accounted for earnings of $13.7 million or $2.21 a share including a $5.4 million extraordinary credit.

First-quarter 1978 revenues totaled $138.9 million, a gain of 34% over the $103.8 million reported in 1977, when the quarter was restated to reflect the acquisition of Business Systems Technology, Inc.

First-quarter 1978 results also show $12 million revenues from Telex-Europe operations, acquired Jan. 1 for cash and notes.

The costs of acquiring Telex-Europe, increased expenditures for its antitrust suit against IBM and the cost of moving the Communications Group were factots Memorex reported as having a negative impact on profits.

Total debt at Memorex increased $19.4 million in the quarter to $147.3 million from $127.9 million at year-end, the firm said.

Total shareholders' equity, however, increased to $126.2 million in the quarter from $112.1 million, a gain of $14.1 million. Common shareholders' equity increased to $60.2 million from $46.2 million. The company also achieved retained earnings of $9.5 million.

First Quarter at Honeywell Sees Performance Increases

MINNEAPOLIS — Revenue, net income and earnings per share increased for Honeywell, Inc. for the first quarter of 1978 compared with performance in the year-ago first quarter.

Worldwide sales, rental and service revenues reached $787.1 million, an 18.7% increase, compared with $663.1 million in the first quarter of 1977.

Earnings for the quarter were $35.4 million compared with $30.9 million in the year-ago quarter. Earnings per share were $1.66, an increase of about 13% over first-quarter 1977 per-share earnings of $1.47.

Net earnings were 4.4% of sales for the first quarter of 1978 compared with 4.5% of sales for the same period in 1977.

Equipment sales were 80% of first-quarter revenues, with rental and service comprising the remaining revenue.

The acquisition of Synertek, Inc., a designer and manufacturer of integrated circuits, was completed during the first quarter, and Honeywell purchased 368,753 shares of its own stock in the open market to replace shares issued to close the merger.

In addition, General Electric Co.'s holdings of Honeywell stock have been reduced to less than 200,000 shares as a result of Honeywell's purchase of General Electric's computer business.

"The computer business was particularly strong in the first quarter compared to last year, with improved bookings, revenue and profit performance both in the United States and outside," the firm said. "Worldwide computer orders were up substantially and computer backlogs remain at a high level. Computer rental and service revenues in the first quarter increased 18.8 percent over the comparable 1977 period to $164.7 million. Outright computer sales were up substantially, the firm claimed.

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(2) U.S. Commerce Department figures.

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Earnings at DPF Hit $6 Million

HARTSDALE, N.Y. — DPF, Inc. reported earnings for the nine months ended Feb. 28, of approximately $6.1 million or $1.44 a share on revenues of $369.7 million.

This compared with earnings of $3.1 million or 74 cents a share on revenues of $351.8 million in the same period a year ago.

Computer equipment leasing accounted for $33.3 million in revenues for the nine-month period compared with $20.4 million in the comparable year-ago period.

The major portion of the firm's revenues were derived from the 1977 acquisition of Interstate Brands Corp., a commercial bakery.

Quarter Records Posted by Itel

SAN FRANCISCO — Itel Corp. reported the highest first-quarter results in its 10-year history with earnings reaching $7.4 million or 63 cents a share on revenues of $123.5 million.

Comparable figures for the same year-ago period showed earnings at $4.5 million or 50 cents a share on revenues of $78.6 million.

The performance during the quarter reflected gains in both marketing and provision of services related to transportation and equipment, Itel said.

Since the year-end, Itel has placed more than $175 million of long-term fixed rate debt in the U.S. and overseas.

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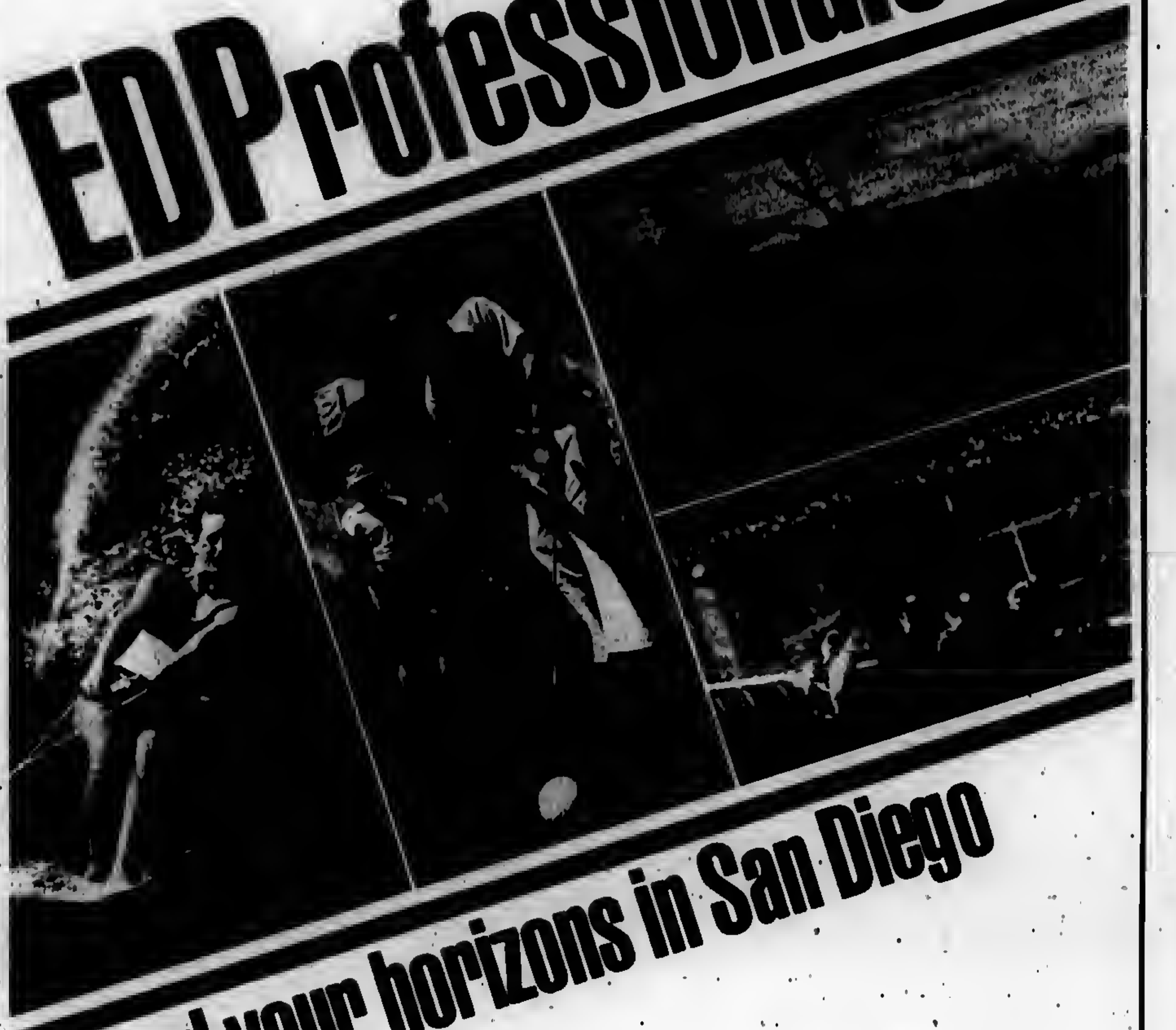

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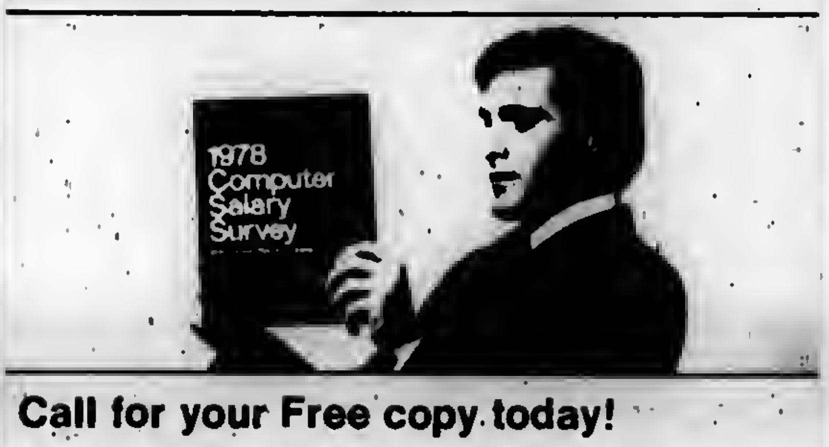

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Performs research on circuits, systems and subsystems and related hardware and software in order to provide management with information on concept feasibility and estimated system cost for design and development. Efforts involve providing existing services with new techniques and/or new services on existing equipment.

LONG RANGE PLANNING

Long Range Planning activities involve research studies on a wide variety of subjects related to the telephone communications industry. These studies include such areas as data communications, new technology, new services, future switching networks, evaluation of new switching techniques and review of the impact of political, economic and regulatory considerations. Intent is to provide well founded counsel and recommendations to upper management on future development programs and courses of action.

SYSTEMS DESIGN

New Feature Design—Plan and develop the future hardware and software evolution of current large scale fully stored program controlled switching systems. Develop new features for existing equipment, study new features impact on existing systems, and estimate the development costs and requirements.

Product Design—Design advanced fully stored program controlled systems for telecommunication application. Develop large scale software programs in an on-line, real-time environment and related digital hardware using CMOS, Shottkey, TTL as well as Static and Dynamic MOS.

International Design—Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development and detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad

SOFTWARE DESIGN

Data Base Software—Responsible for logical and physical data base design and implementation related to telecommunications systems. Develop programs which automate the generation of data base contents for these systems in an IBM 370 environment using PL/1.

Support Software—Involved in compiler, assembler, simulator maintenance and enhancement as well as other IBM 370 software developments. Support effort is related to micro and large processor developments.

Application Software—Large scale development in telephone system real-time control. Diagnostic and fault recognition software, administrative software involving real-time data base administration, switch and network overload procedures as well as executive software.

SYSTEMS CONTROL AND TESTING

Development and execution of comprehensive test plans to evaluate the performance of large stored program switching system prototypes. Execute configuration management on all hardware, software, and components and maintain project control for all activities. System evaluation performed on both laboratory prototypes and initial field site locations.

If you have in-depth expertise in one or more of these areas, and a BS, MS, or PhD in Electrical Engineering, Computer Science, Math or other appropriate engineering discipline as well as an interest in moving forward with challenging new frontier in computer technology, talk with us.

If unable to call send resume including recent salary history to:

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The focal point of Harris' long-term commitment to the distributed data processing marketplace is in DALLAS, the heart of the growing NORTH TEXAS METROPLEX, where we currently are completing construction of our new $7 million, 240,000 square foot headquarters facility. Career opportunities in DALLAS are aimed at meeting the many challenges facing us as we design new systems, hardware and software, to meet our customers' needs . . . today and tomorrow.

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- Compilers and Assemblers
- Linkage Editors
- System Utilities
- Data Communications Systems
- Online, Interactive Systems
- Hardware Diagnostics
- Virtual Systems
- I/O Drivers
- Distributed Processing Systems
- Remote Batch Terminals

B.S. or M.S. in Computer Science or related field and Assembly language experience required. Development experience on minicomputer or microprocessor systems and familiarity with structured design and programming techniques preferred.

Analysts

Degree and experience in Assembly language programming on minicomputers, preferably in communications. Responsibilities include providing ongoing support for locally developed programs on Harris equipment that spans all functional areas, interacting with customers and designing and developing new programs as required.

HARDWARE DEVELOPMENT

Systems Engineer

Responsibilities will include architecture studies and hardware/software tradeoffs during the specification phase of development projects, performance measurement and analysis on existing systems and scheduling and implementing cost effective system designs and specifications. Requires BSEE (MSEE desired), working familiarity with both hardware and software, and 3 or more years related experience.

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Applicants should have operating systems experience on any large-scale computer system, system generation and implementation procedures, installation of diversified applications, and a minimum of 2 years assembly programming and some high level languages would be desirable.

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TO: George F. Badger, Jr., Director, Computing Services Office, 150 Digital Computer Lab.

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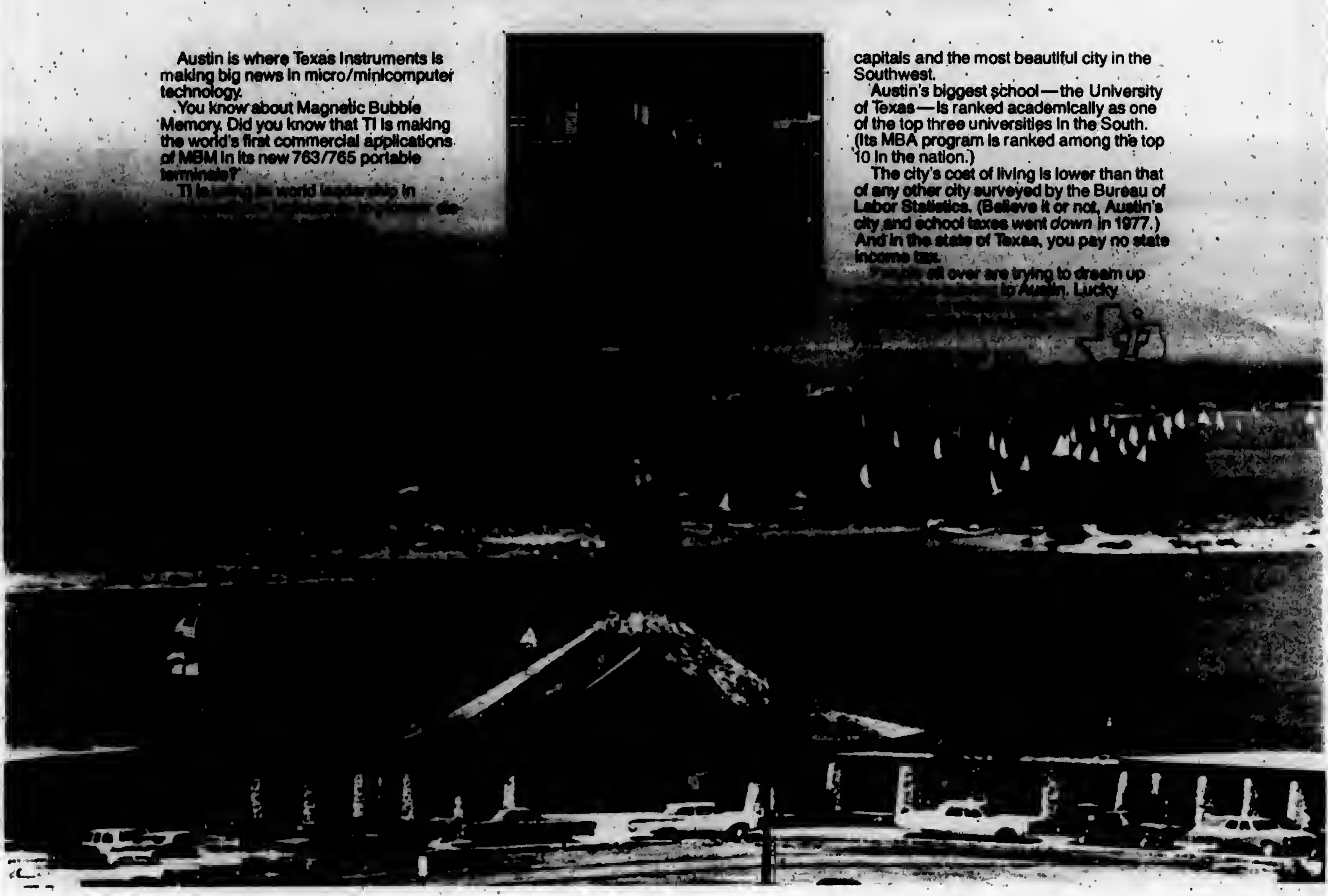

Atlanta Interviews:

Design Engineers
Experience in memory or microprocessor systems design with 1-5 years' experience and a BSEE or equivalent. Opportunities in peripheral interfaces, disc controllers, bubble memory controllers, advanced systems controllers, and multimicroprocessor computers.

Production Test Engineer
Design, development and support of sophisticated test equipment and requirements for new minicomputer and terminal products. BSEE with 1-10 years' experience in computer logic design, checkout or test software experience desirable.

Product Service Engineer
Support new computer products from conception to field maturity with a BSEE and 2 or more years' in design or sustaining of minicomputers/peripherals.

Reliability Engineer
Perform detail stress analysis, reliability predictions, and life testing of new minicomputer products with 1-4 years' experience and BSEE.

Product Marketing Engineer
Support field engineering, analyze customer systems applications, competitive market analysis, and market planning/execution with an MBA and undergraduate technical degree with 1-5 years' computer experience.

Marketing Analyst
Responsibilities through marketing for software products including research, competitive analysis, and coordination with software development. Must have a CS degree.

Product Marketing Planning Manager
Responsible for long-range planning of computer and systems products, market segment definition, market share studies for minicomputers. 5-7 years' experience in computer marketing.

Audit Analyst
Individual selected for these positions will conduct in-depth technical analysis of new software products and product development for quality and usability.

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Duties will require maintenance of existing software packages and assist in our nationwide field operation.

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If unable to arrange an interview on these dates, send your resume in confidence to: Lee Cooke/P.O. Box 2909, M.S. 2106, Dept. 8399/Austin, TX 78769.

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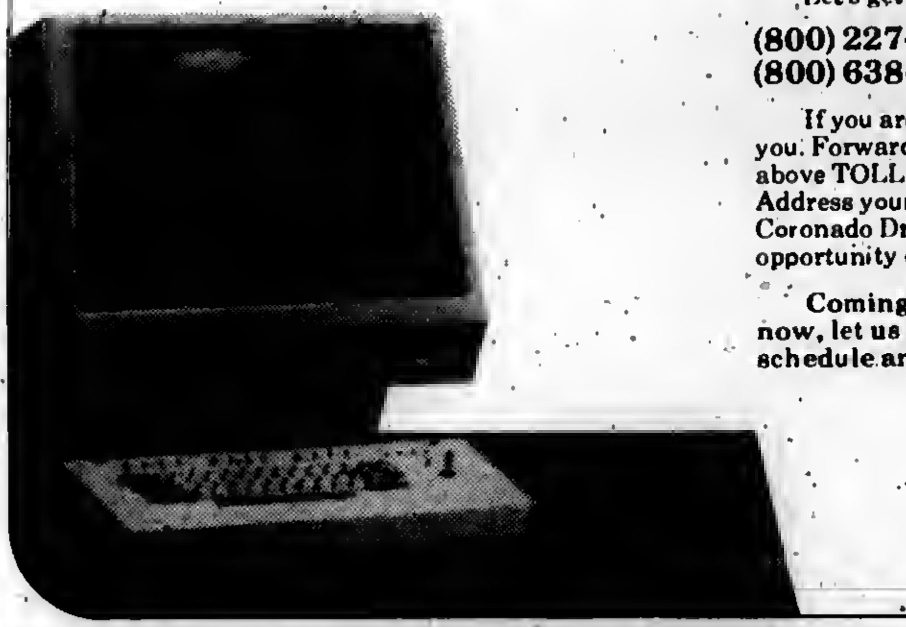

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You will support the MVT and SVS operating systems, debug system problems, and maintain the SCP's, packages, utilities, HASP, and IMS/360. We are planning a conversion to MVS and IMS/VS. This position requires experience in IBM software (S/370 OS/VS2 or IMS DB/DC), and background in internal or development support. Data communications experience helpful.

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Mr. James Scotland, Chairman
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BS degree or equivalent in Physics is required.

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2-5 years experience in real-time, minicomputer system software and scientific applications software design, documentation and implementation. Familiarity with DEC PDP-11 systems, RSX-11 operating system and DECNET.
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APPLICATIONS PROGRAMMER

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Minimum qualifications: Masters degree in related field; programming experience in PL/1; knowledge of basic statistics; experience in using computer-based statistical packages; administrative skills including planning, organization, and coordination skills.

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For a detailed description call 800-255-2757 or 913-532-5970.

Submit application materials to: J. Lance Kramer, Associate Director, Division of Continuing Education, 301 Umberger Hall, Kansas State University, Manhattan, KS 66506.

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PURDUE UNIVERSITY COMPUTING CENTER

Has openings for applications programmers with at least one year of relevant experience on a large CDC System, and a B.S. or M.S. in computer science or engineering or in a related academic area. We seek highly motivated individuals who can take full responsibility of all aspects of a programming project and can carry it to completion.

Selected individuals will be responsible for development, documentation and maintenance of applications programs and subprograms. At least one year of Fortran programming experience required. Experience with other scientific programming languages helpful.

Salary: $12,000 to $20,000 depending on qualification. Excellent benefits in addition to salary. Excellent opportunities for personal and professional advancement.

Write: Mr. Tom Heyworth, Administrative/Professional Employment, Personnel Services, Adms. Building, Purdue University, West Lafayette, In 47907

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OVERSEAS OPPORTUNITY

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We are a worldwide leader in the marine engineering and construction industry offering a challenging data processing position in our Dubai, U.A.E. operations.

The applicant must possess B.A. in Math or Computer Science and 6 years in data processing, 3 years of which are in systems programming. The applicant should be familiar with 370/135 migrating 2A one megabyte 138. Must have experience with DOS/VS operating systems with power, CICS on-line systems, assembly language coding. It would be a plus to be familiar with Panvalet and PL/1. Applicant should also be able to support a system with minimum vendor support.

This challenging growth position offers excellent salary, family status, overseas premium and fringe benefits package. Please submit resume, including salary history in complete confidence to:

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Oceanic Contractors, Inc.
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P.O. Box 61961
New Orleans, LA 70161

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AUSTRALIA

DB/DC SUPPORT STAFF

Up to $A17,750 p.a. plus Benefits

The Bank of New South Wales, Australia's largest commercial bank, and one of the largest I.B.M. users in Australia, is seeking experienced DB/DC Support Staff for its software group located in Sydney. The bank is currently committed to IMS based data base and data communications development on a large scale.

DUTIES
Participate as a member of the DB/DC Group in supporting the development, maintenance and operation of new and existing systems using IMS/VS Data Base and Data Communications, and the LEXICON Data Dictionary. Responsibilities include data base design, IMS/DC tuning and performance, data base recovery design and general problem solving.

EXPERIENCE
1-2 years experience in IMS/VS DB or DC. Training could be provided for a person with experience in:-

- IBM equipment with OS/VS;
- other DBMS;
- application development technical control;.
- systems programming.

HARDWARE
Three 370/158's in Sydney and six 370/145's in other States using 3705 communication controllers and other peripheral equipment supporting a network of 3600 finance terminals in its first stages of implementation, as well as an extensive range of batch and on-line systems.

SOFTWARE
The bank has installed MVS,VS1, TSO, VTAM/NCP, IMS/DB/DC and expects to remain in the forefront of SNA development in Australia.

CONDITIONS
Air fares and relocation expenses for your family (USA—Australia) will be met by the bank and up to three months' subsidised transit housing can be available. These are long term career positions.

THE JOBS
A range of positions is available requiring different levels and types of expertise. While extensive training opportunities are available, some degree of expertise in any of the above software fields is essential.

BENEFITS
Four weeks' annual leave with pay loading.
Superannuation.
Housing finance available in line with bank's current lending policy applying to specialist staff.

APPLICATIONS
Please apply in writing to:

Brian Bussell
Bank of New South Wales
New York Agency
Suite 2412, 24th floor
200 Park Avenue
New York, N.Y. 10017

Arrangements will be made to interview selected applicants in late May.

Bank of New South Wales

Mini Computer Programmers.

all levels

We are looking for individuals who can aggressively pursue **System Software Projects** from design through implementation. The right candidates will be self-motivated, capable of scheduling their time, know machine language programming and are willing to commit to getting the job done. **Openings are available in the following areas:**

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Familiar with communications programming under real time executives and operating systems. Two to five years machine language programming experience and two to three years in communications applications.

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Should have solid experience with high level language Compilers and Interpreters; and / or system utilities such as assemblers, editors, loaders and debugging tools. Two to five years machine language programming experience in related areas.

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Opportunities for experienced Programmers to enter ground floor development of new and progressive operating systems. Also design and implement enhancements to a variety fo operating systems and real time executives. Three to five years real time programming and assembly language experience preferred.

EXPLORE THESE EXCITING OPPORTUNITIES!

Call Tom Soderquist COLLECT at: (714) 833-8830, Ext. 349 for immediate appointment (after hours or week-end appointments arranged) or send your resume to:

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Immediate opening for experienced DOS-CICS systems programmer. Responsibilities include implementation and network management of a leading edge, on-line teleprocessing system for a progressive trucking company headquartered in Southwestern Ohio. Excellent career opportunity for capable, personable individual. Attractive starting salary and benefit program. Forward resume and salary history for consideration. Reply to: CW Box 1547, 797 Washington St., Newton, Ma. 02160

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The State University of New York at Binghamton is seeking a programmer/analyst for the support of academic research and instruction. This position offers potential to work with academic disciplines as diverse as chemistry and music. An opportunity exists to develop essential academic computer resources and to gain increasingly important management and communication skills. The Computer Center provides excellent interactive and batch resources.

This position requires at least a bachelor's degree, and three years applicable experience. Relevant experience can include computer-related work performed as a student or researcher. Expertise in statistical data processing and/or mini-computer systems is desirable.

SUNY-Binghamton is one of four university campuses in the State University of New York System. The campus of 9,500 students is located near a variety of cultural and recreational resources. The salary for the position is competitive, with an outstanding benefits package.

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Please send your resume by May 15, 1978 to:

Dr. Russell S. Vaught
Associate Director,
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SUNY-Binghamton
Binghamton, NY 13901

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This position offers an excellent starting salary, commensurate with your background and experience, plus a comprehensive benefits package. Qualified applicants are urged to forward resume in confidence to **John Ross, Mail Station M-84, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

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DATAPOINT CORPORATION

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AUSTRALIA

Senior Systems Programmer/ Systems Programmers

Up to $A17,750 p.a. plus Benefits

The Bank of New South Wales, Australia's largest commercial bank, and one of the largest I.B.M. users in Australia, is seeking experienced systems programmers for its software group located in Sydney. The bank is currently committed to IMS based data base and data communications development on a large scale.

EXPERIENCE
At least two years' experience in an IBM OS software environment.

HARDWARE
Three 370/158's in Sydney and six 370/145's in other States using 3705 communication controllers and other peripheral equipment supporting a network of 3600 finance terminals in its first stages of implementation, as well as an extensive range of batch and on-line systems.

SOFTWARE
The bank has installed MVS,VS1, TSO, VTAM/NCP, IMS/DB/DC and expects to remain in the forefront of SNA development in Australia.

CONDITIONS
Air fares and relocation expenses for your family (USA—Australia) will be met by the bank and up to three months' subsidised transit housing can be available. These are long term career positions.

THE JOBS
A range of positions is available requiring different levels and types of expertise. While extensive training opportunities are available, some degree of expertise in any of the above software fields is essential.

BENEFITS
Four weeks' annual leave with pay loading.
Superannuation.
Housing finance available in line with bank's current lending policy applying to specialist staff

APPLICATIONS
Please apply in writing to
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Bank of New South Wales
New York Agency
Suite 2412, 24th floor
200 Park Avenue
New York, N.Y. 10017
Arrangements will be made to interview selected applicants in late May.

Bank of New South Wales

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We're looking for manufacturing application specialists with all levels of knowledge and experience who are interested in joining a progressive, dynamic organization developing business systems for sale to our customers and use in our plants. The system is a complete business system for the discrete manufacturing firm and includes such subsystem areas as Bill of Material, Inventory Control, Material Requirements Planning, Work-in-Process, Purchasing, Master Scheduling, Capacity Planning, and Order Entry.

The system is being implemented for use on NCR's latest generation of large mainframe processors, the Criterion. The system also utilizes transaction processing software to facilitate on-line interactive communication to terminals. NCR-TOTAL is the data base management system. All programs are written in COBOL.

If this sounds like something you would like to be involved with, and you have at least a bachelor's degree, 2 or more years of comparable experience, know and have used COBOL, and have experience with large systems, we would like to invite you to come to Dayton for a personal interview.

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Join a professional data processing organization with challenging growth opportunities for career oriented individuals. We are seeking professionals that are interested in a OS/VS state-of-the-art environment and who possess the following skills: Three or more years having COBOL OS JCL knowledge. System Analyst; coding, debugging, and implementation. Experience with FDR credit card system is desirable but not required. We are conveniently located in down town Cincinnati, Ohio and we offer an excellent salary and benefit program.

For those interested candidates, please forward a copy of your resume and salary history to: M.L. Bush, The Fifth Third Bank Personnel Department, 38 Fountain Square Plaza, Cincinnati, Ohio 45202. An Equal Opportunity Employer.

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PROGRAMMER/ANALYSTS - Systems and Applications Programmers and Analysts for commercial and scientific applications. FORTRAN and COBOL are used for applications. Familiarity with the IBM 1130 and DNA Systems TSO/CYTOS preferred. Excellent compensation package including salary, incentive, and bonus plans, including expatriot premium. A one year contract with completion bonus is included.
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You will interface with top management and will be responsible for all of the functions associated with guiding, directing, and coordinating a leading software or hardware product line in the international market.

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As a member of our in-house minicomputer maintenance team, you will work independently, diagnosing and repairing mainframes, memory, peripherals, and disk storage systems on a wide variety of computer systems based around the DEC PDP-11 family of minicomputers.

The successful candidates must be technical school graduates (or equivalent) with significant manufacturer's training. In addition, several years' experience maintaining the PDP-11 family of computer systems, as well as an excellent working knowledge of trouble-shooting techniques, central processors, mass storage devices and other computer equipment, is required.

We provide excellent compensation, working conditions, and benefits (how does 24 days' annual vacation sound?). Our location in the mountains of northern New Mexico offers a pleasing lifestyle in a setting of great natural beauty: abundant recreational opportunities; a pollution-free environment; and casual, uncrowded living.

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P.O. Box 1663
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An Affirmative Action/Equal Opportunity Employer
Women, Minorities, Veterans, Handicapped, Urged to Apply
U.S. Citizenship Required

Programmers

Senior Systems Programmers

The successful candidates will participate in the design and implementation of software to support a nationwide research library network. Implementation experience in one of the following specialty areas is mandatory: generalized on-line database/information retrieval systems, library automation systems, disk access methods, or on-line applications programming. In addition, close familiarity with 360/370 assembler language is desired.

Communications Support Personnel

Candidates will possess a high school diploma and 2 years experience in data communications. Desired experience includes data transmission over TELCO circuits; diagnosis and repair of terminals, modems, and other pertinent equipment. Knowledge of TELCO and EIA interfaces, and a working knowledge of testing devices and methods employed to support long distance communications.

Please send resume and salary history to: P.C. Coulter, Ballots Center, Encina Commons, Room 103, Stanford University, Stanford, CA 94305. An Equal Opportunity Employer Through Affirmative Action.

STANFORD UNIVERSITY

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Combine your scientific and business know-how in these project leadership roles.

These high visibility positions require in-depth experience and the stature to interact with middle and upper echelon management in effectively developing large bill of materials, financial and documentation control applications.

Ideal candidates will have Bachelor's degree in Computer Science, Accounting, Finance or Business Administration and 6 to 8 years successful experience in the design/implementation of business systems and at least 2 years technical programming. Minimum 4 years relevant systems design experience and proven ability to present ideas also necessary. Experience with IBM 370, TOTAL and TSO helpful.

Babcock & Wilcox is a growing high technology energy company and offers excellent salary, full benefits and a comfortable lifestyle in a favored Blue Ridge Mountains area. Write in confidence, detailing experience and salary history, to Mr. G.W. Bunch, Ref. 317.

Babcock & Wilcox
Power Generation Group
P.O. Box 1260, Lynchburg, Va. 24505
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SYSTEMS ANALYSTS (DATA PROCESSING)

We are one of the largest teaching and research medical facilities in the Midwest, currently seeking several Systems Analysts for our Systems and Procedures Department.

To qualify, you should have at least 5 years experience in programming at the Senior Programmer/Analyst or Systems Analyst level, and have a thorough, state-of-the-art knowledge of COBOL (a second language is highly desirable); OS-JCL, Utilities, Operating Systems, Sort-Merge, and CICS. You must have had previous responsibility for at least one major project from inception to completion. Experience in the design, programing, and implementation of on-line systems is helpful but not mandatory. You should be familiar with concepts of packaged software (preferably MSA) and possess good analytical skills and judgment. In all respects, the applicant we seek must be a professional.

If selected, you will be responsible for the installation of packaged financial software, the design, programming, installation and debugging of programs, analyzing program or system problems, investigating software programming aids or tools, and setting up standardized procedures. You will report directly to the Manager of Systems and Procedures and be assignable on a consultant basis to special projects. You must have strong managerial skills, as you will supervise Programmer/Analysts in the programming of large or complex systems.

We offer qualified individuals an excellent salary and comprehensive fringe benefits package that includes paid relocation and tuition reimbursement. For consideration, please send resume, including salary history and requirements to:

David J. Kinsella
Manager, Employment

MICHAEL REESE HOSPITAL & MEDICAL CENTER

29th and Ellis Ave. Chicago, IL 60616
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Join a dynamic organization in establishing a County data processing installation.

Excellent opportunity for individual who has already proved himself a capable manager and has been instrumental in establishing one or more installations from their inception. Ability to communicate effectively with all levels of County management is essential.

If you possess such qualifications, why not earn a salary in the twenties and excellent fringe benefits while enjoying America's vacationland year round.

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Our client Companies include Consulting Firms, Manufacturers, Banks, Insurance companies, Oil & Gas companies and Software Houses. They offer career advancement opportunities, strong benefit packages, company-paid moving and interview expense and they pay our fee. We have numerous openings in the Southwest for the Professional Programmer/Analyst. Critical needs include TP, Data Base and MINI computer Programmers.

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If you have recent experience or are now working with OS/MVS in applications, systems or network programming we have career positions you might be interested in. Excellent benefits and working conditions. A proven growth company devoted to technical excellence.

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700 W. Hamilton Ave.
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Attn: Jeneil Wieman

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We are a leading W. Va. bank seeking a data processing professional to assume a major role on the systems and programming staff in the expansion of its multi-bank data processing center.

Candidates must have several years of banking experience and in depth knowledge of NCR hardware and banking software. Excellent communications skills and supervisory ability are required.

We offer excellent salary/benefits package and an opportunity to become involved with the latest NCR hardware and software in an on-line environment.

Michael McKinney
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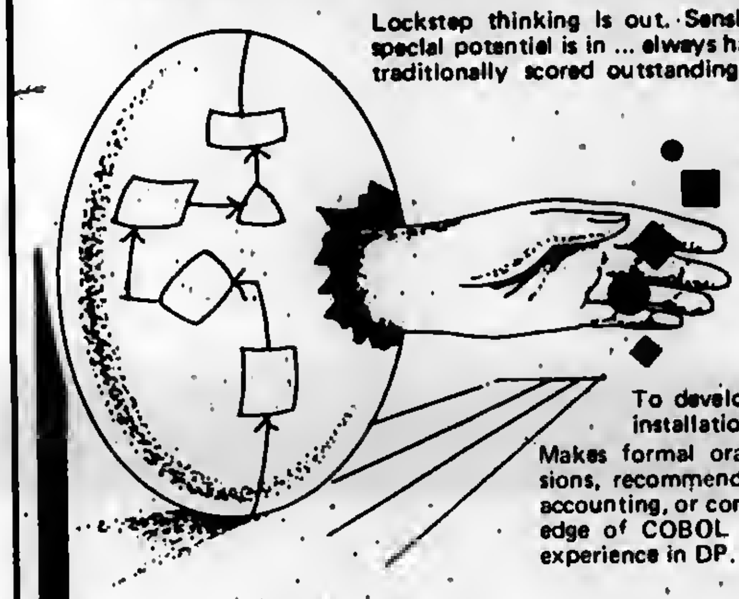

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LEAD SYSTEMS ANALYSTS

To develop and modify DP systems; define and supervise installation procedures. Evaluate OS and improvements. Makes formal oral and written presentations of findings, conclusions, recommendations. Needs Bachelor's degree (statistics, math, accounting, or computer science major) with MBA desirable. Knowledge of COBOL & CICS. Minimum 6 years experience including experience in DP.

SR. SYSTEMS ANALYST

Responsible for systems design flow and test segments, must be able to translate SA requirements into feasible design. Will write complete programs specifications including flow charts showing systems linkage, data movement and resource requirements. Will also design file structures, forms, reports, and procedures for data collection, processing and control. Needs 2-4 years college plus minimum 4 years experience in programming and systems.

Positions with one of our operating divisions located in the beautiful valley area of Appleton, Wisconsin, offers excellent salaries, top benefits including liberal relocation assistance. For prompt, confidential consideration, send resume indicating salary history and current requirements, to:

Manager, Corporate Recruiting
HAMMERMILL
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Diversified NYC communications company with IBM 370/158 OS/VS. 3+ yrs exp. as project leader to design, implement & modify business systems. Potential packed opportunity in the greatest city in the world! $24,000 FEE PAID.

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Implementation and Education

Hospital Corporation of America is seeking an individual to be responsible for maintenance of the continuing education process in support of the implementation of our computer assisted Administrative Systems.

The combined background of instructional design for computer systems in a health care environment is preferred. Skills in marketing and documentation are also desired. Resumes should be sent to: Thomas Bain, One Park Plaza, Nashville, TN 37203

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DATA PROCESSING

IBM 370

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Dynamic expansion of our overseas business areas has created immediate ground floor opportunities for IBM 370 experienced systems professionals to provide direct System Engineering support to Division Marketing and Business Acquisition personnel relative to application of Division's on-line Logistics Management/Inventory Control Systems to customer IBM 370 data processing environments.

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Internals working knowledlge of following IBM system software is mandatory:

- DOS/VS
- CICS
- 3705 NCP
- DL/1
- VSAM

Above positions offer excellent salary, opportunity for foreign travel and one of the most comprehensive benefits packages in the industry. To arrange for an interview, send resume including salary history to Mr. William P. McGee.

Ford

Ford Aerospace & Communications Corporation
ENGINEERING SERVICES DIVISION
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Programmer/Analysts III -$16,138

Background should include systems design and project management experience on large business data processing systems using top down phased development. ANS COBOL, CICS, VSAM and IDMS data base experience also helpful. We are a dynamic shop utilizing an IBM 370/158 OS/VSI. Helena, located at the foot of the Rockies, offers clean air, friendly people (33,000) and wide open spaces. We are only 20 minutes from excellent hunting and trout fishing, river floating, water skiing, national forests and wilderness areas, and only a half-day's drive from Glacier and Yellowstone National Parks.

If you are interested in an exciting career and beautiful surroundings, please forward a resume including salary history to:

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DEPT OF ADMINISTRATION
ROOM 101, MITCHELL BLDG
HELENA, MT 59601

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(215) 568-4580

Programmer/Analysts

Our firm specializes in the recruitment and placement of data processing personnel. Current need exists for qualified persons with minimum 2 yrs. experience in programming and/or systems design. Background in manufacturing, banking or insurance applications highly desirable. Qualified individuals are invited to submit resume, including salary history and geographical preferences, to: EXECUTIVE RECRUITERS INTERNATIONAL, Personnel Consultants, 4101 Medical Parkway, Suite 204, Austin, Texas 78756 or call (512) 454-5247 for additional information. All fees assumed by employers.

APPLICATIONS PROGRAMMER/ANALYST

If you are seeking a permanent position involving the development of financial, student accounting, CAI, personnel, and library applications in a small college environment, this is the position for you.

Preference given to applicant experienced on DEC PDP 11/40 with RSTS/E, BASIC programming, and a BS degree with emphasis in data processing or computer science. Competitive salary and fringe benefits. RPG II and systems programming a plus.

Applications accepted through May 31, 1978. Employment date July 1, 1978. Send confidential resume to:

Howard B. Kipple, Director
Computer Center
NEW MEXICO JUNIOR COLLEGE
Hobbs, NM 88240 (505) 292-8528, Ext. 288

NCR PROGRAMMER

Progressive bank service firm in South Florida is seeking a programmer with NEAT/3 and CIF experience. Interested applicants send resumes and salary requirements to:

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7479 Centrex
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PROGRAMMER

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We'll provide commensurate salary and comprehensive GE benefits along with the kind of exposure needed for long-range professional development and growth. Send resume including salary history, to: Ms. Mary Nofsinger, GE Company, 1755 Jefferson Davis Highway, Arlington, VA 22202.

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A Bachelor of Science degree in computer science or related field is required. 1 to 3 years experience desirable. Must be proficient in advanced FORTRAN and have some experience in an assembler language. Will be responsible for creation of new software and maintenance of existing application program on a real-time digital computer system. Software deals primarily with electric power system monitoring and control, energy production, and accounting. Utilize remote batch and local time sharing computer facilities to accomplish duties. This career position is in our production control center in Niagara Falls New York.

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NMSU Computer Center is seeking a SYSTEMS PROGRAMMER III, starting June 1, 1978. Current configuration is IBM 360/65 running OS 21.8, HASP, and APL. NMSU is currently evaluating a system upgrade. Experience with OS required and Bachelor's degree desirable. Application deadline — May 16, 1978. Send resume and salary requirement to R. Waugh, Computer Center, Box 3AT, Las Cruces, New Mexico 88003. For further information call (505) 646-2226. NMSU is an Equal Employment/Affirmative Action Employer.

Analyst/ Programmer III

for N.C. State University Research and Development organization. Minimum requirements: four year degree in computer science or related field plus three years experience in analysis and programming. MIS, proposal writing, equipment evaluation and acquisition experience desirable. Interested applicants should contact N.C. State University Personnel, Primrose Hall, Raleigh, North Carolina, 27607, (919) 737-2135.

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Salary will be commensurate with experience. Please send your resume and salary history to:

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Send complete resume to:

Director of Personnel
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Pennzoil offers a full range of benefits as well as excellent career opportunities for the innovative professional. Resumes may be sent in confidence to:

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PROGRAMMER/ANALYST

$15,732--$19,176

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Applicants should send a detailed resume to Lois Colt, Personnel, Trendata Corporation, 610 Palomar Avenue, Sunnyvale, California 94086, or call (408) 732-1790.

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Starting salary $25,000-$29,000 and fully paid employee benefits.

To apply or further inquire, contact:

Brigitte Malcolm,
(303) 759-1000, Ext. 472
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Personnel Div.
1325 South Colorado Blvd.
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MEDICAL INFORMATION SYSTEM DEVELOPMENT
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Position requires B.S. in Computer Science or equivalent technical degree and one to three years of employment as a Programmer/Analyst. Experience in the development of data management systems and/or PDP 11 RSTS, BASIC PLUS and/or RSX 11-M desirable. Experience with medical applications not needed.

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Nuclear Division
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DEC-system-10/20
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Applicants should forward resumes to

H. David Todd, Director
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Send resume to: Personnel Coordinator, P.O. Box 2218, Redding, California 96001.

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716-458-8000

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Computer Center
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Applications must be postmarked by May 19, 1978. For application and further information contact Donald Clark, Director of Computer Services, Central Washington University, Ellensburg, WA 98926, or call (509) 963-2821. EEO/AA/TITLE IX Institution.

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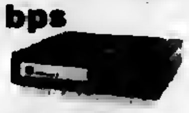
7200 bps 	**MODEM 4800/72** Dedicated line with optional multiport operation for up to three 2400 bps channels.	$6900 $165/mo.*	**$1995** **$80/mo.***
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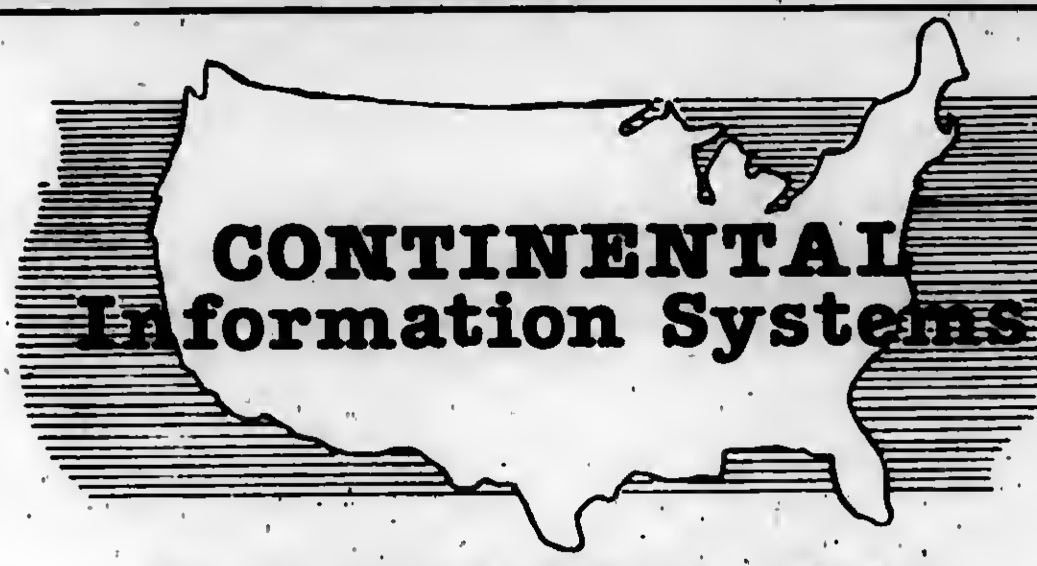

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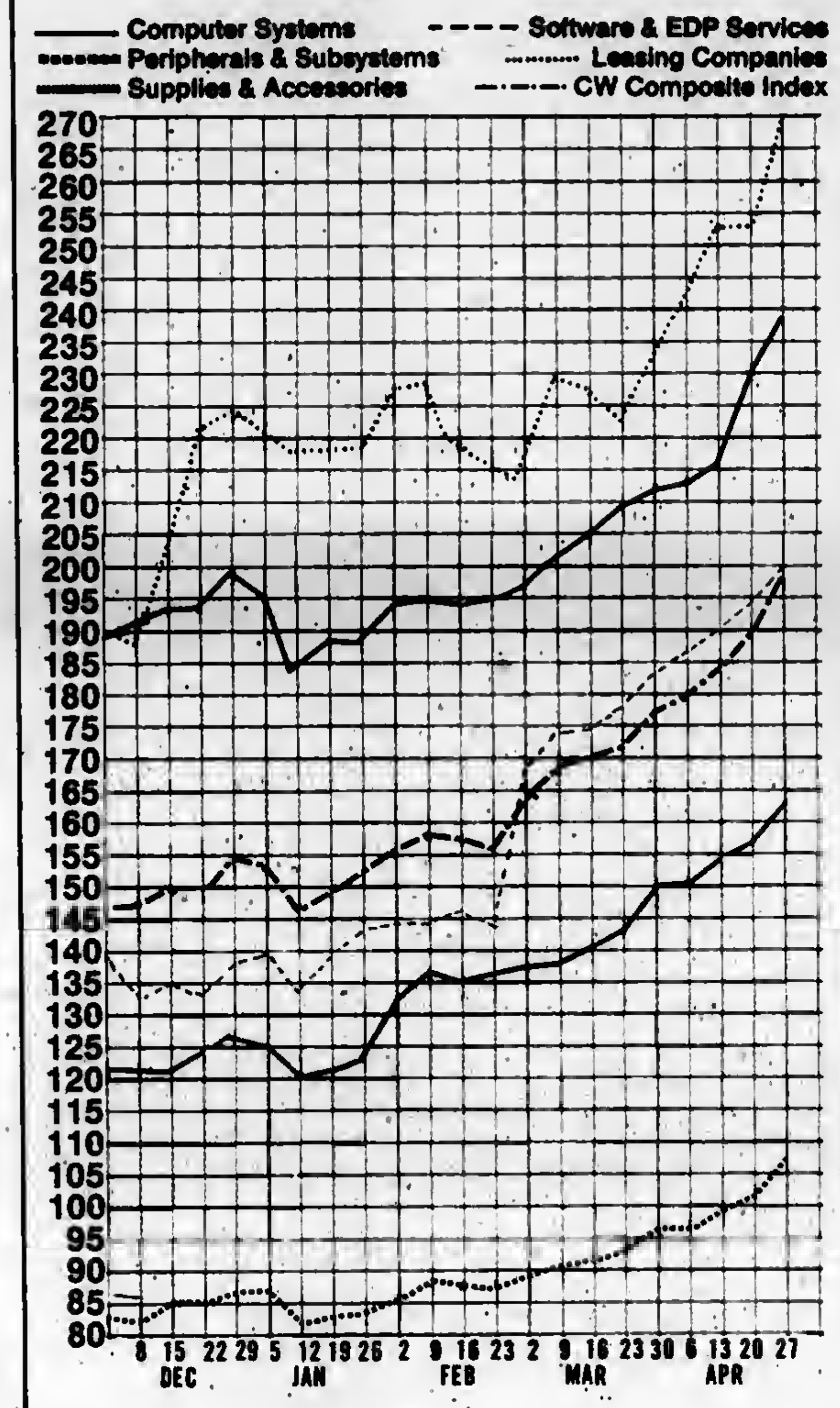

Earnings Reports

CONTROL DATA
Three Months Ended March 31

	1978	a1977
Shr Ernd	$.90	$.75
Revenue	400,3935,000	338,259,000
Tax Cred	300,000	300,000
Earnings	15,681,000	12,981,000

a-Restated.

DATA GENERAL
Three Months Ended March 11

	1978	1977
Shr Ernd	$.85	$.83
Revenue	81,624,000	55,569,000
Earnings	8,464,000	8,218,000
8 Mo Shr	1.87	1.21
Revenue	158,883,000	106,636,000
Earnings	18,632,000	11,931,000

DOCUMATION
Year Ended Feb. 3

	1978	1977
Shr Ernd	$1.22	$.73
Revenue	31,555,000	18,582,000
Earnings	3,657,000	2,021,000

HAZELTINE
Three Months Ended Dec. 31

	1978	1977
Shr Ernd	$.40	$.37
Revenue	17,555,000	15,067,000
Earnings	808,000	750,000

IBM
Three Months Ended March 31

	1978 (000)	1977 (000)
Shr Ernd	$4.01	$3.82
Revenue	4,431,878	4,090,295
Earnings	589,018	573,343

NATIONAL COMPUTER SYSTEMS
Year Ended Jan. 31

	1978	1977
Shr Ernd	$1.35	a$1.06
Revenue	24,897,400	12,727,700
Earnings	2,213,100	1,590,300
3 Mo Shr	.27	a.25
Revenue	8,213,700	3,132,700
Earnings	447,600	393,000

a-Adjusted to reflect 50% stock dividend in December 1977

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, APRIL 26, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 26 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 55	54 1/2	+4 5/8	+8.7
N	BURROUGHS CORP	55- 91	69 7/8	+5 1/8	+4.6
O	COMPUTER AUTOMATION	18- 50	28 1/2	+2 3/4	+10.8
N	CONTROL DATA CORP	20- 29	28 3/4	+ 7/8	+5.1
O	CRAY RESEARCH INC	15- 40	37 3/4	-1 3/4	-4.4
N	DATA GENERAL CORP	35- 54	52	+2 3/8	+4.7
N	DATAPOINT CORP	18- 47	47 1/4	+ 3/8	+0.7
N	DIGITAL EQUIPMENT	37- 55	45 1/4	+1 5/8	+3.9
N	ELECTRONIC ASSOC.	2- 5	4 7/8	- 1/8	-2.5
A	ELECTRONIC ENGINEER.	8- 17	18 3/4	+ 7/8	+5.5
O	FOUR-PHASE SYSTEMS	15- 27	25	- 1/2	-1.9
N	FOXBORO	28- 54	55 7/8	+1 7/8	+3.5
O	GENERAL AUTOMATION	6- 10	9 7/8	+ 1/2	+5.5
O	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	62- 87	75 1/8	+3 1/8	+4.3
N	HONEYWELL INC	45- 55	50 3/4	+1 1/4	+2.5
N	IBM	236-286	282 5/8	+9 5/8	+3.7
O	MANAGEMENT ASSIST	5- 15	14 3/4	+1	+7.2
O	MICRODATA CORP	7- 18	11 5/8	+ 5/8	+5.8
O	MINI-COMPUTER SYST	5- 12	5 3/4	- 1/4	-4.1
O	MODULAR COMPUTER SYS	5- 15	11 3/8	- 1/8	-1.0
N	NCR	32- 51	50	+1 3/8	+2.8
O	PRIME COMPUTER INC	12- 37	36 3/4	+4 1/4	+15.0
N	PERKIN-ELMER	17- 22	20 1/8	+1 5/8	+8.7
N	RAYTHEON CO	16- 42	41 5/8	+1 1/4	+5.0
N	SPERRY RAND	30- 42	39 1/2	+1 1/2	+3.9
O	SYCOR INC	8- 25	22 1/2	+ 3/4	+3.4
A	SYSTEMS ENG. LABS	5- 15	14 1/2	+ 7/8	+8.4
A	WANG LABS.	10- 19	18 5/8	+2 1/4	+13.7

LEASING COMPANIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 26 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	5- 6	5 7/8	0	0.0
O	BOOTHE COURIER CORP	8- 16	18 5/8	0	0.0
O	COMDISCO INC	9- 18	16	+3	+25.0
A	COMMERCE GROUP CORP	1- 5	7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	+	+7.8
P	DATRONIC RENTAL	0- 2	1 5/8	0	0.0
A	DCL INC	1- 4	2 3/4	+ 1/8	+4.7
N	DPF INC	6- 10	9 7/8	+ 5/8	+5.9
N	ITEL	13- 22	21 3/4	+2 7/8	+15.2
N	LEASCO CORP	19- 35	35	+ 1/2	+1.5
O	LEASPAC CORP	1- 2	1 3/4	+ 3/8	+27.2
A	PIONEER TEX CORP	5- 11	5 7/8	- 1/8	-2.0
N	U.S. LEASING	10- 18	14 1/8	+ 1/2	+3.8

EXCH: N=NEW YORK; A=AMERICAN; A=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 26 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1	0	0.0
O	ANACOMP INC	7- 12	11 1/4	+ 1/4	+2.2
A	APPLIED DATA RES.	5- 15	12 1/2	+ 7/8	+7.5
N	AUTOMATIC DATA PROC	25- 30	29 3/4	+ 7/8	+3.0
O	COLEMAN AMERICAN COS	1- 2	1 5/8	0	0.0
O	COMPU-SERV NETWORK	8- 15	7 1/2	- 1/2	-6.2
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	9 1/2	+ 3/8	+4.1
N	COMPUTER SCIENCES	7- 12	11 5/8	+ 3/4	+8.8
O	COMPUTER TASK GROUP	1- 2	2 1/4	+ 1/4	+12.5
O	COMPUTER USAGE	1- 5	2 5/8	0	0.0
O	COMSHARE	5- 11	10 1/2	+ 1/4	+2.4
O	DATA DIMENSIONS INC	5- 5	4 1/4	0	0.0
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	18 1/8	- 1/8	-0.6
O	INSYTE CORP	2- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/4	+ 1/2	+15.5
O	KEYDATA CORP	1- 5	2 1/8	- 3/8	-15.0
A	LOGICON	7- 17	12 3/4	- 1/8	-0.9
A	MANAGEMENT DATA	1- 2	1 1/4	+ 1/8	+11.1
A	NATIONAL CSS INC	10- 20	20	+1 1/4	+8.6
O	NATIONAL DATA CORP	4- 11	10 1/2	+1 1/2	+16.6
A	ON-LINE SYSTEMS INC	16- 24	21 5/8	- 7/8	-3.9
N	PLANNING RESEARCH	3- 6	4 7/8	- 1/8	-2.5
O	PROGRAMMING & SYS	1- 1	3/4	+ 1/8	+20.0
O	RAPIDATA INC	2- 5	4 1/2	+ 3/8	+9.0
O	REYNOLDS & REYNOLDS	17- 25	24	+ 1/4	+1.0
O	SCIENTIFIC COMPUTERS	1- 4	4 7/8	+ 3/8	+8.5
O	TYMSHARE INC	14- 25	21 5/8	- 1/8	-0.5
A	UPS SYSTEMS	4- 6	6	+ 1/8	+2.1
N	WYLY CORP	1- 5	4 5/8	0	0.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 26 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 20	18 5/8	- 1/2	-2.6
O	ADVANCED MEMORY SYS	7- 12	11 7/8	+ 7/8	+7.9
N	AMPEX CORP	8- 14	14 1/4	+1	+7.5
O	ANDERSON JACOBSON	3- 7	6 1/2	+1	+18.1
N	APPLIED DIG DATA SYS	10- 20	14 3/8	+ 1/8	+0.8
O	BEEHIVE INT'L	5- 12	5 5/8	- 1/8	-2.2
A	BOLT,BERANEK & NEW	6- 9	7 1/4	+ 1/4	+3.5
N	BUNKER-RAMO	8- 15	14 3/8	+ 5/8	+4.4
A	CALCOMP	5- 8	6 1/4	+ 3/4	+15.8
O	CAMBRIDGE MEMORIES	1- 4	5 3/4	+ 1/4	+7.1
N	CENTRONICS DATA COMP	16- 30	19	- 3/8	-1.9
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	9 5/8	- 1/8	-1.2
O	COMPUTER CONSOLES	4- 7	8	+ 1/4	+4.5
A	COMPUTER EQUIPMENT	2- 5	4 3/4	+ 5/8	+15.1
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	CERMEN	9- 19	18 3/4	+2 7/8	+18.1
N	CONRAC CORP	19- 28	21 1/8	- 1/2	-2.5
O	DATA ACCESS SYSTEMS	4- 5	4 1/2	- 1/4	-5.2
O	DATA 100	6- 15	14 1/2	+ 5/8	+4.5
A	DATA PRODUCTS CORP	9- 19	19 7/8	+2 1/8	+12.6
O	DATA TECHNOLOGY	5- 4	4	- 1/4	-5.8
O	DATUM INC	1- 4	3 7/8	0	0.0
O	DECISION DATA COMPUT	2- 5	1 3/4	+ 1/8	+7.6
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
A	DOCUMATION INC	8- 15	14 3/8	+1 1/2	+11.4
O	DATARAM CORP	2- 24	20	+3	+17.6
N	ELECTRONIC M & M	4- 6	5 5/8	+ 3/8	+7.5
O	FABRI-TEK	1- 2	1	+	+6.6
O	GENERAL COMPUTER SYS	0- 2	1 1/4	0	0.0
N	HAZELTINE CORP	8- 15	15 1/4	+ 1/2	+3.9
N	HARRIS CORP	28- 34	35 1/2	+4 1/2	+9.1
O	INFOREX INC	4- 8	7 1/2	+ 1/8	+1.8
O	INFORMATION INTL INC	8- 14	9 3/4	+ 1/4	+2.6
O	INTEL CORP	38- 57	51	+2 1/2	+5.1
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	6- 15	15	+1 1/4	+9.0
N	MEMOREX	23- 40	38 5/8	- 1/4	-0.6
N	MOHAWK DATA SCI	5- 9	8 7/8	- 1/8	-1.5
O	PENRIL CORP	2- 8	7 1/4	0	0.0
N	PERTEC CORP	7- 12	11 3/4	+ 1/8	+1.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	5- 5	3 5/8	+ 3/8	+20.8
O	RECOGNITION EQUIP	6- 10	7 3/4	+ 1/8	+1.6
O	SCAN DATA	1- 5	2 1/2	+ 1/8	+8.0
O	STORAGE TECHNOLOGY	10- 35	35 1/8	+ 3/8	+1.1
O	T BAR INC	7- 19	17	0	0.0
O	TALLY CORP.	4- 9	8 7/8	+ 5/8	+7.5
A	TEC INC	6- 10	8	+ 3/8	+4.9
N	TEKTRONIX INC	29- 41	41	+2 1/4	+5.8
N	TELEX	2- 5	5 5/8	+ 3/4	+16.2
O	TESDATA SYSTEMS CA	15- 20	16 1/4	+1 1/4	+8.5
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE APR 26 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	8 1/4	- 1/4	-2.9
O	BALTIMORE BUS FORMS	1- 4	5 1/4	+ 1/4	+8.5
A	BARRY WRIGHT	10- 21	20 7/8	+1	+5.0
O	CYBERMATICS INC	1- 1	7/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 21	20 1/2	+ 1/8	+0.6
N	ENNIS BUS. FORMS	6- 12	12	+ 1/2	+4.5
N	3M COMPANY	43- 58	51	+4 1/4	+9.0
O	MOORE CORP LTD	24- 37	29 1/2	+ 1/2	+1.7
N	NASHUA CORP	18- 28	27	- 5/8	-2.2
O	STANDARD REGISTER	18- 28	25 1/2	+3	+13.5
O	TAB PRODUCTS CO	8- 19	10 7/8	+1 5/8	+17.5
N	UARCO	18- 24	24 1/8	+ 1/4	+1.0
A	WABASH MAGNETICS	10- 15	12 1/4	- 1/2	-3.9
N	WALLACE BUS FORMS	17- 25	23	+ 1/8	+0.5

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NEWSPAPER

Terminals Now Hot Item on Black Market

By Edith Holmes
CW Washington Bureau

WOODLAWN, Md — The Federal Bureau of Investigation is beginning to run into a sizable black market in portable computer terminals, according to David Miller, a special agent in the FBI's Philadelphia office.

Texas Instruments, Inc. terminals seem to be the hottest items on the shelves of those who fence stolen goods, he told a recent gathering on computer security here sponsored by the Social Security Administration.

The bureau knows little else about this black market, he added.

Miller, who has a systems background and specializes in computer fraud, said the FBI encountered the terminal black market through conventional means of law enforcement. Under the laws governing the interstate transportation of stolen property, the FBI "got involved with several fences who've started to talk to us about the trade in stolen terminals," he explained.

"We were startled to see terminals alongside the stolen liquor and television sets of the typical fencing operation," Miller said. "Thinking about it now, I don't know why we were surprised — there's a black market for everything."

Miller expects that, as CPUs get smaller and more compact, there will be a black market for computers as well.

The FBI hopes to have some sense of the dimensions of this new black market in terminals within a year, Miller said. Meanwhile, it is continuing to work with computer fraud cases and is finding the number of these cases has overwhelmed the re

(Continued on Page 8)

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370-Compatible System

National Semi Offers 'Mini'

By Jeffry Beeler
CW Staff

NEW YORK — A hardware vendor joined the growing list of IBM 370-compatible, medium-scale systems suppliers when National Semiconductor Corp. last week announced its first general-purpose minicomputer to be sold directly to end users as well as to OEMs.

Three weeks after National CSS Inc. introduced its 370-compatible 3200 series superminis [CW, April 17], National Semiconductor responded with its own medium-scale system, which reportedly runs unmodified DOS/VS and VM/370 software but offers the same price and architecture as a typical upper-end mini such as the Digital Equipment Corp. PDP-11/70 or the Hewlett-Packard Co. 3000 series.

In addition to providing compatibility with IBM operating systems and applications programs, the System 400 comes with assorted adapters that permit interfacing both to IBM I/O devices and to five classes of minicomputer peripherals, National Semiconductor spokesmen explained.

This I/O capability coupled with the 370 software compatibility allows the System 400, which is said to be comparable in performance to the 370/145, to serve as a remote computing facility in 370-based distributed processing networks, the company officials added.

Service Arrangements

Initially, National Semiconductor will service the system through its existing network of maintenance centers, which currently supports the company's Datachecker point-of-sale systems. By June, the network will total 15 centers and the firm will establish additional System 400 service offices as the need arises, a company official predicted.

Reportedly capable of executing instructions 1.5 times faster than a 370/138, the National Semiconductor mini incorporates 32-bit architecture with a central logic bus (CLB) that transfers data at up to

(Continued on Page 6)

For Public Utility Bills

Court Orders Human Tie

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — A U.S. Supreme Court decision here last week highlighted the need for continued human intervention in computerized billing schemes.

The high court ruled in favor of Willie S. and Mary Craft of Memphis, Tenn. who sued the City of Memphis Light, Gas & Water Division in February 1974 after their utility service was cut off five times for nonpayment.

The Crafts tried repeatedly to correct their billing problem caused, in part, by two sets of gas and electric meters serving the home they had just purchased which had once been a duplex. However, they could find no one at the utility who could unravel the difficulties reflected in the computerized "final notice" bills they continued to receive.

In a 6-3 decision affirming the ruling of the U.S. Court of Appeals for the Sixth Circuit, which granted the Crafts damages for the service terminations they experienced, the Supreme Court justices found the municipal utility at fault for failing to make a procedure available to its customers for challenging disputed bills.

Under the due process clause of the 14th Amendment to the U.S. Constitution, a municipal utility cannot terminate service "at will" but only "for cause," the two courts said.

Due process "requires that,

(Continued on Page 4)

DEC Makes DDP System Out of PDP

By Ronald A. Frank
CW Staff

MAYNARD, Mass. — Digital Equipment Corp. has configured distributed data processing (DDP) versions of its PDP-11/34, PDP-11/60 and PDP-11/70 systems that include a newly introduced intelligent CRT called the VT62 as well as specialized software modules.

Called the Trax systems, the configurations are aimed at multiterminal dedicated net

(Continued on Page 6)

Portable Terminal Uses RF Link

By Ronald A. Frank
CW Staff

SCHAUMBURG, Ill. — Within the next few months a user with a radio transmitting, hand-held terminal could enter an instruction into a small keyboard and update a data base record in an IBM 370 CPU a mile away in real time.

This scenario has become technically feasible with the introduction of a portable terminal system that combines FM business band radio with IBM 3270 binary synchronous data communications.

The RDX 1000 from Motorola, Inc. is a microprocessor-based, hand-held terminal with a self-contained, 53-key alphanumeric keyboard and display plus a two-watt FM transmitter and receiver.

Two-way communications between the RDX 1000 and an IBM mainframe is accomplished via two links, according to a spokesman. The terminal communicates in the UHF business band with an FM base station, the base station,

(Continued on Page 4)

Motorola RDX 1000

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Overreliance on DP — Not DP Errors — Blamed in Collapse of Civic Center Roof

By Howard A. Karten
CW Staff

HARTFORD, Conn. – The roof of this city's $31 million civic center collapsed under a load of wet snow last January because of basic errors in the original design, according to a computer analysis conducted by an academic committee investigating the incident.

This finding was part of a preliminary report of the Mayor's Academic Task Force whose members blamed the problem in part on too much reliance on computers and not enough on common sense.

"Engineers tend to rely on computers too much," according to task force member Howard Epstein, an associate professor of civil engineering at the University of Connecticut at Storrs.

"There should be a lot of hand checking done in structures like this [space frame] because they're not the common ones. People tend to accept anything the computer tells them, which is a very dangerous practice," he said.

Like many engineers, the building's designers used a software package called Structural Design Language (Strudl) to assist in basic engineering calculations. The mayor's committee used the same package to investigate the design.

But, according to committee chairman Hayrettin Kardestuncer, also a professor of civil engineering at the university, "all the designers had to do was to look at the data submitted to the computer and they could see the data was not right.

"They put garbage in and "they did get garbage out," he added.

Kardestuncer acknowledged that users occasionally find bugs in Strudl, which is updated annually by a user's group, but he said the bugs were not serious enough to have affected the calculations much.

Faults Itemized

The preliminary report, which will be followed by a more detailed version expected from the committee soon and another by a New York consulting firm hired by the city, made the following points:

- Both dead loads (the weight of materials used in construction) and live loads (e.g., snow) seem to have been underestimated.
- Buckling of the space frame's compression members appears to have been one of the major modes of failure. Bracing and the connection of interior members were inadequate.
- Struts used in adjusting the slope of the roof on the space frame appear to have contributed to the buckling of the structure.
- Building code provisions were not followed in the design of some of the tension members.

Kardestuncer said his group reached these conclusions after reanalyzing the original data with a system known as Finite Elements Analysis (Finel) in addition to Strudl. The runs were made on the university's IBM 370/155.

Another area of concern mentioned in the report was the need for a double check on engineering calculations.

At present, standard engineering and architectural practice is that a licensed professional engineer must certify the calculations; a provision for an independent check on such calculations is not a part of many construction codes.

Epstein said he plans to mention this need before the appropriate professional groups. Commenting on double checking by the city of Hartford, Kardestuncer said the additional cost of engaging an independent consultant would have been insignificant. "After all," he said, "this was not a coop that was going to house 10,000 chickens."

Babson Honors DEC's Olsen

WELLESLEY, Mass. – Babson College's newly created Academy of Distinguished Entrepreneurs honored five entrepreneurs including Kenneth H. Olsen, president of Digital Equipment Corp., as part of the college's Founder's Day ceremonies held here recently.

According to Babson's president, Ralph Z. Sorenson, the academy was established "to pay public honor to a representative group of entrepreneurs who, through their ability to create, take risks and build, have contributed significantly to the well-being of the economy and society.

Clarification

"Shop Floor Terminals Ease Production for Truck Maker" [CW, April 24] was not meant to give the impression that terminals made by IBM and Panasonic Corp. were incompatible with the Xerox Sigma 7 mainframe.

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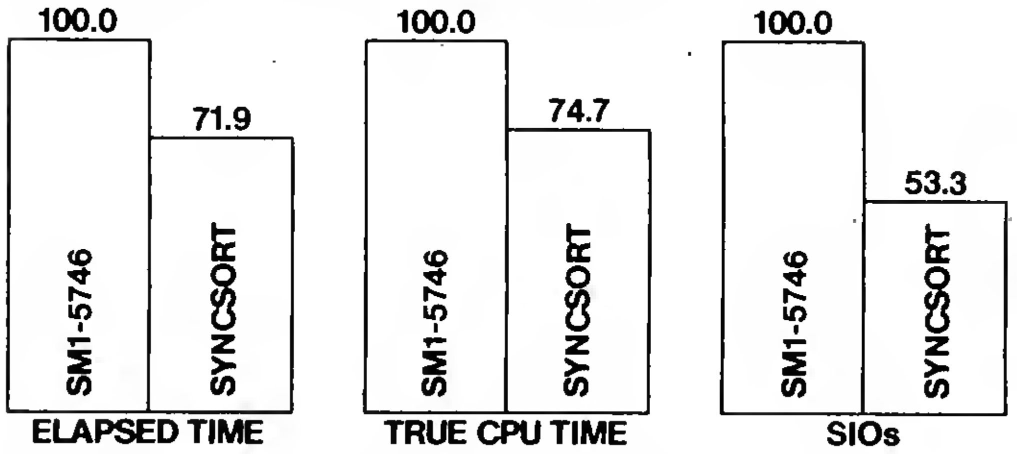
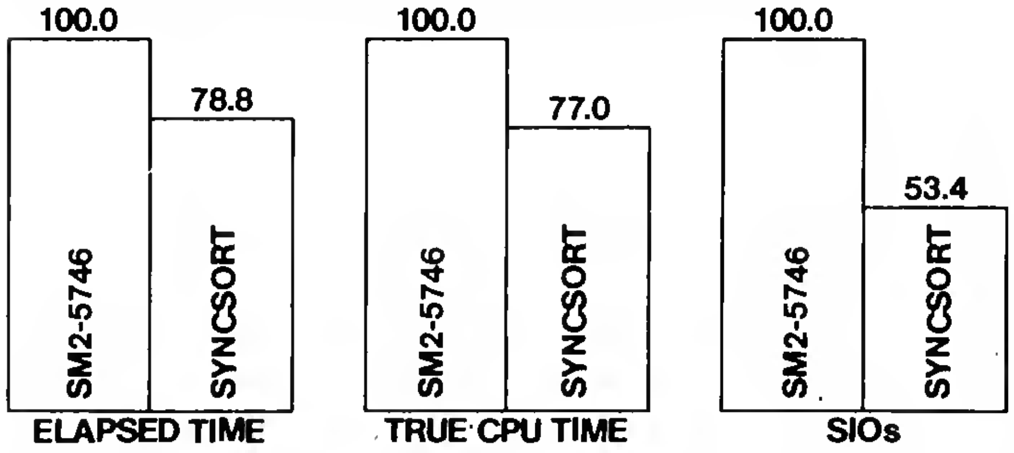
But if IBM has us outnumbered in *quantity*, there's just no comparison in *quality*. That's become increasingly apparent as more and more DOS processors have come around to see if their sorting slippers fit SyncSort.

We are, of course, somewhat nutty on the subject of benchmarks. And most of our users prefer to test SyncSort before they sign on the dotted line. Here are the results of 42 recent benchmarks, covering 213 files, that compare SyncSort's use of computer resources to that of IBM's two "top-of-the-line" sorts:

SyncSort DOS vs. IBM's SM1-5746.



SyncSort DOS vs. IBM's SM2-5746.



How did SyncSort do against IBM's other two "paid-for" sorts. Even better. And as for SyncSort's performance against old SM-483, IBM's "free sort," we can only remind you that the most expensive luxury in the world is a piece of free software!

Another interesting piece of information came out of these tests. We discovered that IBM's DOS sorts perform almost *exactly* the same as their OS sorts. Which is to say, somewhat lackadaisically.

And that may be the real moral of this piece. If you're about to propose to a new DOS sort, maybe you'd better meet the rest of the family first!

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At Annual Meeting

IBM Stockholders Defeat Human Rights Move

By Marcia Blumenthal
CW Staff

DENVER — For the fifth year in a row, IBM stockholders at the recent annual meeting defeated church-supported resolutions on the use of the firm's products in repressive countries.

However, the number of abstentions on the vote gave supporters hope that their campaign was having some effect.

Among other meeting topics, the firm announced that its backlog was running at record levels and blasted the Department of Justice for its handling of the massive antitrust suit against the firm.

In the motion on repression, sponsored by the Interfaith Center on Corporate Responsibility, stockholders supported management with a 97% to 3% vote, but abstentions amounted to six million shares, according to Dr. Howard Schomer of the center.

While such resolutions in the past have dealt only with the firm's relations with South Africa, this year the center — a coordinating committee composed of national Protestant organizations and 150 local and regional Catholic groups — introduced a more general proposal urging shareholders to get IBM to develop clear criteria and a program to ensure that its products are not used in abridging human rights.

Investigations Recommended

The proposal also recommended that IBM initiate investigations into the uses of its computers in Argentina, Chile, Brazil and Uruguay, countries identified as using IBM computers for repressive purposes.

Schomer said the six million abstentions were "motivated abstentions" and interpreted that silence as an indication to IBM management that there is a real problem in the area of human rights.

This year's proposal was fueled by IBM President Frank T. Cary's statement at the 1977 stockholders' meeting that IBM would not knowingly bid for any business involving repressive activities.

In essence, the interfaith group was pressing IBM to act on that statement of corporate principle, Schomer said.

On April 11, in preparation for the annual meeting, leaders of the group met with top IBM executives including Cary.

At that time, Schomer's group asked IBM management to define repression and to show them the standard operating guidelines the company uses to evaluate whether potential customers will use computers for repressive purposes.

IBM executives have been unable to develop an acceptable definition of repression, arguing they would have to rule out doing business with nearly 100 governments, according to Schomer, who pointed out that Cary later admitted this impasse to the stockholders during the annual meeting.

In addition, Schomer contended, IBM reported it investigated the four countries named in the resolution and found the accusations were not corroborated.

At the same April 11 meeting, the interfaith group asked IBM's management to outline the categories of business refused in keeping with the stated commitment of the corporation. Schomer said IBM responded that it has not yet refused any business.

Largest Backlog Ever

In other statements at the annual meeting, the firm said it had the largest backlog of orders in its history and will add up to 10,000 personnel to handle the load.

All plants are being worked on a three-shift-a-day basis, Cary reported.

In his strongest public statement yet on the antitrust case against the firm, Cary claimed the firm had not been dragging its feet on the trial and placed the blame for the delays squarely with the Department of Justice.

"Despite IBM's repeatedly announced readiness to go to trial, the antitrust division asked for delays — twice in 1972, twice in 1974 — and then in 1975 it amended its complaint to include some totally new charges," he said.

Furthermore, he said IBM attorneys would present the firm's side of the case as "crisply and expeditiously as possible.

"We have always been opposed to delays," Cary added. "We believe we are right. We want to get this over with."

Portable Terminal Uses Radio Link to 370

(Continued from Page 1)

in turn, interfaces to an RDX 1100 control unit that transmits data to the mainframe over a conventional data communications link.

The portable terminal is compatible with IBM 3270 CRT protocol. Editing controls similar to those on the 3270 can be initiated by the RDX 1000's operator.

The terminal includes a 480- character memory and data is shown on a 16-character LED display.

Transmission between the RDX 1000 and the RDX 1100 control unit is in Ascii code. The minimum transmission rate over the radio frequency (RF) channel is 1,200 bit/sec or 80 char./-sec, Motorola said.

Data transmitted between the RDX 1100 control unit and the CPU at speeds of 1,200- to 9,600 bit/sec can be coded in either Ascii or Ebcdic. The control unit can be connected with conventional modems using a standard RS-232 interface, the spokesman noted.

Teleprocessing Support

IBM teleprocessing software support for the RDX terminal system includes Btam, Tcam and Vtam. These can be used with 360 and 370 systems running under CICS, IMS, TSO and Video 370, Motorola said.

The CPU controls communications through polling or selection of terminals operating in the system. Terminal identification resides in a table lookup in the RDX control unit.

Polling and selection sequence response activity between the CPU and the control unit is similar to that of a remote 3270, according to Motorola.

When interfaced to the appropriate base station, the control unit is said to support up to 32 RDX 1000 terminals in a multidrop configuration. An error detection/correction scheme is utilized on the channel to minimize message retransmission, the firm added.

An optional voice communications capability on the portable terminal reportedly allows the terminal operator to page other terminals in the system.

The distance over which the terminal can communicate with the base station depends on normal FM propagation characteristics, the spokesman noted, adding it typically can range between 100 feet and two line-of-sight miles.

The terminal can be equipped with a light pen that reads Code 39, an alphanumeric bar code used in industrial environments.

A data-only version of the RDX 1000 costs $3,600 while the data/voice unit costs $3,750. The FM base station is priced at $4,500 and the RDX 1100 control unit costs $19,800.

First deliveries of the RDX system are scheduled for late this year. Motorola's Communications Division is at 1301 Algonquin Road, Schaumburg, Ill. 60196.

Court Orders Human Link

(Continued from Page 1)

at a minimum, the utility provide its customers with an opportunity to present their cases to "designated personnel empowered to rectify" errors in charges for services. In the case of the Crafts, the courts found, no one at the utility provided this kind of assistance.

The ruling does not apply to private utility firms, the court said.

While the Supreme Court emphasized the need for a human interface between the utility's computerized billing system and its customers, the justices also suggested that customers have a responsibility to try to resolve billing problems.

Originally, the Crafts along with several other customers of the utility, filed this case in a district court proceeding. The district court decided that out of all those suing the utility, only Mary Craft had "sought in good faith to determine the cause of the 'double billing.' "

By the time the case reached the Supreme Court, only the Crafts remained in the suit against the utility company's president and general manager, vice-president, members of the board of commissioners and two employees who had responsibility for terminating utility services.

Mary Craft missed work on several occasions to go to the utility's offices to resolve the "double billing" problem. The Crafts also had called in a private plumber to combine their two meters into one after learning from the utility company's meter reader that both sets of meters were running in their home.

Unfortunately for the Crafts, the plumber did not consolidate the meters properly, and they continued to receive two monthly utility bills until January 1974.

Since the initial decision by the district court in the utility company's favor, Memphis Light, Gas & Water has changed its complaint and error procedures. With every computerized "final notice," customers are informed that "credit counselors" are available to talk with them about billing problems, and they are given a phone number to call, a spokeswoman for the utility said.

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Ontario Ends Software Centralization Effort

By Brad Schultz
CW Staff

TORONTO — After a five-year experiment with centralized computer services, the Canadian province of Ontario has dissolved its central software group and is returning to decentralized software development.

However, the Ontario Ministry of Government Services is retaining the group's hardware counterpart.

The Ministry's Systems Development Services (SDS) Division was disbanded last month and the bulk of its staff transferred to other provincial agencies. Since its creation, SDS had lost an estimated $2 million.

In contrast, the allocation and support of hardware resources continue to be profitably managed by the Computer Services (CS) Division.

The divisions were formed on a competitive basis with private industry when the centralization program was inaugurated in 1973. The program was intended to optimize the consumption of both hardware and software resources by the Ontario government, according to Bernard Webber, management technology director for Ontario's Management Board. Webber played a key role in administering the program.

SDS was largely staffed with software specialists from Ontario government bodies, all but eliminating those bodies' DP units. Agencies therefore had to contract either with SDS or private firms to meet their software needs.

Committee Recommendations

The consolidation effort was carried out in compliance with the 1971-1972 recommendations of an advisory group of academic, civic and business leaders called the Committee on Government Productivity. The committee urged the government to centralize to prevent underutilization of DP resources in some agencies when other agencies were experiencing a shortage of resources.

The committee concluded that government bodies build DP staffs to meet the demands of projects under way, but when projects phase down and no other work is available for those specialists, rather superfluous tasks are invented to prevent their idleness.

Bringing an end to centralized software development and terminating the division was not entirely at odds with the committee's recommendations, Webber said. The committee had proposed that the centralized scheme's progress be closely monitored on a profit-and-loss basis and that the government be prepared to take corrective action should things not work out.

The policy switch has induced most SDS people to take positions with agencies that had been SDS clients. However, most of them are not returning to the same jobs they had before joining SDS because of the way demand has changed throughout the provincial government, Webber said.

Reason for Failure

Explaining SDS' negative performance, Webber said many programmers who joined SDS when the division was established came from agencies where they had successfully completed projects and no meaningful work remained for them.

For this reason, SDS had difficulty in finding client agencies to hire SDS personnel. A programmer could not expect the agency he had just left for lack of work to hire him back as a consultant, although his skills and experience might be tuned to that agency's requirements more than any other.

"A majority of ministries in the government transferred all but one or two people to the central agency, and the government allowed each ministry to keep sufficient resources so that it could manage the flow of projects...to supervise [their] ongoing progress . . . and thus report in a responsible way to their own ministry management," Webber noted.

"In the larger ministries, those necessary resources were judged to be much larger than one or two people, and some of the ministries perhaps kept 15% or 20% of [their DP] staff members, transferring something like 80% to the central agency rather than 98%," he continued.

Webber mentioned another factor in the division's disappointing performance: "The government budgetary system perhaps was a bit restrictive for this kind of an agency to exist.

"A government manager, if he is a little uncertain as to the level of his resources in a given year, will wait until the latter part of the year before he undertakes some of the discretionary projects."

For this reason, a "central systems agency might have people lying idle the first part of the year and then have a demand for twice as many people in the last four months of the year."

This situation impaired SDS' ability to compete with the private sector, he said, because the latter can adapt more easily to fluctuations in demand.

Before centralizing DP services, the top management of a government structure — typically at the deputy secretary level — should undertake a careful, comprehensive study of the personnel, agency requirements and other aspects, Webber advised.

"This review should include an in-depth look at the experiences of other government agencies that have tried to do this kind of thing," he suggested. The review should examine what went wrong in other places "and then make the judgment that best fits the environment at hand."

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More Action on Sharansky Demanded by NAS Members

WASHINGTON, D.C. — Members of the National Academy of Sciences (NAS) have expressed dissatisfaction with Soviet officials and indicated they want further action by NAS authorities in regard to the Anatole Sharansky case.

The call for action was made in a resolution passed at a business meeting here recently in which NAS members said they were dismayed at the "lack of Soviet response to NAS initiatives on behalf of Soviet scientists denied their human rights." The resolution was directed to the NAS' governing council.

Members were referring to the lack of response to inquiries made by the NAS Committee on Human Rights on behalf of Sharansky, a Soviet computer scientist, as well as research biologist Sergei A. Kovalev and high energy physicist Yuriy F. Orlov. The committee has sent official letters to various Soviet political authorities, including President Leonid Brezhnev, asking for information and the release of the dissidents. It has received no replies.

NAS President Philip Handler also has received no response to his request to send legal observers to Sharansky's pending trial. Sharansky has been imprisoned more than a year, charged with espionage. [CW, Feb. 20] No date has been set for his trial.

The NAS resolution was made to prompt further action at the next council meeting, which is scheduled to take place at the end of June.

DEC Turns PDP Into DDP With Help of VT62 CRT

(Continued from Page 1)

works involved in interactive transaction-processing applications.

The VT62 is a microprocessor-based CRT with 8K words of buffer storage that is downline-loadable from the PDP processor. With the Application Terminal Language (ATL), a user can store in the CRT buffer up to 64 application-specific messages along with the basic forms definition.

Applications are written in either Cobol or Basic Plus 2, a spokesman noted.

The terminal transmits data in blocks rather than character by character, making more efficient use of lines and CPU resources, DEC said. With its built-in intelligence, the CRT can utilize different forms based on a common software program.

For example, the spokesman explained, different VT62 CRTs could have screen formats in differing languages even though each language implementation would be based on a single program.

The Trax systems operate under Decnet for communication with other Trax systems. An IBM 3271 emulation protocol is available so a Trax system can interface with an IBM mainframe utilizing 3270 Binary Synchronous Communications, according to the spokesman.

For Near-Novices

The terminal was designed for use by operators who do not have detailed DP experience. The forms-oriented make-up can guide users through transactions with "menu selection and function keys that avoid use of conventional computer commands," DEC said.

Local intelligence at the terminal provides detection of keying errors. User messages are displayed in a separate screen area away from applications data, the company said.

Trax systems can operate at speeds from 300- to 9,600 bit/sec on either dial-up or private-line facilities, and multidrop nets can be configured. The Trax operating system software includes features for high availability and security, DEC claimed.

For users with installed DEC systems, the PDP-11/34, PDP-11/60 and the PDP-11/70 can be upgraded in the field. This requires the addition of the Trax operating system together with the necessary software modules and a required number of VT62 CRTs.

Internet Communications

Under the announced Decnet support, a Trax terminal in one system can communicate with a terminal in another Trax system using a Transaction Step Task (TST) feature under the ATL form. In such an operation, a terminal invokes a subroutine called TST Spawn to access TST in another system which, in turn, connects the calling terminal to the called terminal, the spokesman said.

In most cases, this operation is transparent to the terminal operator, he added.

Many of the local editing operations and the instructional routines to guide the terminal operator are controlled by the local microprocessor without interaction with the PDP-11, the company said.

Trax supports up to 16 "simultaneously active" terminals on the PDP-11/34 and up to 64 terminals on the PDP-11/70. A typical PDP-11/34 with Trax software, eight VT62 CRTs, 256K bytes of memory, 56M bytes of disk and a 9-track tape drive is priced at $131,840.

A PDP-11/70 with 20 terminals, 384M bytes of storage, 134M bytes of disk and a tape drive costs $211,420.

Prices for other configurations, including the field upgrade of installed PDP-1s, were not available. First deliveries are scheduled for July.

National Semi Has 370-Compatible Mini

(Continued from Page 1)

20M byte/sec, the firm reported.

In a minimum configuration, four systems elements attach to the CLB — a 256K-byte main memory and three processors , consisting of an instruction processing unit (IPU), a dual I/O processor (IOP) and a service processor, the spokesman said.

All three types of processors are microprogrammed and come with writable control storage based on static MOS random-access memory (RAM), they said.

The IPU is said to emulate the 370 instruction set and provides a 32K-byte writable control storage expandable to 256K bytes. Based on a 32-bit National Semiconductor IDM2901A microcomputer, the IPU comes with address translation, clock, CPU timer, clock comparator and 370 user-accessible registers, the officials said.

The IOP also incorporates an IDM2901A and provides 16K bytes of writable control storage expandable to 256K bytes, the noted. Designed to control peripherals and execute 370 channel programs, the IOP reportedly oversees an 8-bit, asynchronous front-end I/O bus that transfers data at up to 1.5M byte/sec.

Unlike the system's other CPUs, the service processor uses an 8-bit National Semi Series 80 microprocessor to emulate 370 console functions and to perform system diagnostic and control functions, the company said.

Equipped with a standard 48K-byte control storage, the unit supports a diskette drive that loads microprograms for all three processors as well as for the system's console and dignostic communications adapter, it added.

Main memory, meanwhile, is said to consist of 16K-byte MOS RAMs, and 256K bytes can fit on one printed circuit board.

Expandable to 12 IOPs

In a maximum configuration, a System 400 expands in 256K-byte increments to 16M bytes and incorporates up to 12 IOPs, a spokesman noted.

Each IOP can interface to peripherals — without software modifications — either by using standard IBM channel protocols or the System 400's integrated peripheral adapters (IPAs), he said.

With an IBM channel-to-control unit interface adapter, the System 400 emulates 370 I/O channels including byte multiplexers, block multiplexers and selectors, National Semi explained.

The adapter also allows the system to accept any standard IBM controller and associated devices, a spokesman said.

With the IPAs, meanwhile, users can reportedly attach the following National Semi or OEM peripherals to the system:

- 200M-byte disk drives emulating the IBM 3330-11.
- 800 and 1,600 bit/in. tape drives emulating the 3420 series.
- A line printer emulating the 1403 or 3203.
- A card reader/punch emulating the 3505/3525.
- A diskette unit emulating the 3540.

As many as eight IPAs can attach to one IOP, the firm said.

Communications Adapters

Users can also attach terminals to the system through integrated communications adapters that attach to the IOP and support eight asynchronous or bisynchronous lines transmitting up to 9,600 bit/sec, the spokesmen reported. With the adapters, the IOP can support as many as 64 communications lines, they said.

Because of its compatibility with 370 software, the System 400 accommodates Assembler, Cobol, RPG-II, PL/I, Fortran, Basic, Algol, APL, Pascal, CICS, Video 370, Script 370 and VSPC plus assorted editors, loaders, libraries and debuggers.

Packaged in 15-in. by 17-in. printed circuit boards, the System 400 modules plug into one or more standard 28-slot backplanes, the officials said. Cards containing the system's electronics reportedly mount in a standard 19-in. rack.

System Price

A basic System 400 configuration costs $165,000 and cosists of an IPU, two IOPs, a service processor, 256K-byte main memory, system console, 200M-byte disk drive unit with adapter, 75 in./sec tape drive unit with adapter and eight communications lines with adapter.

Shipments of the system will begin during the first quarter of next year from National Semiconductor at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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Correction

The tornado shown in the April 17 front-page photo occurred in 1975, not 1977.

House to Say When DP Gives Campaign Edge

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – The House Administration Committee is expected to begin working on a policy to govern congressmen's use of computers and franked (free) mail to manipulate the voters back home.

The use of computers and computer services paid for with taxpayers dollars has become an issue in this election year [CW, April 3]. Many have contended that the mailing lists and information on voters contained in the memory banks of these systems provide incumbents with an unfair advantage over political opponents.

The House Administration Committee's Policy Group on Information and Computers, consisting of Representatives Charlie Rose (D-N.C.), Edward W. Pattison (D-N.Y.) and Dave Stockman (R-Mich.), agreed last week to propose an amendment to the rules by which House members must live that would tie their use of computing power to franked mail. The name or address can't go on an envelope unless the piece of mail bears a congressman's frank, according to a Computer Policy Group staff member.

The members of the House understand the rules governing the franking privilege, he explained. Congressmen seeking reelection can't use their free mail allowance in their campaigns.

While the proposed rule is clear, the dividing line between official business and campaign purposes remains blurred.

Funding 'Indigestion' Welcomed by NBS

Seventy percent of the National Bureau of Standard (NBS) budget request for fiscal year 1979 is slated to go to its Institute of Computer Science and Technology efforts to help the federal government "get all the mileage out of [computer system] standardization that it can," according to Dr. Jordan J. Baruch, assistant secretary for science and technology within the Department of Commerce.

The $13.4 million increase the NBS is asking Congress to appropriate for the development of standards on high-level languages, software quality control and network interfaces [CW, Feb. 27] is only 2% of the increase warranted in this area, Baruch told the Senate Subcommittee on Science, Technology and Space at a recent hearing.

Sen. Adlai E. Stevenson (D-Ill.), who chaired the NBS oversight hearing, expressed his concern that the almost 25% increase in the NBS' overall budget would give the bureau "financial indigestion."

Baruch readily agreed the Institute of Computer Science and Technology might have trouble swallowing such a a large budget increase in its present organizational form. "But we think that if we have enough money, we will be able to staff and organize the institute so it can do the job," he asserted.

Two additional witnesses – Dr. W. Dale Compton, vice-president of research for Ford Motor Co., and Dr. William O. Baker, president of Bell Laboratories – supported the bureau's budget request for its computer institute and added that, ultimately, even that won't be enough.

Washington Update

Baker called interface standards the most serious work facing the institute. He maintained that the lack of such standards has led to "fragmented systems development all over the nation."

Geller Hearing Termed a 'Lovefest'

Henry Geller's Senate confirmation hearing here recently was nothing short of "a lovefest," observers agreed. Appearing before the Senate Commerce Committee's Subcommittee on Communications some six months after his name first surfaced as President Carter's choice for the new job of Assistant Secretary of Commerce for Communications and Information, Geller was questioned by a senator who called him by his first name and otherwise provided all the welcome from Congress that he could want.

Sen. Ernest F. Hollings (D-S.C.) has fought even longer than Geller for a strong administrative focus on communications and information policy development. Hollings suggested that the purpose of the hearings was to find out what powers were left to Geller by the executive order that abolished the White House Office of Telecommunications Policy (OTP) and created the National Telecommunications and Information Administration (NTIA) in the Commerce Department [CW, March 27].

Geller argued that the merger was "more than an alphabetical game. The new entity is more than the sum of its parts."

But while NTIA may well represent the first time the executive branch has placed a proper focus on basic telecommunications and information policy issues, Geller acknowledged the new agency can only recommend actions to Congress.

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HEW System Screens Student Loan Requests

By Ann Dooley
CW Staff

WASHINGTON, D.C. – More than one-fourth of the students applying for certain federal education grants so far this year have supplied inaccurate information and have been rejected by a computer programmed to find such errors.

Used for the first time this year, the computer edit system checks for discrepancies or omissions on applications to the Basic Educational Opportunity Grant program. The system has so far "flunked" 200,000 of the first 800,000 applicants.

The Basic Educational Opportunity Grant program is aimed at providing funds for students who may wish to attend colleges or vocational or technical schools.

Some of the student's mistakes occur through honest error or oversight, according to Leo Kornfield, director of the Department of Health, Educational and Welfare (HEW) student aid program, but others cheat by underestimating their family income in hopes of getting a larger grant, he said.

Students who are rejected can submit a corrected application but these are carefully examined to ensure accuracy, Kornfeld said.

In order to receive a grant, a student must fill out a form describing family income, family size, total number of siblings in school, taxes paid and other pertinent financial data.

The system analyzes all the information and is programmed to kick out any application that is inconsistent, according to Kornfeld.

If a student is eligible for a federal grant, the system analyzes the family's financial situation to determine how much it can pay and how large the grant should be, he explained.

$100 Million Savings Expected

Previously, the grant program had no effective method of checking the accuracy or honesty of its applicants. The department would examine a random sample of applications for inconsistencies or errors but would not be able to complete the manual check before the awards were made, he said.

By weeding out applicants who are ineligible or who would otherwise receive too large a grant, the system is expected to save at least $100 million to $150 million annually.

Theoretically, once students are made aware they can't succeed at cheating, they will provide more complete and honest information, Kornfeld said.

This is a more accurate system that will give a student a fair grant based on need, he noted, adding that last year, four million students applied and two million received some grant money.

The department decided to install a preventive maintenance system for an already good program administering funds for those who need help to attend school, he said.

Similar to IRS System

The HEW edit system is similar to that of the Internal Revenue Service, (IRS), but there is no cross-checking with that agency, Kornfeld stated.

Security is very tight, he added. Every applicant has a coded user number and each department has access to only a certain amount of information.

There are 10 regional offices around the country for loan pay-back purposes, but they don't have access to any personal financial data, he added.

Since the program is so new, information is still being gathered on what types of mistakes are being made in grant applications. If many similar mistakes are occurring, the application form may be changed, he said. But many of the students rejected by the system don't deserve a grant at all, he noted.

In addition to catching applications with errors, the department will also perform an audit on 10% of those students considered eligible for aid. Special emphasis will be placed on those who resubmitted corrected applications. Many of the students resubmit a corrected application solely in order to try to obtain a larger grant allotment, he noted.

The student aid department's grant, loan and work-study programs are all computerized to some extent, Kornfeld noted.

The loan program system keeps track of billing records and procedures once a student is eligible to start paying back the loan, he explained. The work-study system is programmed to calculate job alloeations to educational institutions, he said.

All program work is contracted to outside companies on a competitive bid basis, Kornfeld added.

The department is also nearly in production mode for a computer system used to track down student-loan defaulters and start billing procedures, he added.

Terminals Hot On Black Mart

(Continued from Page 1)

sources it can devote to them.

Computer fraud is definitely on the increase and "is becoming more and more sophisticated," the special agent stated.

Organized crime has not moved into computer fraud as far as the FBI can tell, however, he added. Computer crimes are usually committed by two or three technical people within the victimized organization.

Miller looks forward to the passage of Sen. Abraham Ribicoff's (D-Conn) computer crime bill, introduced in the Senate nearly a year ago, because he believes it will define for people in industry the line between a computer prank and a criminal act.

No employer would file suit against a programmer who programs the system to print out a picture of Snoopy or the Mona Lisa, for example. But the boundary between criminal intent and innocent use of the computer system begins to get fuzzy, Miller pointed out, when an employer permits a programmer to calculate his income taxes on the system and the programmer turns around and offers the same service to the neighbors on his block for a fee.

"There are some judges and attorneys who contend we need laws that apply specifically to computer abuse," Miller said, noting most computer criminals are convicted under such laws as the mail fraud statues. Others, however, say new laws aren't necessary because computers have permeated every aspect of life today.

"Bank larceny is still bank larceny regardless of whether a computer is used to commit the fraud," he said.

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Employers Polled

DP Graduates Lack Business Savvy: Survey

By Nancy French
CW Staff

SAN MARCOS, Texas — Most university computer science programs are not producing graduates with the expertise needed in the commercial DP environment.

Furthermore, most graduates of such programs lack the ability to apply DP in areas that aid in decision making, operations control and forecasting for future growth, according to a report published here recently.

The findings were released by three professors in the Department of Accounting and Computer Science at Southwest Texas State University and were based on 486 responses to a questionnaire sent to 1,200 companies using computers.

The professors concluded that if one programming language is emphasized over another, it probably should be Cobol. They said systems design, flowcharting, documentation, file design and information retrieval should be emphasized at least as much as, if not more than, programming. In addition, undergraduate business education should be stressed as a second area of study, since survey respondents reported that computer science graduates need more familiarization with accounting and general business procedures.

The survey team included Prof. Marvin A. Johnston and assistant professors James R. Cook and Michael C. Gallagher.

Programming Languages

In the area of programming languages, about 47% of those responding to the survey said their applications are programmed in Cobol and approximately 79% reported having Cobol compilers. Utilization of PL/I was found to be almost "nonexistent" and Fortran was used for approximately 10% of applications. "Yet Fortran has been strongly emphasized by most educational institutions for a number of years, dating back to the early 1960s, when it was the dominant computer language," the report said.

Seventeen percent of those responding reported using RPG, which the professors found "not surprising" since there are thousands of minicomputers in use and RPG is one of the primary languages on minis.

The professors found the results on Assembly language coding "interesting," because although Assembly was said to be in use for only about 14% of applications, it is being used by 59% of all installations.

The report pointed out, however, that Assembly is used for special purposes such as systems programming and teleprocessing control programs and as such "it is a very important language.

In the language category entitled "other," most respondents mentioned languages associated with particular manufacturers, such as NCR Corp.'s Neat/3.

Basic was the one exception, the report said. A relatively simple language not tied to any particular vendor, Basic is taught generally as a "first computer language" for beginning students rather than as a language with long-term applicability in the business world, the report indicated.

The second area of investigation was computer utilization. Respondents indicated that 86% of computer applications are commercial in nature compared with only 14% scientific. About 96% of all installations surveyed were involved in at least some commercial applications.

Preparation for commercial DP is sorely neglected in the college curriculum, the researchers noted in their report, with very few educational institutions offering complete degree programs in business-oriented computer science. At most, Fortran, Cobol and an introduction to DP are offered — yet industry wants business training for the graduates it hires.

The third area of investigation was major techniques and concepts. Systems design was rated most important, followed by file design and information retrieval. Flowcharting and documentation came next with programming, fifth. Ranked last in importance were computer-based information systems theory, statistics and operations research.

The fourth area of investigation dealt with sources of education for computer science personnel currently working in industry.

The report said 63% of all employees were educated in four-year colleges or through company training programs. The remaining 37% was fairly evenly split among trade schools, junior colleges, vendor training and "other." In "other" the most frequently mentioned source was military training, the report said.

The final area of investigation concerned the importance of bachelor's and master's degrees in working as a computer specialist.

On a scale of one to five, with one being most important, the mean rating for a master's degree was 3.54 and for a bachelor's, 2.31.

The report's authors can be reached at the Department of Accounting and Computer Science, Southwest Texas State University, San Marcos, Texas 78666.

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Utica Schools Open Up Job Placement Service

By Marguerite Zientara
CW Staff

UTICA, Mich. — The Utica Community School System, which has been using computerized information for three years to help its students find jobs, recently began offering the same service to the community at large.

Since the Vocational Identified Placement (VIP) service began in March, more than 160 area residents have obtained jobs through the service, according to Earl J. Phillips, director of vocational education for the school system and initiator and director of the placement service.

The school system has been using the General Information Survey (GIS), a computerized test that helps determine occupational interests, since 1975. GIS is leased from Tymshare Corp. for $1,000 per year and is used by all the high schools in 21 school districts in the Utica area, Phillips said.

When the service "went public," it added another computerized test, the Michigan Occupational Interest Survey (MOIS), developed by a Michigan State University professor and furnished to the school system free under a State of Michigan grant.

Interests Determined

Both tests determine such interests as whether a person prefers working inside or outside, with people or alone and whether he enjoys manual labor. When a person's preferences have been determined, that information is keyed into one of two Digital Equipment Corp. Decwriter IIs, which then outputs different occupations that could fill those interests.

The various occupations that interest a person can be keyed in and the system will indicate how much they pay, where and how many jobs are available, what training is necessary for the jobs, how many students attend the training schools and the cost of an educational program. The GIS furnishes this information on a national scale and the MOIS covers statewide opportunities, Phillips noted.

Both systems output an Occupational Information File, a four-year college file, a two-year college file, a scholarship and financial aid information file and a supplemental list of other specialized fields of interest.

'Good for Everybody'

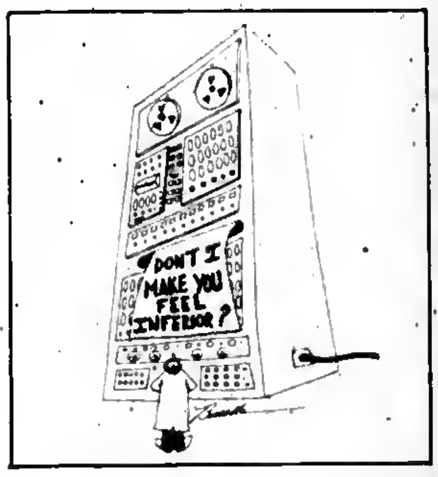
"It's very fascinating for a student to do this. You talk to the machine, it talks back. It's good for everybody," Phillips said. A person with two or three interests might come away with eight feet of computer printout paper, he said.

The service is free of charge to anyone of any age within the school system area. The data base, which is furnished by the developers of the tests, is updated every year.

If there is a surplus of jobs or trained applicants at any time, Phillips said, he advertises in the local newspapers to try to match people with jobs. Phillips hopes to have a computerized listing of applicants and potential employers within a year so users can access the information themselves.

The service is funded through the State of Michigan's "added cost" vocational funding program, under which the state furnishes the additional cost over regular classroom training to train students for available jobs.

About 65% of residents using the service are students or recent graduates and the rest are over 25 years of age.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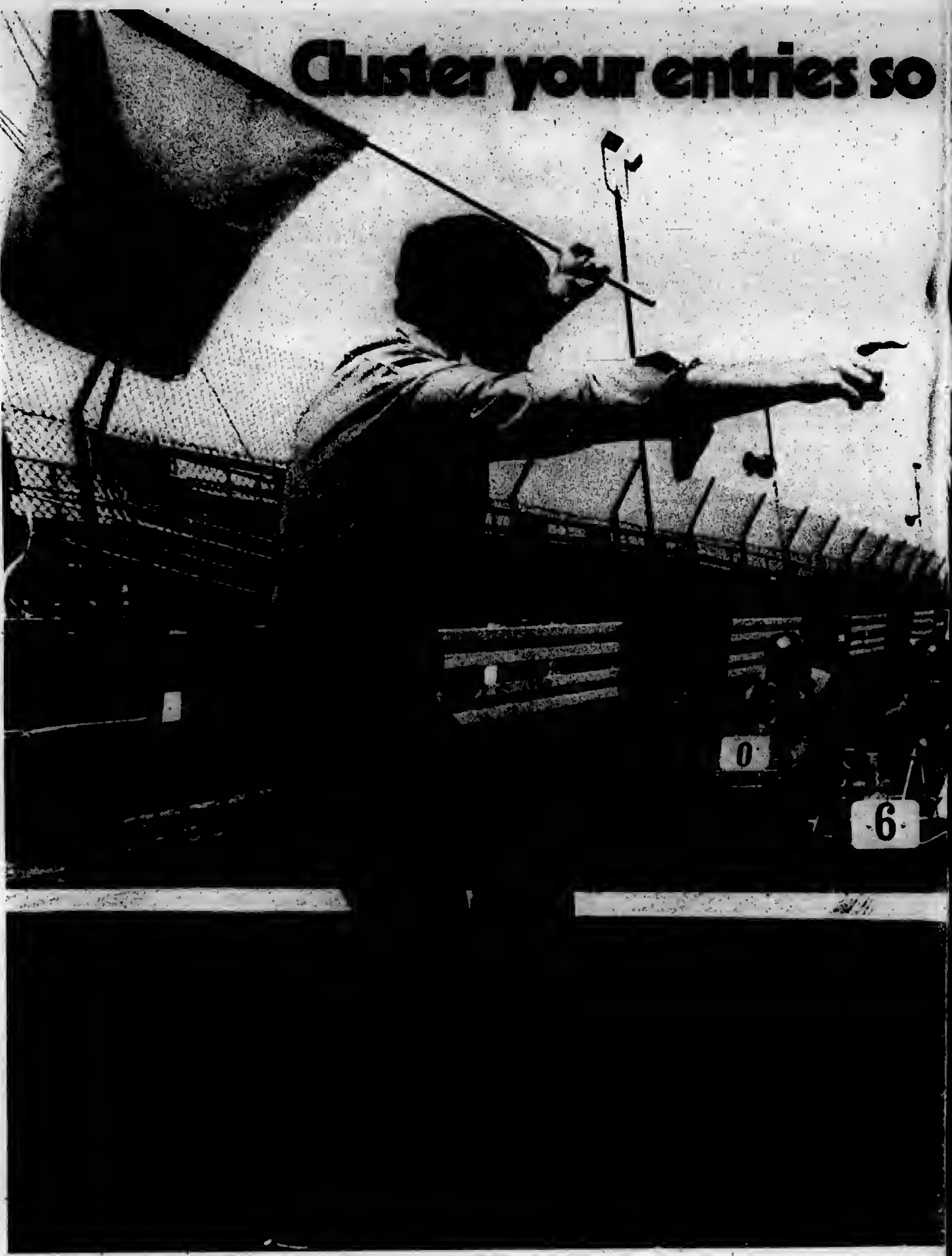

Depreciation Techniques Misapplied

Appraisers: 90% of DP Sites Wrongly Insured

By Howard A. Karten
CW Staff

BOSTON — More than 90% of the computer installations in the country are incorrectly insured, according to a recent study made by the American Computer Appraisal Service (Acas) here. Four billion dollars worth of hardware is overinsured, according to the study, while $2 billion is underinsured.

The reason: Businesses are unaware of the true state of the market and/or are misapplying conventional depreciation techniques, according to S. Paul Blumenthal, manager of the service.

Conventional depreciation techniques, derived from formulas used to depreciate equipment for tax purposes are not as accurate for computer equipment as they are for other capital equipment, Blumenthal said, mainly because of the rapid rate of technological change.

For example, using the original cost method to evaluate an IBM 370/168-3 a user would come up with a figure 33% higher than its current market value because buyers now want to purchase 3033s instead of 168s.

In contrast, the book value of a 370/155 is approximately 50% less than its current fair market value. An owner of one of these machines could lose close to $300,000 in the event of a disaster, Acas said.

Compounding the problem is that different pieces of equipment depreciate at different rates. For example, a CRT that uses technology with a high rate of change will drop much faster in value than a medium-speed line printer, which is a staple.

The result of this situation, according to Acas, is that CRTs are consistently overinsured while printers are underinsured.

Acas, a divison of the American Used Computer Corp. here, has been doing appraisals for the past 10 years. Because of the volatility of computer technology, no standard publication exists that lists prices of used computer equipment.

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Mormon College Given 370 to Aid Translation Work

PROVO, Utah — Former Brigham Young University President Ernest L. Wilkinson and his family have donated an IBM computer to the university for use in language translation and research.

The IBM 370/138 will be used for computer-assisted translation work on the *Book of Mormon* and other projects.

In the past, the institute has shared computer facilities with numerous other departments on campus, according to Dr. Eldon G. Lytle, director of the university's Translation Sciences Institute, but now translation and research activities can be conducted without the usual interruptions and delays associated with a time-sharing operation.

The institute has developed a text processing system that enables the staff to produce computer-assisted translations in nearly half the time of manual translations and at about one-third the cost, Lytle said.

By mid-1979 Lytle expects to be translating in five different languages, including Spanish, Portugese, German, French and Chinese.

Bankers Meeting Slated for June

ZURICH, Switzerland — An international symposium on computers in banking will be held here June 13-15 to exchange ideas on defining and implementing management and automation strategies.

For further details, contact the secretariat of Interconvention, c/o Swissair, P.O. Box CH-8058, Zurich, Switzerland, or the representative of the patronage and program committee, Dr. G.R. Kutter, c/o Winter Partners, Zollikerstrasse 251, P.O. Box CH-8008 Zurich, Switzerland.

IBMer Attributes Success to Leadership Role

By Catherine Arnst
CW Staff

SAN FRANCISCO — Although IBM is just beginning its defense in the U.S. vs. IBM antitrust trial in New York, its strategy is getting a dress rehearsal in the Memorex Corp. vs. IBM case in progress here.

Rather than disputing whether IBM actually took certain alleged anticompetitive actions, the testimony of IBM witnesses here emphasized the opposite (see related story on Page 71). Several of these witnesses are also scheduled to appear in IBM's defense in the government case in New York, and it is unlikely their testimony will differ substantially there.

On the stand here, IBM's senior vice-president and group executive of the General Business Group, George (Spike) Beitzel, expressed the three major themes on which IBM's defense here is built:

- IBM's product and pricing actions in the general-purpose computer systems and peripherals market were taken to remain competitive, not to block competition.
- IBM always regarded the market as a competitive one in which a firm that wanted to stay in the running could not remain static.
- IBM's success resulted from taking a "leadership strategy" rather than being a "follower." While such a strategy involved greater risks, it also afforded greater profitability.

A distinguished looking man who appeared sure of both himself and his company, Beitzel testified IBM's goal was to "push the frontiers of knowledge in every direction." This was particularly true in 1964, when IBM introduced its System 360, he said.

A man who has spent his entire career with IBM, Beitzel said that the motivation for the 360 was to benefit the user, who "for the first time in the computer industry could design his own automobile" in the sense that he could choose from a variety of options to get the performance he wanted.

By 1969, the 360 line was beginning to show its age as a result of competition from plug-compatible peripheral manufacturers, minicomputers, service bureaus and third-party leasing companies, Beitzel said. To remain effective, IBM's executive suite put into action an internal product management system that would allow the firm to "manage the future."

The system looked at three criteria when considering new products: the customer and his needs, the cost of developing the product and the competition.

Competitors were generally either "sprinters or followers," Beitzel said, adding there is nothing wrong with being a follower. "It's a perfectly acceptable business strategy. There is nothing unethical or wrong with it; IBM just doesn't believe in it."

The advantages of taking a leadership strategy is that for one thing, it is "more exciting." Leaders attract a brighter and more daring group of people. But there are also greater risks because one is not necessarily offering a product which the user has come to expect, Beitzel, who worked his way up through the corporate ranks, told the jury.

Monitoring the Competition

Both Memorex and the government have maintained that an important part of IBM's "leadership strategy" was conducting in-depth studies of competitors that highlighted their weaknesses. Products and pricing policies were then introduced which preyed on those weaknesses, IBM's opponents have alleged.

Beitzel agreed that IBM studies its competitors, but only because "our marketplace is tremendously competitive and we had to know what was going on or our business would not be able to grow."

In spite of attempts to monitor the competition as accurately as possible, IBM consistently underestimated the strength of both general systems and peripherals manufacturers, Beitzel said.

In the early 1970s, IBM set up a special task force, headed by Henry Cooley, vice-president of the Systems Development Division, to study peripherals manufacturers. The reports of the Cooley task force are a major issue in the Memorex lawsuit because they are alleged to be anticompetitive studies.

The Cooley task force was actually just one of many such groups IBM set up and from which Beitzel received reports on almost a daily basis, he said. He also noted that, although such reports may contain recommendations which appear anticompetitive, those recommendations were not followed.

Some of the ideas the Cooley task force presented, such as cutting prices or locking in peripherals devices with the system itself through hardware, software or marketing, were unacceptable because they were basically dead-end solutions that didn't move IBM forward at all, Beitzel said.

It was board chairman Thomas J. Watson's view in particular that the long view be taken for corporate strategies, and he wanted the firm to be based on three principles: respect the individual, provide an excellent product and give the best service possible, according to Beitzel.

IBM started its defense here at the beginning of April and expects to complete its presentation the week of May 15 after approximately 14 witnesses have taken the stand.

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Planning Vital: Bowyer

Mismanaged DBMS Can Hurt User

By Don Leavitt
CW Staff

CHICAGO — Data base management systems (DBMS) "obviously provide us with powerful tools to use in enhancing the capabilities offered by computer-based systems," but they also present new risks that can only be met with enlightened management, according to John W. Bowyer.

The director of information systems services for International Harvester told a recent conference here the familiar pitfalls of DP systems are heightened with data base. He then emphasized the point with an analogy.

"Business systems methods prior to computers were analogous to 5,000 laborers moving a hillside with baskets and traditional computer methods have been rather like giving motorized wheelbarrows to the 5,000 laborers. The data base approach . . . does the job with one atomic blast.

"With the laborers (with or without wheelbarrows), things happen in very small bits . . . work can successfully terminate at any point. With the blasting, on the other hand, everything must be done right the first time or, instead of a mountain to move, there may be a Grand Canyon to fill!" he told the meeting sponsored by the American Institute of Industrial Engineers.

If everything goes right, Bowyer continued, a great deal of time and money can be saved. But "managing data base requires vast management and technical skills, better planning and more precise control" than managing conventional DP operations, he said.

"The potential is great, but the price of failure is dramatic," he reiterated.

Plan to Avoid Pitfalls

To minimize the risks and avoid as many of the pitfalls as possible, managers must first plan what they are doing. "We [must] develop strategies and long-range plans to preclude as many of the problems as possible. We [must] make sure our data center plans adequately address the issues of physical security, physical backup and *real* portability of data and applications, through standardization.

"These strategies cost money but not so much, incrementally, as you might think, if they are properly planned in advance," Bowyer noted.

"Next we must establish standards . . . and a central control point for development, administration, interpretation and enhancement of these standards," the International Harvester manager said, adding, "in a corporation as large and as complex as ours, this means a corporate staff function, adequately staffed to provide a leadership role."

The cornerstone of this central group's mission and charter statement is a design review procedure, according to Bowyer, who explained that data base systems are developed by application systems and programming organization. "But at predefined points in the development process, the formal design review must occur and the outcome must be documented. Our particular design review procedure includes four such checkpoints:

"The purpose of Design Review I is to make the corporate data base administration group aware and involved, at a very early stage, of an application development group's plans to implement a data base system" he said, adding that the purpose of Design Review II is to participate and approve the systems design and implementation plan as prepared by the application development group, "This is the phase in which operations management must participate," he warned.

Design Review III is intended to check the detailed design just prior to programming and ensure that it agrees with the recommendations of Design Review II. "At this time, provisions will be made to generate an on-line test system," Bowyer continued.

"The goal of Design Review IV is to verify that all on-line functions are performing within the standards and that all preparations have been made to place the system in the standard production environment," he said, completing the four-step process.

In addition to the design reviews, the corporate staff people also provide consulting services during all phases of development and tuning services after implementation, Bowyer noted.

John W. Bowyer

"Finally," he said, "we as managers must develop the practice of tackling the issues and problems head-on. To avoid problem situations, hoping to 'fall' into a solution, or hoping the problem will go away, only invites the 'snowballing' effect . . . and eventual disaster."

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Attendee's name supplied upon request

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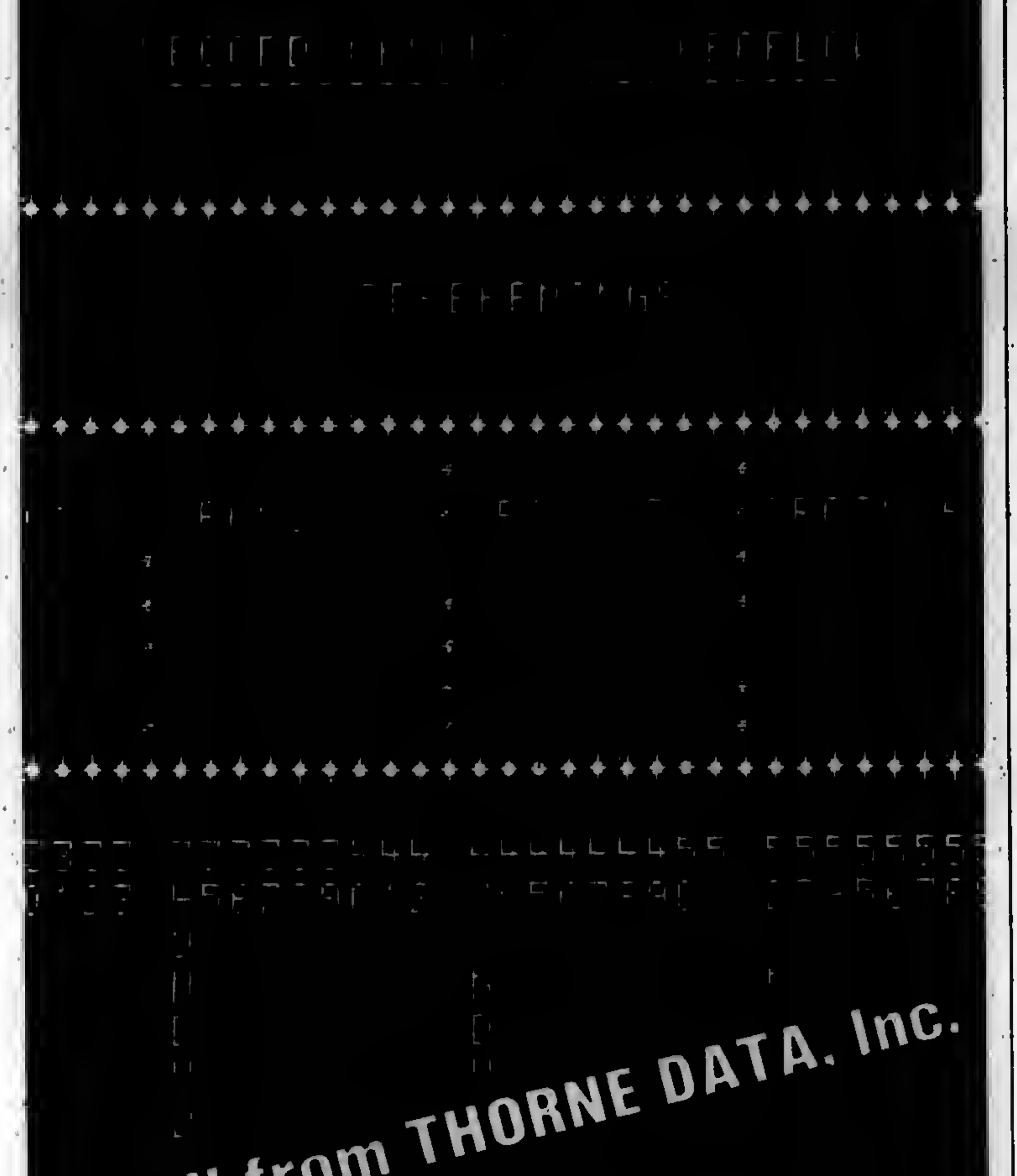

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Service Helps Locate Goods for Handicapped

By Howard A. Karten
CW Staff

BLOOMINGTON, Ill. — A computerized service here is helping handicapped people locate products and information that can make life easier for them.

By searching a data base of products especially designed for handicapped people and tips sent in by others, the system has helped answer such questions as: How can a quadriplegic paint? How can a person with only one arm fish? Where does a handicapped person in a small community buy a battery-powered wheelchair?

The service, called Accent on Information (AOI), is believed by its owner, Raymond C. Cheever, to be the only one of its kind in the country, and he said it handles about 1,000 requests for information per year. Written in PL/I as a joint project between Illinois State University and the Illinois Institute of Technology, the program runs on an IBM 370/145 at Illinois State.

The "spare-hand" fishing belt for the disabled is just one of thousands of hard-to-find devices and services in the data base of Accent on Information.

To use the system, a person sends in a letter or uses a special request form from Cheever's magazine, *Accent on Living* (AOL). An information specialist at AOI's office encodes the request and makes out punch cards with the request and the person's address. Requests are then batched, written on tape and run against the 3,500-item data base.

In encoding the request, the information specialist uses a special thesaurus developed for AOI. It contains approximately 5,000 terms that describe subjects of possible interest to handicapped people, including both activities and products. Examples of such terms are *eating*, *sports*, *education*, *mobility aids* and *wheelchairs*.

Thesaurus Essential

The use of the thesaurus is critical to the system, Cheever said, since it allows a product or tip to be categorized in several ways. When AOI receives information on new products, the product is analyzed for any possible descriptors. The name of the product, along with cross-referencing material and the attached descriptors, is entered in the data base.

The descriptors are used to designate the content areas to be searched as well as the method of searching. For example, in looking for information on sports for paraplegics, the information specialist might describe the request like this: (*sports activities* or *recreation*) and (*paraplegics* or *physically handicapped*). The retrieval system will then look for the words "recreation" and "paraplegics" occuring together, "sports activities" and "physically handicapped" together, and so on. This permits flexibility, latitude and thoroughness, Cheever noted.

Since the system became operational in 1976, interest has been much wider than originally anticipated, Cheever said. Public schools, physicians and rehabilitation agencies, among others, have shown an interest.

AOI is an outgrowth of the magazine *Accent on Living*, which Cheever started in 1956, four years after he was stricken with polio.

"There was no central clearinghouse where handicapped persons could get the information they needed about products that could dramatically change their lives," he said, so he decided to start one. Although he charges $6 for the service, the fee is waived if a handicapped person cannot afford to pay.

AOI can be reached through P.O. Box 700, Bloomington, Ill. 61701.

Non-ACMers: Can You Help?

NEW YORK — The Association for Computing Machinery (ACM) is seeking six nonmember individuals to participate in a workshop on computers and society educational courses and materials scheduled for July 16-18 in Williamsburg, Va.

The participants are being sought to assist in reviewing position statements, materials and recommendations and in evaluating the programs, ACM said.

The individuals will be selected on the basis of a letter of application expressing interest in the subject area. Expenses will be paid.

Application letters with four copies should be sent to Gerald L. Engel, Department of Mathematical and Computing Sciences, Old Dominion University, Norfolk, Va. 23508. They must be received prior to June 1; successful applicants will be notified in mid-June.

Call for Papers

FOURTEENTH MEETING OF THE COMPUTER PERFORMANCE EVALUATION USERS GROUP (CPEUG), Boston, Oct. 24-27, 1978.

The theme of the conference will be the role of measurement, evaluation and prediction technology in the major areas of the DP life cycle: planning, acquisition/development and control. Topics include workload modeling, benchmarking terminal systems, installation auditing and performance metrics, standards, prediction and management.

Send two copies of abstracts, summaries of tutorials or summaries of workshops by May 15 to Terry Potter, Program Chairman, Digital Equipment Corp., ML 3-3/E67, 146 Main St., Maynard, Mass. 01754.

COMPCON FALL '78, Washington, D.C., Sept. 6-8, 1978.

The program will focus on communications networks. The Short Notes session will provide an opportunity to present new work or applications; the presentations are restricted to five minutes.

The participants in the Short Notes session, submit a 250-word summary by Aug. 1 to Shirley Ward Watkins, National Bureau of Standards, Technology B212, Washington, D.C. 20234.

Reduces Employee Turnover

Things Go Better With Career Pathing at Coke

By Nancy French
CW Staff

ATLANTA — Career pathing can vary from very formal to very informal, and no single approach is absolutely correct, according to Coca-Cola Corp.'s DP education and standards coordinator. But if your firm's approach is well thought out, the job turnover rate will be low, Mary Chris Williams told a Computer Expo'78 audience here recently.

Coke offers its 173 DP employees a "semiformal" career path that is "planned" and "known informally" to those employees and "relies on its managers" for implementation, Williams said.

People can move upward within a single job category, such as programming or data preparation, for example, whether or not a job slot exists, but a lateral move requires a job opening, Williams said.

CW Photo by T. Scannell
Mary Chris Williams

A great programmer who doesn't want to become a manager to earn a manager's salary can do that, too.

The entire system is based on counseling, training and the use of a data base to maintain a record of employees' training history, experience, nonutilized skills and annual appraisal by management, she said.

But the "heart of the system is training," she said, and that is done primarily on company time.

How It Works

Without revealing exactly what the Coke DP department's employee job categories or salary ranges are, Williams explained how it works.

All programmers and analysts "hired off the street" are expected to have a college degree, she said, but an operator can become a programmer, a programmer can become an analyst and a data preparation clerk can become an operator as long as he has completed the required education modules and the appropriate job slots are open.

As an example, Coke has four levels of data preparation clerks headed by a manager. A third-level data preparation clerk who wants to move into operations can become a second-level computer operator, she explained. A computer operations shift supervisor can become a second-level programmer; seven have opted to make this move since 1976, she said.

Likewise, a data controls specialist whose function is to interface with users in the preparation of data can become a first-level programmer, but would not move into operations, she said, nor would an operations person move into data control.

Third-level programmers can become first-level systems analysts and move up through that career path, she explained.

Salaries overlap in such a way that a person never loses pay, and almost always gains a little, even when moving to a lower level job within a new functional category, she said.

Aspirations Known

Unlike many government agencies and large corporations, Coke tends not to post job openings and relies instead on its manager's knowing what career aspirations employees have, Williams said. This is done through extensive job counseling and a yearly performance review.

This information is sent to the training director, who reviews it and enters the employee's desires, his training history, the manager's appraisal and the employee's perceptions of his abilities and nonutilized skills into a data base that is tapped when jobs open.

Since 1976, and for the next three years, Coke will be using outside audiovisual training packages from Advanced Systems, Inc. Courses are broken into five half-day modules and, with the exception of certain programming courses, they never last longer.

All 173 DP employees are expected to take 80 hours per year of training which, for programmers and analysts, is supplemented by vendor training.

The curriculum is presented to employees in printed form so they know what's expected of them, Williams said. Courses that receive poor employee ratings are modified or replaced, and grades are never reported to management unless the person "fails."

"In such cases," she said, "these failures are reported with the suggestion that the individual be placed in another job."

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Fast Scores Win Fans at Figure Skating Events

WALTHAM, Mass.— A competitor's split-second timing can make the difference between winning or losing a figure skating event. Similarly, timing in the scoring process can make the difference between winning or losing audience interest in figure skating as a sport.

"Until we computerized the scoring process for the U.S. Figure Skating Association, the 30 minutes to an hour it took to calculate championship standings after each event didn't exactly help generate public enthusiasm for the competitions," according to Honeywell Information Systems, Inc. computer analyst A.L. Beard.

HIS has donated processing time to run the programs since 1972 when the U.S. Figure Skating Association, of which Beard is an executive committee member, began testing the computerized scoring system in parallel with manual methods. The programs have been used to provide official scoring for regional, sectional and U.S. Figure Skating Championships since the 1973-74 season and the world championships during the 1975, 1977 and 1978 events.

"Scoring of figure skating events is considerably more complex than the high/low discard and averaging system of gymnastics and diving. Although this scoring system can handle more disparate marking situations more fairly than the simpler systems, it requires some lengthy calculations," Beard said.

Since rink-side terminal operators are more familiar with skating than computing, tutorial interface eases scoring task.

Each event is decided by a panel of judges, typically seven or nine. Each judge evaluates the skater independently and grades the performance on a scale of zero to six in .10 increments.

The judging system is supported by a scoring system carefully designed to find a consensus among the judges and minimize the effects of judges who are inconsistent with the majority.

The computational part of the scoring process is handled by a group of skating association volunteers who are designated accountants. Two of them operate two rink-side terminals connected by a telephone line to two HIS CPUs on a time-sharing basis.

Results are printed on the terminals about 30 seconds after all the data is entered. They must then be certified by the chief accountant and the referee, signed, photocopied and distributed. The entire process takes five to 10 minutes.

Final results, of course, are most important. But the value of a computerized scoring system is most apparent in the posting of intermediate standings, something which was not possible before automation.

In addition to generating greater audience interest, the availability of intermediate standings increases the spirit of competition among the skaters, Beard said.

"A figure round takes up to 3-1/2 hours to complete," he said. "Before we computerized, no official standings were available throughout this long period. The judges' marks were available for each figure, but marks are not standings. The skaters and the public wanted standings.

"With these results available, the skaters knew almost immediately who had moved up and who had done a figure badly and dropped back," he noted.

Programmed for Novice

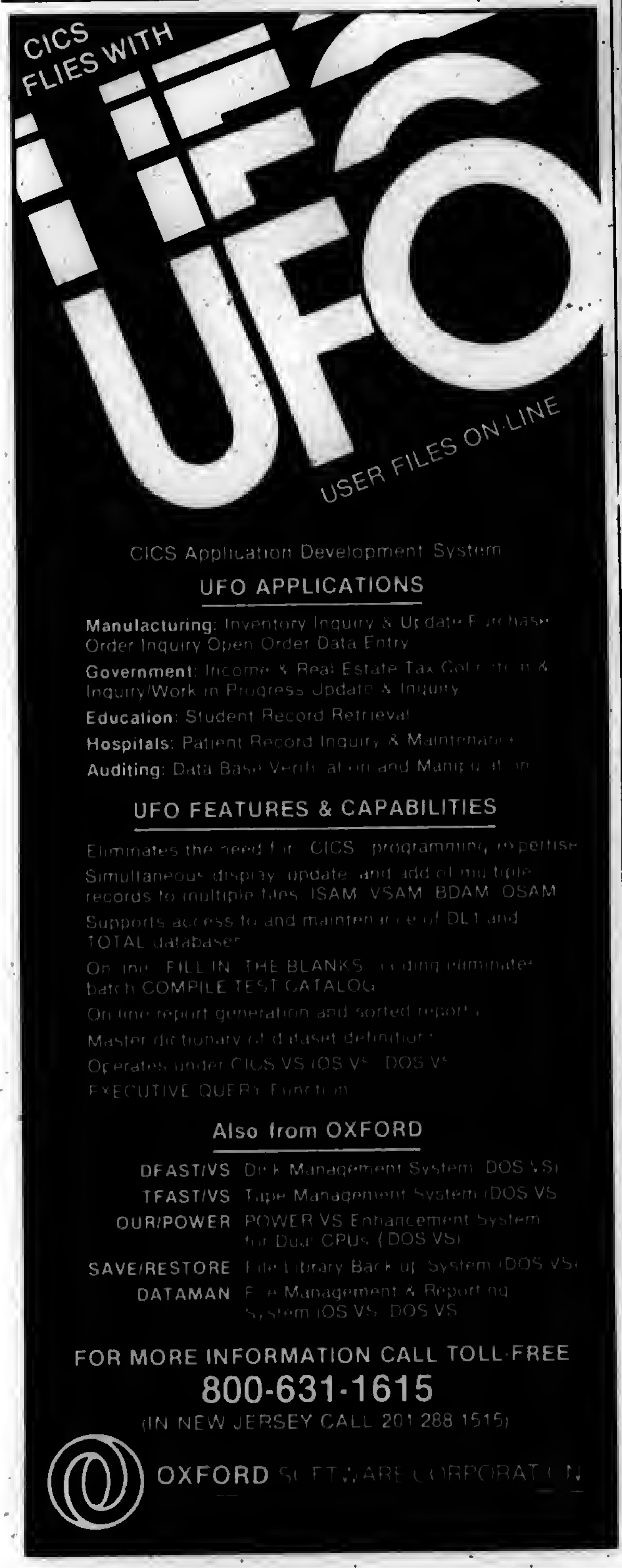
The rink-side terminal operators are intimately familiar with skating, but not with computers. The programs were designed to present the novice operator with a tutorial interface in skating terminology and to make all input and output parallel the previous manual formats as much as possible.

The programs are written in Fortran. The operator directs the program by entering an event code — or file name — followed by a command to the program. File names were called event codes to make the terminology easier for the operators. Event codes are two-character abbreviations of the event name, such as JL for Junior Ladies.

"The command language is a decided departure from normal time-sharing procedures," Beard said. Rather than using alphabetic verbs or abbreviations, the commands to the program are numeric. This simplifies the programs and, more importantly, makes it easier for the operator.

During the U.S. championships in Portland, Ore., in February, processing was done by two HIS 60/66s at HIS' Phoenix facilities.

A HIS 6040 at the National Capital Commission in Ottawa and a 66/40 at Scarborough, Ont., provided continuously updated standings throughout the five days of world championship competitions in March. Beard served as the accountant responsible for computer operators under the Canadian chief accountant during these events.



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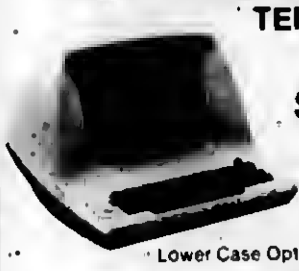

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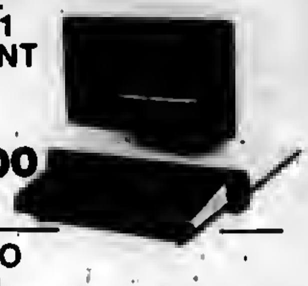

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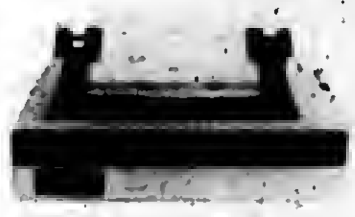

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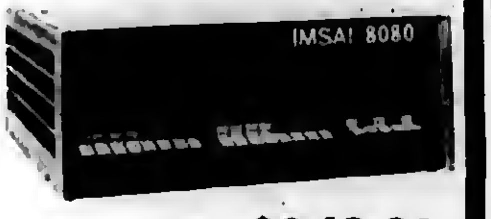

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Idle OCR Costs Idaho $4,000/Mo

By Howard A. Karten
CW Staff

BOISE, Idaho — The state of Idaho has been paying $4,000 in monthly rental fees for nearly five months for an optical character recognition (OCR) scanner it is not using. And that situation is likely to continue until July, according to Laird Justin. director of DP for the state auditor's office here.

The device, an IBM 3886 OCR reader, was delivered in December to scan time sheets for a payroll system now being developed. At the time of delivery, Justin said, he was uncertain when the system would be installed.

Rather than cancel the order for the scanner, he accepted it, knowing that testing the scanner could be done concurrently with other development work.

A significant factor in accepting the scanner was the knowledge that a lead time of nine to 10 months is necessary when ordering this type of equipment, according to Justin.

Personnel Turnover

Personnel turnover has been a significant factor in the delay of the project. In the past year, 11 programmers and analysts have left Justin's staff, and five such positions are presently open.

Salary scales are a significant factor in this turnover, Justin feels. The city of Boise has several other large DP shops competing with the state for personnel, including Boise Cascade Corp., Morrison-Knudson Co., Inc. and several large banks.

"There's a significant demand for programmers and analysts and a very small supply here . . . state installations have a big problem keeping good people, and the salary structure is a big reason," Justin said.

The rental of the scanner has not been a total waste, however, according to Justin, since other Idaho governmental agencies, such as the Department of Health and Welfare, have also been testing the scanner for use in developing systems.

The state auditor's office presently runs an IBM 370/158, operating in part as a service bureau for other state departments and agencies.

Pay-by-Phone Bill Service To Cover Two-State Area

By Marguerite Zientara
CW Staff

CINCINNATI — A telephone bill-paying service will be offered beginning July 17 in southern Ohio and northern Kentucky by 13 savings and loan (S&L) associations.

The joint effort, called Pay-by-Phone, is being made through Automatic Data Processing, Inc. (ADP) here and will be the first multiple S&L system in the country and the first to cover a two-state area, Janet McInerney, Pay-by-Phone manager said.

ADP provides on-line DP services to S&Ls in a six-state area, including Kentucky, Ohio, Indiana, Tennessee, West Virginia and Illinois, and the firm has contracts in Pennsylvania and Michigan.

The system differs from other telephone banking services in that a Pay-by-Phone customer is not restricted to using a Touch-Tone phone. The customer will talk to a human teller who will handle all transactions, answer questions and read back the customer's payment requests, McInerney noted.

Initially there will be four human tellers, based here at ADP, who will work with a Digital Equipment Corp. VT52 CRT. The system runs on a DEC 1134 CPU, with a LP11 300 line/min printer and an LA180 180 char./sec printer, McInerney said.

System Description

To join the system, a customer opens a 5.25% interest-bearing Pay-by-Phone account. Dollars deposited earn interest until the day they are needed to pay bills, and the account may be treated as a savings account, allowing deposits and withdrawals.

The customer lists recurring fixed bills, such as mortgage and car payments, and recurring variable bills, such as utility bills and credit card payments. The merchant's name, mailing address and the customer's account number are also listed. The fixed amount bills may be paid automatically each month on a date designated by the customer, McInerney said.

To pay recurring variable bills, the customer calls the Pay-by-Phone number and states his Pay-by-Phone account number and secret code. Then the customer identifies the merchants to be paid, the amount and the date of payment, she explained.

Daily Checks

Each day the Pay-by-Phone system writes one check for each merchant and provides a listing of the customer's names, account numbers and amounts paid.

Once a month, the customer receives a descriptive statement showing to whom the bill was paid, the amount and the date of payment.

The ADP project uses a system developed by Telephone Computing Service Inc. (TCS) in Seattle. TCS is the originator of telephone bill-paying, McInerney said, and a vendor of telephone bill-paying services. With the addition of the 13 S&L associations, TCS will have 67 financial institutions nationwide offering the service.

Cost: 10 Cents

In the U.S, about 125 financial institutions have 285,000 telephone bill-paying accounts with approximately 565,000 transactions per month. Currently 90,000 merchants around the country are being paid through a telephone bill-paying system.

Pay-by-Phone reduces the amount of check writing and eliminates postage and envelope costs. McInerney estimated that each bank will charge "probably 10 cents per transaction."

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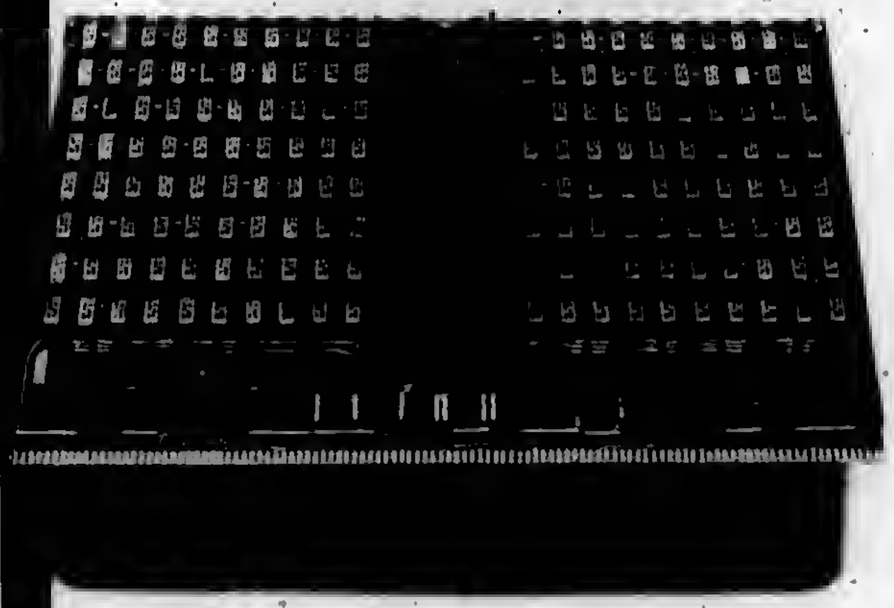

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In New York in November

Meeting Set on Transborder Flows

NEW YORK — Transborder data regulation and the world information economy will be the focus of attention at a Nov. 28-30 conference here sponsored by Online Conference Ltd., a London-based firm.

The conference — a follow-up of one held in Brussels last February — is designed to bring American DP manufacturers, service companies and communications suppliers up-to-date on recent developments in Europe and the developing countries where governments want to share or control the information economy within their borders.

The conference will draw together decision makers from both government and commerce from many nations, according to the meeting's organizers.

Jan Freese of Sweden, Louis Joinet of France, Rudolph Schomerus of Germany and Gerhard Stadler of Austria will discuss national laws and their transborder implications.

Frits Hondius will report on the status of the Council of Europe's draft treaty and an European Economic Community spokesman has been invited.

Data communications issues will be reported on by Torsten Larsson of Sweden, who has been asked to speak on European postal, telephone and telegraph (PTT) developments.

Final site arrangements have not yet been made, but sponsors expect conference expenses to be about $750- to $800 per attendee.

Further information is available from Carl Fielstra, at the law offices of John Eger, 1742 N Street N.W., Washington, D.C. or from Richard Elliot-Green, Online Conference Ltd., Cleveland Road, Uxbridge, England UB8 2DD.

Data War Smoldering

WASHINGTON, D.C. — An information war is smoldering on two fronts, according to the American edition of *European Community* magazine. Danger signs are up because Europeans fear a situation like the one that exists between the U.S. and Canada, in which data increasingly winds up in American computers, beyond Canadian control.

"So far no major international dispute has developed, but the Europeans who deal extensively with multinational corporations see themselves in a position comparable to the Canadians'," the magazine said.

Technology has offered a second front, according to author Jonathan B. Tourtellot, "in the form of satellites able to outperform anything previously set aloft. This battle has been quietly brewing through the United Nations Committee on the Peaceful Uses of Outer Space and involves direct broadcast satellites, which can push unwanted information into a country, and Landsat, which can take unfavorable information out."

Calendar

June 21-23, Toronto — **Data Processing Operations Management**, sponsored by the University of Chicago Center for Continuing Education. Contact: The University of Chicago Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.

June 21-23, Washington, D.C. — **Distributed Minicomputer Networks**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held July 26-28 in San Francisco, Aug 23-25 in Boston and Sept. 27-29 in Washington, D.C.

June 21-23, Washington, D.C — **On-Line Systems Audit Controls**, sponsored by the Institute for Professional Education (IPE). Contact: IPE, Suite 601, 1901 N. Fort Myer Drive, Arlington, Va. 22209. Also being held July 19-21 in San Francisco, Aug 28-30 in Washington, D.C. and Sept. 20-22 in Denver.

June 25-28, Lancaster, Pa. — **Association of Data Communications Users, Inc. Annual Seminar and Business Meeting**. Contact: H. Hershkowitz, The Chase Manhattan Bank, 17th Floor, 1 New York Plaza, New York, N.Y. 10004.

June 26-28, Santa Barbara, Calif. — **36th Annual Device Research Conference (DRC)**, sponsored by the Institute of Electrical and Electronics Engineers Electron Devices Society. Contact: Dr. James C. McGroddy, 1978 DRC Chairman, IBM, T.J. Watson Research Center, Yorktown Heights, N.Y. 10598.

June 27-29, Helsinki, Finland — **Third International Conference, Software Engineering for Telecommunication Switching Systems**, sponsored by the Institute of Electrical Engineering (IEEE). Contact: Manager, Conference Department, IEEE, Savoy Place, London WC2R OBL, England.

June 27-29, Atlanta — **Electronic Computing in Civil Engineering**. Contact: Civil Engineering Program Applications, P.O. Box 1532, Rockville, Md. 20850.

June 28-30, Washington, D.C. — **Configuration Management of Software Programs**, sponsored by George Washington University. Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

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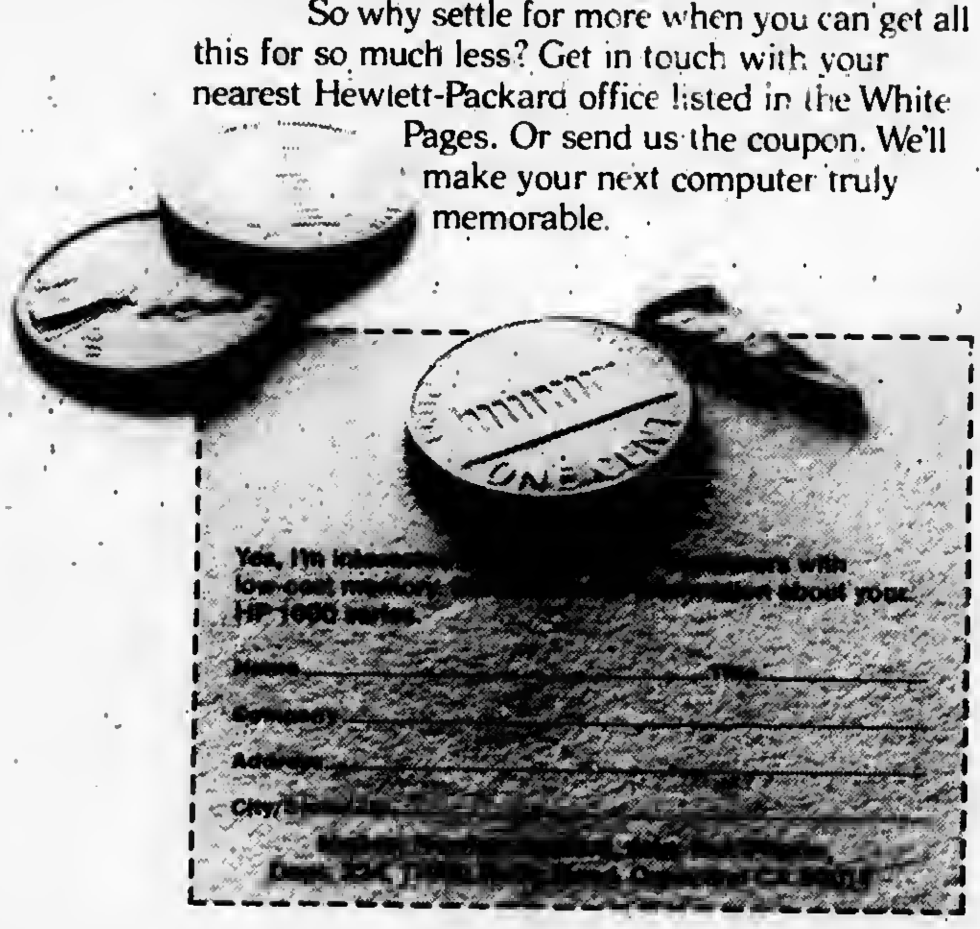
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System Lets Firefighters Know What to Expect

By Marguerite Zientara
CW Staff

KANSAS CITY, Mo. — When a fire alarm rings in Kansas City, firemen know just about what to expect at the scene of the incident, thanks to the fire department's sophisticated computer system.

By the time an engine company is racing to a fire, dispatchers at the Fire Alarm Exchange are radioing to them information gleaned from terminals and printouts that details the location, condition and occupants of the affected building.

The fire department uses five software programs to aid in its No. 1 priority — lifesaving — and its No. 2 priority: property conservation, according to Donald B. Stein, the department's administrative assistant for computer services.

The Invalid and Bedfast Persons List and the Guard Dog Information programs are two that were developed "from scratch" within the department, Stein said. If there is an invalid in the building where firemen are going and that person has been registered with the department, the firemen will be told the invalid's name; his ailment, whether he can walk and in which room he should be found.

Since people reporting a fire often call in an imprecise address, Stein explained, that program was changed to indicate any invalid in a certain block of a street, rather than just a building.

The Guard Dog Information will indicate guard dogs and occassioinally other potentially dangerous animals in a building. Also indicated are their handlers' names and telephone numbers so someone can immediately be called to help the firemen get inside a building.

Informational Accesses

Since the system runs on Kansas City's all-purpose IBM 370/158, it can access the city's real estate records to determine exactly what kind of building is at a reported address. "If an address check indicated there was no building at a reported address, we would send one vehicle just to check it out, but not a full response of five vehicles," Stein explained.

The system can also access the water department's file, which shows whether a building is occupied, and whether there is a sprinkler system in the building. The Department of Motor Vehicles file would identify the owner of a burning car so he could be notified.

In addition, if a fireman were to be injured or become ill at the scene of an incident, Stein said, the system would indicate his blood type, any allergies he suffers, whom to notify, what hospital he prefers and the name of his personal physician.

Main Program

The main program in the system is the Uniform Fire Incident Reporting System (Ufirs), which was purchased from the National Fire Protection Association (NFPA) as a management tool. The data input to this system, such as how many men were on a particular truck, what kind of truck it was and what equipment was used for an incident, is used for compiling monthly statistics for the department.

Used in conjunction with Ufirs is the Statistical Package for the Social Sciences (SPSS), developed at the University of Chicago. SPSS is a programming aid consisting of 16 subprograms which permit a program to be written using only seven or eight punch cards, Stein said.

"For example, Ufirs has a monthly printout that shows how many calls came in by hour of day and day of week for that month. If you want to learn about Jan. 1 to March 31, you would have to run the January, February and March reports and add them all together.

"With SPSS, we can get all of it together," he explained. "Under Ufirs we get a record of all the calls. Under SPSS, we can say what hour of the day most of the fires occurred or what hour of the day most of the first aid calls occurred."

There is quite a variance in the number of first aid calls to which each fire truck responds, Stein pointed out. SPSS can indicate which truck should be the next one to get a new resuscitator or which company should get the next new truck which is determined by usage.

While many other cities are making use of one or more of the computer tools that Kansas City has adopted, "it is unusual for all of these to be juxtaposed," according to Philip S. Schaenman, associate administrator in charge of the National Fire Data Center of the National Fire Prevention and Control Administration (NFPCA) in Washington, D.C.

"I don't know that it is the leader, but it is far up on the list, one of the more advanced cities," he added.

Four Terminals

The system, which is about three years old, makes use of two IBM 3275 remote entry terminals located at the Fire Alarm Exchange building and two IBM 3277 direct-access terminals in the main office at City Hall.

The department is now studying the feasibility of a computer-aided dispatch system which would keep track of each truck's status, Stein said. That type of system would indicate the trucks closest to a fire geographically or time-wise, based on the street network, he explained.

Stein hopes in the future to have "reasonable numbers of fire trucks where the fires are likely to be. It doesn't make sense to have, for example, 80 men downtown during the day when we have 10,000 office workers there and have 90 men at night when there's no one there."

Ribicoff to Talk To DP Auditors At June Meet

DEARBORN, Mich. — Sen. Abraham Ribicoff (D-Conn.) will speak on computer crime legislation at the sixth international conference of the EDP Auditor's Association here June 19-21.

Ribicoff will appear at the general session Tuesday morning June 20.

The conference, which will emphasize "advanced concepts and practical applications," will also feature a keynote address by Alan Taylor, a consultant and columnist for *Computerworld*.

Additional information on the conference slated for the Hyatt-Regency Hotel here, is available from Seymour S. Ribiat at Blue Cross-Blue Shield of Michigan, 600 E. Lafayete, No. 1012, Detroit, Mich. 48226.

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System Due Up in '81

CRTs to Replace Radios in L.A. Police Cars

By Marguerite Zientara
CW Staff

LOS ANGELES — By 1981, computer terminals will have replaced patrol car radios for the Los Angeles Police Department (LAPD), allowing police officers to check and obtain information up to 80 times faster than through normal voice communications.

Under a $27,347,500 contract with System Development Corp. of Santa Monica, Calif., 850 E-Systems, Inc. MDT 800 CRT terminals will be installed in the entire marked fleet of the LAPD, according to Sgt. David Wiltrout, police liaison for the Emergency Command Control Communications System (ECCCS).

The system will reduce delays in information transmission from the present rate of up to 20 minutes to 5-15 seconds, Wiltrout said.

Under the present radio-based system, an officer in the field must request a radio frequency, for which he may have to wait a few minutes. When he gets a clear frequency, he reads the CRT operator at the station the information needed to determine whether a suspect is wanted. That information includes all that is furnished on a driver's license — name, address, height, weight, sex, hair color, eye color and the license number, Wiltrout said.

As the operator receives the information, it is input to a CRT. Once he gets a response, there may be a considerable delay before the operator can relay the information to the field officer, since he must share the frequencies with three other operators and acknowledge any transmissions received while waiting for the frequency to clear.

Transmission System

The ECCCS system will allow an officer to type in the information at his own speed. Since the department is in the process of converting to an all-portable radio system, the existing mounted radio apparatus in each patrol car will be used to transmit the data digitally to a series of receiving radio towers, Wiltrout explained.

The information will then be transmitted via land lines or microwave to a cental downtown location. There, five E-Systems, Inc. RDC 90 Radio Data Link Converters, one for each channel, will receive and convert the information for input to four Digital Equipment Corp. PDP-11/70s.

Those computers will then reformat the information into several messages for input into files of local wants and warrants maintained by the City of Los Angeles, Wiltrout explained. Almost simultaneously, messages will also be sent to the state information system to check on wants and warrants at the state level and to the National Crime Information Center (NCIC) to check on national wants and warrants.

A second benefit of the system is in the area of security, Wiltrout noted. "We know for a fact that criminals frequently use scanners and other radio devices to listen to our calls and avoid arrests," he said. "With this system they won't be able to, since you can't eavesdrop on digital transmissions."

The MDT 800 utilizes a small reflective screen with a mirror arrangement at its base, which enlarges the CRT display and minimizes the danger of its implosion in the vehicle, Wiltrout said.

Clearly Not A DP Error

DALLAS — Computers are getting more and more human these days. In fact, a so-called "computer" in the Urban Planning Department here goes by the name of Jo Anne Yadack, and while she may sometimes wish she were a computer, Yadack is actually very human.

The identification error arose when a city official attempted to explain how street names in a recently incorporated community were going to be renamed to eliminate duplication as well as make the names more interesting and romantic.

Unfortunately, the official wasn't sure how the task was to be accomplished and, when asked by reporters, answered that a computer was going to do it, hoping that would satisfy everyone. The information was widely reported by several newspapers and at least one wire service.

But in the meantime, Jo Anne ("The Computer") Yadack is working out all the details of the street name changes in a very uncomputerlike way — by hand.

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Editorial

Sound Development Approach

The Automatic Transmission of Mail (Atom) system by Combustion Engineering, Inc. (CE) [CW, May 1] is interesting not only in itself, but also in the way it was developed.

Instead of performing a massive study of the needs for an electronic mail system and the possible ways of meeting those needs, the firm plunged right ahead and developed one — for the cost of such a study.

When it is modified and the final version settled on, the resulting system will be based on actual user experience with the pilot system and not just speculation as to what users want and will use.

Obviously, such an approach will not work for all applications, but the technique could be applied in many other areas. Too often, both DPers and end users spend as much time planning systems as they do implementing them, and while this can be justified in many cases, it can also lead to wasted time and money.

Even after many of these elaborate plans, the developers sometimes find systems do not work as well as in actual practice as they did on paper. Then, it's back to the drawing boards for the development of a second system — this time based on real experience with the first design.

CE cut through that process by designing and implementing what it called a throwaway system. It works and is giving users hands-on experience. Since it cost about the same as a plan might have, the firm is now way ahead because it will have user experience in addition to planners' ideas when it implements the final version.

And Just Before NCC . . .

With all the buildup under way for what promises to be the largest computer conference ever — the National Computer Conference in Anaheim, Calif., June 5-8 — hopefully the smaller but at least as interesting History of Programming Languages Conference (June 1-3 in Los Angeles) will not be overlooked.

Sponsored by the Association for Computing Machinery (ACM) Special Interest Group on Programming Languages (SigPlan), the conference was designed to preserve the historical record of the development of several of the major languages in current use.

The speakers include the developers of some of the major languages: Alan Perlis and Peter Naur on Algol; Ken Iverson on APL, Douglas Ross on APT, Tom Kurtz on Basic, Jean Sammet on Cobol, John Backus on Fortran, Geoffrey Gordon on GPSS, Charles Baker on Joss, Jules Schwartz on Jovial, John McCarthy on Lisp, George Radin on PL/1, Kristen Nygaard on Simula and Ralph Griswold on Snobol. The conference will be keynoted by Grace Hopper.

In all, the three-day affair promises to offer some interesting insights into how languages are developed, all straight from the horses' mouths, so to speak.

So in addition to the big show in Anaheim, users and computer buffs — particularly DP history buffs — would be well advised to spend a few days up the coast in Los Angeles. Registration fees range from $65 for SigPlan members to $80 for non-ACM members. Information is available from Rorrie Ratkevich, Ground Systems Group, Hughes Aircraft Corp., 1901 W. Malvern, Mail Drop 606-K126, Fullerton, Calif. 92634.

Data Past

Eight Years Ago
May 13, 1970

ATLANTIC CITY, N.J. — A committee sponsored by the American Federation of Information Processing Societies last week called for the development of a code of professional conduct for the computer and information processing field.

— — —

ATLANTIC CITY, N.J. — Viatron announced at the Spring Joint Computer Conference that it was leaving the leasing business and that it was breaking its bargain price structure.

The price of the 2101 microprocessor was raised 70% to $1,640, while the price of the Viatape recorder was boosted from $196 to $384. Also gone was one "free" black-and-white video display for those who ordered multidisplay systems.

Five Years Ago
May 9, 1973

TULSA, Okla. — Hints about IBM's future product line were revealed in documents introduced in the IBM/Telex Corp. antitrust trial here.

Under the code name "Midas," the 3330 disk drive, introduced three years earlier, was being modified to create a new style drive with half the capacity and fewer disks per pack for small, medium and intermediate installations. The other major developments described in the court documents were the "Iceberg," a double-density 3330 drive and the "Apollo" drive for the future generation 375 family of computers. IBM documents also indicated that the "Winchester"-type technology, also under development, might delay introduction of the Midas disk product.

'Just You Let Us Pros Handle It, Uncle . . .'

Letters to the Editor

Jumping the Gun?

There is no such thing as an ANS Fortran 77 language yet, contrary to your story "ANS Fortran 77 Introduced for Mini-, Microcomputers" [CW, April 10].

Douglas M. Grant
Stamford, Conn.

Reader Grant is logically correct but common usage doesn't always follow logic. Now that the American National Standards Institute has approved the new Fortran (see Page 29), it has also sanctioned the continued use of the informal name Fortran 77 to distinguish the now-current standard from other proposals. Ed.

Tips on Evaluating DBMS

I found the recent article on the misuse of the label "data base management system (DBMS)" [CW, April 17] most interesting and relevant to the current DP environment.

We have done some soul-searching on this and have developed a set of criteria that a package labeled "DBMS" should satisfy. These were developed from the viewpoint of large mainframe users and do not attempt to address the Codasyl versus non-Codasyl distinction. DBMS should offer:

- Data compression (automatic is preferable to user exit type).
- Data independence.
- Interfacing from high-level host languages such as Cobol, PL/1, Fortran and BAL (although BAL is not considered high level).
- Built-in safeguards for data integrity.
- Security down to field level.
- Support of multiple keys with nonunique values.
- Logical view of required data.
- Logically relating different files.
- Integrated data edit features.
- Interactive query facilities.
- Interfacing with major teleprocessing monitors and systems.
- Provision of centralized control and monitoring of data base through relatively simple utilities.
- A good report writer facility.

A particular installation may wish to alter the terminology or even compromise on some of these criteria, but any such compromise is most likely to result in the degeneracy of DBMS into file management systems (FMS). Indeed, FMS may be what many installations really need.

V. Venkatakrishnan
Aetna Insurance Co.
Hartford, Conn.

Pascal Attractive Anyway

In "Growth of Pascal Called Revolutionary" [CW, April 24], Richard Cichelli stated that "The Pascal 6000 compiler outperforms Control Data Corp.'s Fortran, Cobol and Algol compilers."

The Pascal 6000 compiler does outperform the Fortran compiler in that it compiles Pascal programs and the Fortran compiler doesn't! I don't think there is any other sense in which it can reasonably be stated that the Pascal 6000 compiler outperforms CDC's Fortran.

Pascal is a very attractive language. Here and at many other colleges and universities, it is used extensively in computer science and computer engineering courses.

Pascal's advantages have been enough to attract many users. There may eventually be Pascal compilers on the CDC systems that compile as fast as the Fortran compilers do and that produce the kind of optimized code Fortran compilers produce, but such compilers do not yet exist.

Saul Rosen
Director, Computing Center

Purdue University
Lafayette, Ind.

Above Technical Know-How

Operations Supervisor Puts Leadership First

By Jack Stone
Special to CW

"Raise your hands if you feel your operators and control personnel are hardworking, competent, motivated employees."

I asked this of a group of operations managers and supervisors attending a recent operations management seminar I presented. I was surprised to see the hands of about a quarter of the people present, the most I've seen from any group.

During coffee break, I chatted with one of the attendees who responded quite positively to the question. She was so enthusiastic about her operations team that I asked for the opportunity to tell her story.

Here is my interview with Wanda Anderson, data center operations supervisor for the Ray-O-Vac Division of ESB Ray-O-Vac, Inc. of Madison, Wis.

Q. Wanda, would you begin by relating your DP background?

A. I started as a data entry operator and after several years, I was promoted to data entry supervisor. Four years later, in 1976, I was given the opportunty to become data center operations supervisor.

Q. And the hardware you now have installed includes . . . ?

A. We have a medium-scale mainframe installation, with 512K of main storage, eight disks and six tapes. We also support low- and high-speed terminal applications during prime shift.

Q. What experience did you have in the machine operations department that qualified you for the supervisory job?

A. I was acquainted with the organization, procedures and personnel, but I really didn't have any direct experience in the machine room as an operator.

Q. That's quite a step, isn't it, moving from keypunch supervisor directly to an operations supervisor position with substantial responsibility for a complex production facility? Did you have a lot of technical training that prepared you for the task?

A. Not really, no. Oh, I knew the basics of business DP and we had enriched the data entry jobs with off-line communications work, but that was about it.

Q. On what basis, then, do you feel you were selected for the job?

A. I believe I was offered the job because I demonstrated success in bringing primary supervisory skills to the keypunch area. We had a great team of people in that department and worked well together to get the job done. Apparently, my management felt these same skills were required in the computer room, and I was given the promotional opportunity.

Q. Would you identify these skills?

A. Basically, they are those relative to leadership and employee relations. Of course, technical skills are desirable, but were considered secondary in importance to the real job to be done — by both my manager and myself. Besides, we both felt I could attend technical classes along the way.

The Human Connection

Q. Have you been able to pick up the technical training or experience you feel you need?

A. I feel I have made a great deal of progress. However, I realize, because the environment changes so fast, I have to keep growing.

Q. But how are you able to make intelligent decisions if you are light in the technical skills area?

A. Oh, you don't understand! Although there's much more to learn, I feel I have enough of an understanding to handle the decision-making aspects of my job. Besides, we have, in other sections of our data center, people with good skills and experience who are willing to provide assistance in the technical area. We all work together as a team to get the job done.

The problem is that I feel somewhat short of the technical background needed to train the operations staff. I strongly believe a major responsibility of the supervisor is to personally conduct the technical training. In addition to the quality of training it can provide, it helps build strong relationships between management and employees.

Q. How successful are you in your current job?

A. I believe my management is satisfied with my performance, and, except for my concern in handling the technical training, I feel comfortable in handling all the functional areas, particularly the operations and personal aspects of the job.

One reason for my progress has been the excellent company-sponsored training programs in supervisory skills and communications. I have taken courses in interviewing, performance appraisal and transactional analysis, to name a few.

Q. Would you share some of the guidelines you have found useful in building your capabilities as a supervisor?

A. Surely. The first is to address and resolve personnel performance problems as they occur. You shouldn't wait until performance appraisal time.

A second is to listen to the staff express their likes and dislikes about their jobs. Then, add them all up and see if you can find alternate ways of organizing or operating that can better meet what the staff prefers, without having a negative impact on production.

In addition, the supervisor should deal with employees in a candid, straightforward way. He should also be able to build the same attitude in the staff.

Business Offerings Growing

Software Can Make TRS-80 More Than Toy

The Taylor Report

By Alan Taylor CDP

The development of computers is more a matter of software than of hardware. So last August, when the Radio Shack Division of Tandy Corp. promised payroll systems for less than $20 as well as delivery of more complex business systems later, the matter was of more than minor interest.

It's now been six months since the first release of the Tandy/Radio Shack TRS-80, and software development, as with any new system, is experiencing some delays. The disk operating system has not yet been released, although Tandy's John Roach tells me it won't be long.

The documentation is also running somewhat behind schedule. The Level Two manual is not yet available although Level Two systems are in the field for evaluation purposes. However, the manual has been written and is in galley form.

There is actually a series of manuals available for Tandy's software package. Of these, perhaps the best developed are the checkbook balancing and budgeting system of the personal finance package and the payroll package for up to 12 employees.

The software documentation isn't particularly uniform from one manual to another. The personal finance package manual, for instance, gives flowcharts of each of the four programs (initialization, checkbook balancing, monthly budget and final budget summary.) However, the payroll package, with its two complicated programs (the update and summary and the payroll program), does not have such charts.

All of this raises the fundamental question as to whether the Tandy computer is little more than a toy or something computer people have to take seriously.

Easy to Criticize

The facilities of the present Tandy system are easy to criticize. The $600 Level One, which is the only one available at this time, does not produce hard copy and has only a restricted 4K user memory. The programming results are correspondingly modest.

Moreover, even when the Level Two system arrives, with its increased speed, more peripherals and better Basic, users are going to have to face the problems of serviceability and reliability.

Yet when all is said and done, a fabulous amount of work can be done on the current Tandy system. And, any computer-wise group can use it — a family or an organization with a couple of amateur programmers.

The fact is, in the past 25 years, understanding of DP has risen to the point where there is now hardly an area in the country that doesn't have some DP-wise residents. Indeed, I suspect at the moment there are at least as many of these people as there are individuals familiar with car mechanics.

I think it's in this "computer-literate" environment that we have to look at both the software and hardware of the Tandy computer event. For, make no mistake about it, the TRS-80 is an event, and by the time one adds in the other home computers, "home-computing" adds up to a very significant resource from the point of view of professional DPers and the "traditional" DP establishment.

Understandable System

If carefully broken down, the particulars of the system's payroll package, for example, are not too hard to understand and the type of business for which it is designed won't, I think, have too much difficulty using it.

About a year ago, while talking of some Digital Equipment Corp. systems, I commented that their introduction could change the computer markup situation and bring things down to a more reasonable level. And I think last year did see some reduced hardware markups. This situation is equally true of the Radio Shack systems. Already sales have surpassed the 10,000 mark and the demand is from people who want to take control of their own work, not from "computer-niks."

There are going to be quite a number of failures with the TRS-80s, but there are also going to be many successes. As more types of software become available from sources and as more connections can be made to the system, the importance of these units will increase. As for reliability problems, at these prices (the maximum business system costs about $3,000) the systems form a DP capability that many can afford to duplicate.

The system, however, still depends on that all-important software base to make it more than a toy, so I'll keep you posted as its software (and that of its competitors) is introduced.

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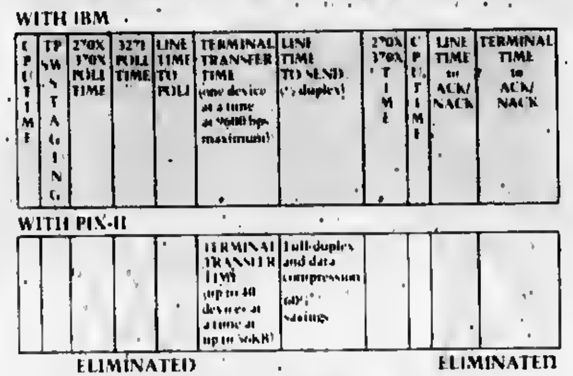
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Stretching Back to IAS

Smithsonian Sparks Memories of DP Roots

Reader Commentary

By Anthony C. Constable
Special to CW

Except for a two-year spell in California, I have lived in and around Washington, D.C., for the past 10 years. Like many residents, I have not spent as much time as I should have at the truly great local museums that comprise the Smithsonian Institution.

A short time ago, I was asked if I would like to attend a private showing of the Smithsonian's collection of computing devices. The viewing had been arranged under the aegis of the local chapter of the Data Processing Management Association. Intrigued, I agreed at once.

It was a Tuesday evening early last March. We arrived at the "Associates" entrance of the Smithsonian's Museum of History and Technology shortly before 7:30 p.m. The guard directed us to the building's main foyer, where all such tours assemble.

The guide for our party was Dr. Uta Merzbach, curator of the institute's Mathematics Department. Merzbach explained that because of the security precautions surrounding a nearby "loaner" exhibit, we would have to see the exhibits backward, that is, the most recent one first. This accident of scheduling resulted in a unique and excellent viewing of the Smithsonian's collection of computing devices.

The main hall that houses the institute's computer collection is shared with the petroleum, nuclear energy and physical science exhibits. Computing, I am pleased to report, is very well represented; the area devoted to its exhibits is larger than each of its neighbors.

All of the true computers currently on display were built during the 1946-1956 time period. More modern equipment will follow as its time-from-obsolescence increases and more room is found.

IAS and Univac I

At our first stop we were shown portions of the IAS machine. This machine, Merzbach explained, represented the practical realization of the von Neumann concept of internal storage (electrostatic in this case) in a computing device. I asked if IAS was an acronym for "immediate access storage," but was told this particular IAS stood for the Institute of Advanced Studies at Princeton.

The IAS machine was limited since it was programmable only through firm wiring. It did, however, have random-access storage and performed binary arithmetic in parallel. As the prototype for several later machines, the IAS machine deserves its place in this the computing Hall of Fame.

We then inspected some pieces of the first Univac I machine which were acquired from the Bureau of Census. The Univac I actually aced the then-current IBM offerings and should have given IBM a real run for its money. That was not to be.

However, the Univac I did have many interesting technical aspects. We saw its Unityper, a typewriter-like peripheral device that handled both the input and output of paper tape. Great Grandmother complete with knitting needles in her chignon would have looked good behind this one.

Next to the Unityper was one of the first magnetic tape drives, the Uniservo I. This device passed reels of magnetized metal tape at read/write speeds of 100 in./sec and recorded its data at a very low density.

The tape reels were, of course, extremely heavy. A full-sized reel weighs about 20 pounds and holds only 200 feet of tape.

Alongside of this was the Univac I console. Merzbach told us the machine had been built around the principle of "acoustic mercury delay lines," but was unable to answer why the console contained switches labelled "Heater I" and "Heater 2." She did, however, strongly dispute my suggestion that these had been provided to keep the operator's feet warm.

Creature Comforts

My postulation began to sound more promising as we were shown the next machine. This beauty's console had come complete with an ashtray and cigarette lighter as well as a built-in telephone. The ashtray proved conclusively this was not an IBM machine; the elder Watson would never have gone for that.

It turned out to be a Burroughs machine, the J1. This machine had seen service guiding the early rockets and satellites at the then-named Cape Canaveral in Florida.

The J1 is believed to have the first fully transistorized computing machine ever delivered. It is enthroned upon what is probably an early example of a raised floor and, consequently, the exhibit looks real.

We were allowed to pull out and examine one of its 20 or so program panels, each of which is about half of the size of a regular doorway. It is incredible to think that these removable panels, when wired, and used in conjunction with console switches, could act as the guidance mechanism for a huge rocket.

Since the J1 appeared to be a relatively complete machine, we wondered if it was still operational. We were told the machine could be put back into running order, but that it would be difficult to find an application that would come close to justifying such an undertaking.

I agreed it would be hard to imagine the old work horse churning out Snoopy calendars for the tourists on its double pizza-oven-sized drum plotter. Even the Smithsonian itself, I was disappointed to learn, relies exclusively on more modern equipment to handle its internal computational needs.

Behind the J1's raised floor we discovered a device reminiscent of an old public weighing machine. It was one of the tape transports from the National Bureau of Standards' Seac machine.

SEAC stands for "Standards Eastern Automatic Computer" and should not be confused with Swac, Seac's faster little brother which was domiciled in Los Angeles.

The Seac tape drive is interesting because it employed the notion of keeping all of the read or written tape from a reel heaped up within its vacuum chamber instead of winding it onto a take-up reel, as do most modern tape drives. The pur-

(Continued on Page 26)

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Capitol Museum Sparks Memories of Past

(Continued from Poge 25)

pose, Merzbach stated, was to maximize the rewind speed.

If this methodology strikes you as archaic, it is worth remembering the popular 8-track cartridge works on a very similar principle.

Our next stop was at the Whirlwind I, built at MIT between 1948 and 1952. The development project was directed by the illustrious Jay Forrester and was funded by the Office of Naval Research (ONR) and the U.S. Air Force.

This machine had such huge dimensions that the building that became its first and only home had to be constructed around the machine as it was being assembled.

The "firsts" that were incorporated into this behemoth are impressive. They included magnetic core storage, magnetic tape and the light gun. The latter looks like a modern hand-held hair dryer and is kept in a bracket mounted to the right of the machine's chest-high circular screened console.

The console's screen reminds one strongly of a port hole. No doubt this was for the benefit of the ONR admiral who was holding many of the purse strings.

18,000 Vacuum Tubes

Moving back in time, we were shown one of the 40 storage modules from the Eniac machine built by the Moore School of Engineering at the University of Pennsylvania. This machine worked exclusively through vacuum tubes — all 18,000 of them.

The operator of this electronic numerical integrator and calculator, used by the Ballistic Research Laboratories in Maryland until the mid-1950s, certainly would not have needed anything to warm his feet.

The last major exhibit consisted of parts of the Mark I machine, completed at Harvard in 1944. The Mark I is considered to be the first practical demonstration of Charles Babbage's analytic engine concept.

This fact has and will be disputed; there were contemporary developments here in the U.S. and in Germany. For sure, however, it was IBM's first real computer project because IBM supplied the money and much of the fabrication skill to Prof. Aiken's project team.

The Mark I relied on hundreds of relays to hold information while its program was introduced, instruction by instruction, via 3-in.-wide paper tape. The full machine was 51 feet in length and must have sounded like a million people eating dry rice with chopsticks out of plastic bowls when it was being operated.

Behind the Scenes

We were by this time well saturated with new interesting facts. Therefore, after a short reverie among the collections of difference engines, slide rules, and sequential analyzers, we were intrigued when we were invited behind the scenes to view the artifacts Merzbach had squirelled away in her private basement library/laboratory.

Here, among the rows of shelves and filing cabinets, we were able to examine an original set of handwritten Mark I operating instructions, inspect reels of metal computer tape and browse through the first Fortran manual ever produced, Merzbach explained the Smithsonian has only about 10% of its collection of almost everything on public display at any point in time. (The rest of its collection of computers is held in a large warehouse in Maryland. However, in order to keep its collection current, new items are constantly being sought. The message that came across in this regard was that ultimately it is the efforts you and I make in preserving our heritage that dictates the completeness of the record we will leave.

Therefore, if you have or if you know the whereabouts of any obsolete item of computing equipment or piece of documentation, the folks at the Smithsonian would like to hear from you. The address is: Dr. Uta Merzbach, Curator, Mathematics Department, Room 5002, Museum of History and Technology, The Smithsonian Institution, 14th and Constitution Avenues, Washington, D.C. 20560.

During our visit behind the scenes that evening, my attention was drawn to an object wrapped in newspapers. It turned out to be a section of memory from an IBM 7090 machine.

The wrapping paper looked very familiar. It consisted of several old issues of — yes you've guessed it — *Computerworld.*

Constoble is an independent computer consultont currently working out of Monrovia, Md.

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Final Text Not Yet Ready

Ansi Approves 'Fortran 77' Standard

By Don Leavitt
CW Staff

NEW YORK — The American National Standards Institute (Ansi) completed its work on the new Fortran standard early last month but withheld news of its action since the text of the standard is going through final editing and copies will not be available for another 60 or 90 days.

On the other hand, an Ansi spokesman noted, the substance of the standard is contained in the proposal published by Ansi's X3J3 technical committee in June 1977 and amended in October, largely in response to public comments on the original draft.

With so much work done last year, the proposed standard became popularly known as Fortran 77 and Ansi has agreed to accept continued use of that informal title even though the formal documentation will carry the designation X3.9-1978, he said.

Fortran 77 provides two levels of the langauge: Fortran and Subset Fortran. The subset has been tailored to minimize storage requirements and to simplify the development and maintenance of supporting software. In any case, the new standard replaces both X3.9-1966 (Fortran) and X3.10-1966 (Basic Fortran), the spokesman said.

Although generally compatible with the old standard, Fortran 77 differs in enough ways to make it troublesome to convert programs written in strict compliance with Fortran 66, according to X3J3 chairwoman Jeanne Adams, information services manager at the National Center for Atmospheric Research.

However, she added, many Fortran programs today already utilize language extensions provided by the compiler builders to meet needs unanswered by the 1966 standard. Since the changes in Fortran 77 have the same purpose, they tend to match many of the common extensions, and conversion of an extended Fortran 66 program may be quite simple, Adams said.

The changes include, for example, the introduction of a limited capability for structured programming, she continued, citing the availability now of IF and ELSE . . IF statements for branching.

A variety of changes have been made in the area of I/O control; list-directed I/O is defined in the new standard. New statements in support of file manipulation include OPEN, CLOSE and INQUIRE, she noted.

Detailed discussion of the now current standard will be the focus of a technical session at this year's National Computer Conference, she noted, but X3J3 is already gathering material in preparation for the next update of the standard five years hence, called Fortran 82.

'Trace' Aids Datapoint Users

LITCHFIELD, Conn. — The Trace package from Pacesetter Corp. was developed to give the Datapoint Datashare programmer an insight into the actual logic paths taken by his program while it is executing.

To speed debugging, the package gives the programmer the actual labels of steps executed, according to a spokesman. The steps can be displayed on a terminal, written to disk for later examination or routed to a printer if immediate hard copy is needed, the spokesman said.

With such output, the programmer can compare what is actually happening with what was expected. If there is a difference, he can get a better insight into where the problem exists, the spokesman explained.

Trace is available under lease for $375/yr, he said from Pacesetter Corp., Marsh Road, Litchfield, Conn. 06759.

'Look' Adds MVS, TSO Displays

PRINCETON, N.J. — Version 5.0 of Look, the real-time performance measurement system for IBM 360s and 370s running under OS/MVT or OS/VS, includes enhancements for both MVS and Time-Sharing Option (TSO) operations, according to the vendor, Applied Data Research, Inc. (ADR).

Look can be utilized from any operator console, CRT or hard-copy terminal to gain immediate appraisals of what is occurring within today's dynamic DP environments and make changes when appropriate, ADR said.

The package provides performance displays that indicate CPU use, I/O and — for VS installations — paging activity, as well as other displays that help control major subsystems of the operating systems. Resource displays are also available to highlight wait conditions, allocation of devices or data sets and similar activities.

Dynamic system controls are also part of Look, permitting real-time changes in an operational environment to keep it running optimally.

Look 5.0 is said to include new dynamic control commands for MVS users, new performance displays (also for MVS), TSO measurement facilities and extensions to existing Look features. The MVS performance displays provide information about the Auxiliary Storage Manager and the System Resource Manager, ADR explained.

The permanent license fee for Look varies between $4,800 and $6,000 depending on the operating system. The software is also available on lease for three years at $194/mo or for five years at $159/mo, ADR said from the Route 206 Center CN-8, Princeton, N.J. 08540.

Welcome Mat Is Out

Computerworld will publish a special report on systems and utility software in July and invites contributed articles on this topic.

CW is especially interested in tales of user experiences with systems and utility software products and in commentary on the state of the art and where it is going.

What should installations expect from such products? How should they approach acquiring them? What problems are encountered in implementing these products? What services exist to help users?

These are some of the questions we would like to answer in the report. You can help with manuscripts limited to about 1,000 words (four typed, double-spaced pages). Please send them by June 16 to Brad Schultz at *Computerworld*, 797 Washington St., Newton, Mass. 02160.

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Decsystem Users to Meet

CAMBRIDGE, Mass. — Users of Digital Equipment Corp. Decsystem-10s and 20s will be able to choose from among 65 technical presentations and workshops if they attend the 12th semiannual Decsystem-10/20 Symposium at the Hyatt Regency hotel here later this month.

Sponsored by the DEC Users Society (Decus), the May 23-26 meeting will include sessions on data base management, site security, financial topics and transaction processing. User panels will also cover software development and conversions, hardware maintenance and operational considerations, according to Norbert John Kubilus, the Decus Decsystem-10/20 user group chairman.

Mary Beth Peters, an independent organization development consultant, will deliver the keynote address on May 25. A software clinic will be still another part of the schedule for that day, Kubilus said.

The registration fee for the conference is $95 (prepaid) or $115 (at the door). Single-day registrations are also available at a lower cost, Decus noted from 129 Parker St., Maynard, Mass. 01754.

CICS Journal Use Shown

KANSAS CITY, Mo. — "CICS/VS: Journal Control" from the Edutronics Group is the latest course module for programmers, operators and DP managers in the vendor's multimedia series on IBM's CICS/VS teleprocessing monitor.

Journals are powerful CICS/VS facilities available for use in creating and managing special-purpose sequential data sets during real-time execution, an Edutronics spokesman explained.

The course provides a thorough view of journal file management as well as a detailed explanation of preformatting, journal file identification and dual extents, he claimed.

The course module is the most recent release in the new CICS/VS series.

All courses in the vendor's library are available under a variety of rental plans, the costs of which vary with the volume of courses being utilized and the length of the contract. Edutronics is at 3435 Broadway, Kansas City, Mo. 64111.

With Special Feature

'Robot' Gets Broader Data Access

KENSINGTON, Md. — Robot, a query/data retrieval system that enables users to phrase their requests in English, has been extended — through a separately priced option — to support sequential, Isam, Vsam and unloaded data base management system (DBMS) files, according to the vendor, Artificial Intelligence Corp.

Until now, Robot could work only in conjunction with a DBMS such as Software AG's Adabas or National CSS, Inc.'s Nomad. With the Data Access Module, it becomes a self-contained inquiry/reporting system capable of working with data wherever it is stored, a spokesman said.

The Data Access Module includes a utility that makes a pass over each file, creating a read-only "informational" version of the file and an inverted index. The module also includes a retrieval component that Robot uses to access the index and file, the spokesman continued.

The accessibility provided by the module enables users to get at data without having to convert to a DBMS. On the other hand, when a DBMS is being used, subsets of the full data bases can be extracted to meet the specific, immediate needs of the user, the spokesman said.

The optional module will be available in the third quarter for use with IBM's Time Sharing Option or in batch operations. Robot costs $30,000; the module will cost an additional $20,000, the vendor said from 3514 Plyers Mill Road, Kensington, Md. 20795.

Payroll, Personnel Work Runs With 'Q-Pac' System

MANCHESTER, N.H. — The Q-Pac payroll, personnel and labor costing system, now available in the U.S. and Canada from Q-Pac America, Inc., is a modular system intended for use on IBM 360 and 370 equipment, according to its vendor.

By utilizing parameter entries to configure the processing to be done during each payroll run, the system reportedly can be customized to each user's needs without altering the basic source code. This same technique allows a single run of the system to support multiple distinct processing combinations, a spokesman said.

In addition to supporting "unlimited" numbers of earnings and deduction patterns for individual employees, Q-Pac also handles tax calculations.

The personnel portion of the system provides payroll and educational history files for use in skills inventory operations and Equal Employment Opportunity (EEO) reporting.

The labor-costing logic includes backing for an unlimited number of job codes, percentage split on job codes, cost allocation, accrual accounting, cumulative costing and a "universal" general ledger interface, he said.

Initially developed in South Africa and marketed for some time in the U.S. by Software International, Q-Pac operates under DOS or OS or the VS environment.

The package costs range from $15,000 to $30,000 from Q-Pac America, 1 Perimeter Road, Grenier Field, Manchester, N.H. 03103.

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DOCS is quickly and simply installed on any system. All that the user need do is catalog the DOCS distribution tape to his Core Image library, define where the DOCS hard copy file is to be located and execute DOCS. Total installation time required is under 10 minutes.
DOCS functions concurrently with EDOS, GRASP, DOS/MVT, DOS/RS, POWER II, ASAP, POWER/VS, and ITEL's DOS/VS executing on a S/360 and will enhance the system operation by providing improved facilities for the use of these packages while DOCS is controlling SYSLOG.
DOCS is currently used in over 250 installations world-wide including diverse businesses and US Army bases.
DOCS is available from CFS, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

SPEED
DOCS provides significant through-put improvement by the very nature of the speed of the 3277 display unit alone. Operators can even pre-answer messages on the console.

MULTIPLE CONSOLES
DOCS allows from 1 to 16 3277 display unit consoles to be used simultaneously as SYSLOG devices.

MULTIPLE OUTSTANDING REPLIES
DOCS permits messages followed by Reads to the typewriter to remain unanswered without tying up the system. All outstanding Reads are shown in high intensity on the display console(s).

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DOCS does away with any need for the Console Buffering option in DOS or DOS/VS thus providing a savings in the core required by the users' supervisor as well as greatly reducing significant overhead to the entire system. Experience has shown that total through-put improvement with DOCS installed may approach 10% to 20%.

ELIMINATES DEPENDENCY ON TYPEWRITER
DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is asynchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLST.

NO USER PARTITION REQUIREMENT
DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

MULTIPLE EXTERNAL INTERRUPT KEYS
DOCS provides a separate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a background partition problem program. A unique interrupt key is provided for each DOS/MVT region.

ICP Million Dollar Club

Send requests for DOCS to CFS. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:

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'IFPS' Utilizes Matrices To Study Financing Plans

AUSTIN, Texas — The Interactive Financial Planning System (IFPS) from Execucom Systems Corp. was designed to answer "what if" questions by working with one or more matrices compiled from user input.

The user defines a model by specifying the source of data for matrix rows and columns and how this data is to be manipulated: The IFPS Executive subsystem lists, copies, combines, consolidates and deletes models and data files.

In contrast, the modeling subsystem drives the analysis and editing of individual models under user-specified commands.

The user can build, edit and maintain data files in a third subsystem while a fourth, the report generator facilities, allows creation and editing of output formats.

Monte Carlo

The Modeling Language subsystem performs risk analysis via Monte Carlo simulations, a technique that entails solving a problem for each set of parameters derived from user estimates or certain distribution functions, Execucom said.

The user can determine probable effects of hypothetical changes in his environment by employing these Monte Carlo solutions as summarized in histograms, a normal approximation table, a frequency table or other forms.

Current IFPS versions run on IBM, Honeywell Information Systems, Inc., Univac, Burroughs Corp., Digital Equipment Corp. and Control Data Corp. CPUs, the spokesman said.

The system can operate in either batch or interactive modes on any CPU with sufficient available memory, a Fortan IV compiler and, for interactive use, suitable time-sharing software, he said.

IFPS costs $28,000 including documentation and the first year's maintenance. Installation and training costs an additional $2,000, Execucom added from 3409 Executive Center Drive, Austin, Texas 78731.

'OWL' Eases DOS Programming

ATLANTA — The On-Line Without Limits (OWL) package from NCI, Inc. is said to provide unique program development support to users in an IBM DOS/VS environment running under CICS. An OS/VS version is planned for later this year.

OWL permits programmers to have complete freedom in text manipulation, NCI claimed, since its CRT control module allows the programmer to move the display not only up and down to the desired line of coding, but right and left to the particular phrase, word or character of interest, all with a single command.

Another feature — labeled the Toggle Switch — gives the programmer the option of concurrently displaying different areas of a program, file or report in either a full or split-screen format. Direct cursor editing is also an OWL feature, an NCI spokesman noted.

Beyond that, the Dynamic Recall feature provides the ability to summon prior program versions at a single command and to highlight the most recent changes. On the other hand, the spokesman added, a multilevel password system provides a unique security mechanism so OWL's capabilities cannot be utilized by unauthorized people.

Currently the DOS/VS CICS implementation costs $6,450. It can be ordered from NCI, 6075 Roswell Road N.E., Atlanta, Ga. 30328.

Space Manager Gains Upgrade

BROOKFIELD, Conn. — Version 3.0 of the Adas disk space management package from Universal Software Inc. is said to provide IBM DOS and DOS/VS installations with two additional features: Alternate Volume Allocation (AVA) and Automatic Secondary Allocation (ASA).

The basic software is a transient-driven system that assigns disk space (when a file is Opened) from available areas on a pack, eliminating the manual task of locating unused space.

AVA allows the user to establish "pools" of alternate volumes where files can be allocated if the original pack does not have enough space. These pools can be set up on a system, partition or even a job basis, a spokesman noted.

ASA allocates additional space if the original extent is exhausted, preventing job cancellation for "no more available extents."

Version 3.0 is available now under rental plans starting at $150/mo, the spokesman said from the vendor offices in the Brookfield Office Park, Rt. 7, Brookfield, Conn. 06804.

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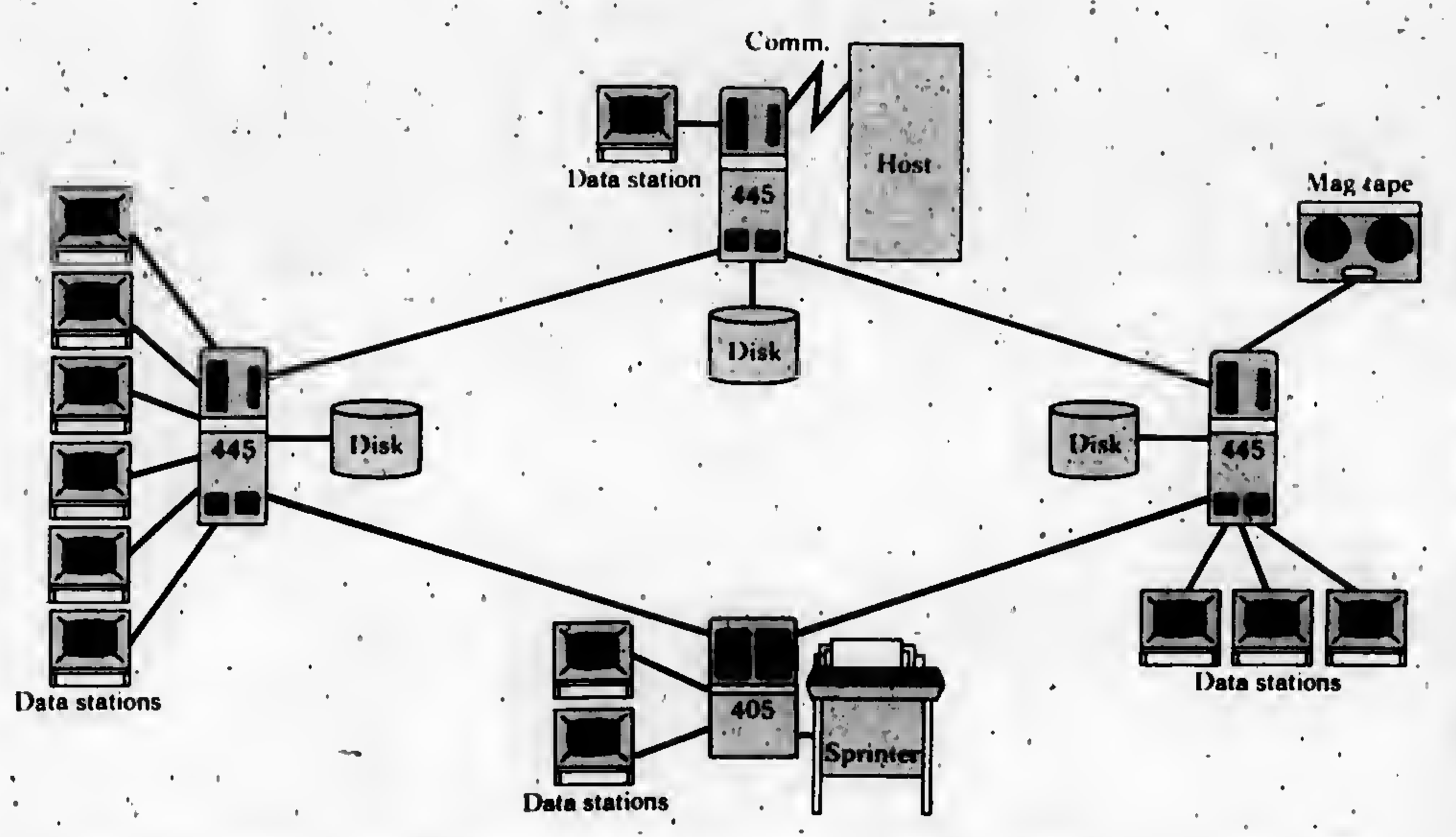

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Technologies Linked — Part I

Economists Given User Languages, Data Bases

By J. Harvey Trimble Jr.
Special to CW

The Bureau of Labor Statistics (BLS) has coupled two maturing technologies — problem-oriented languages and the data base approach — into a system that allows the economist who has little or no computer training direct use of the computer as a research tool.

When applied to the problems of storage, retrieval and analysis of economic time series, these two technologies generally complement one another and have been combined by the BLS into a system for data analysis and retrieval of labor statistics [Labstat].

The problem-oriented languages used include Statistical Analysis System (SAS); Statistical Package for the Social Sciences (SPSS); Time Series Processor (TSP); Table Producing Language (TPL); and Macro Data Language (MDL). SAS and SPSS are multipurpose statistical analysis systems that provide a wide variety of statistical operations and substantial data manipulation facilities. TSP is a system for economic analysis and econometric modeling.

TPL is a system for cross-tabulation developed by the BLS and currently in use by nearly 175 other organizations. MDL is a tool developed by the Federal Reserve Board that provides facile interaction with time series data and limited analysis and display facilities.

Collectively, these languages provide a full range of analytical and display services to the economist, yet they require very little or no procedural description of how the problem is to be solved. In other words, once the user has mastered the language syntax, he need only experess the "what is to be done" part of the problem and not "how to do it." This frees the user from dealing with the mechanical computer-oriented aspects of the problem and lets him concentrate on the intellectual aspects.

Several examples of the simplicty of these languages should help provide some insight into how they assist in the analytical process. The two MDL statements to compute over-the-month percent change in the Wholesale Price Index for farm products from January 1976 to January 1978 and create a table of the results are:

```
CHANGE: FARM WUP01 7601 7801
TABLE: FARM 7601 7801
```

The first statement computes the over-the-month percent change in farm products for the period January 1976 to January 1978 and stores the percents in a new time series labeled FARM. The second statement prints a table of the percent change. The language has quite a simple and self-descriptive syntax that facilitates learning and usage.

The SAS statements to perform factor analysis on the annual total U.S. unemployeemnt rate, U.S. average consumer price index, wholesale price index for all commodities and total nonagricultural employment from 1960 through 1977 are:

```
PROC FACTOR;
VAR UNEMPLOY CPI WPI EMPLOY;
```

For each variable, these two statements will produce the following outputs: means and standard deviations, correlation matrix, prior estimate of communalities, communality estimates and eigenvalues of the correlation matrix.

Clearly the user must be familiar with the language to understand what will be produced, but given that background, the user can generate a large volume of statistics.

Data Base Approach

The data base approach provides the only missing element to these problem-oriented languages — well organized and uniformly stored data. The Labstat data base contains 66,000 time series from 16 different BLS surveys consisting of more than nine million observations.

Included are series on consumer prices, wholesale prices, employment and unemployment and productivity measures. The data is stored together under the Cincom Systems, Inc. data base manager Total, which permits the direct retrieval of any one of the 66,000 time series.

Thus, interactive access to the data is supported, permitting economists to retrieve and interact with the time series data from any one of more than 160 computer terminals located throughout the BLS.

The languages are coupled to the Labstat data base in such a way that users need not concern themselves with extra steps of retrieving and for-

(Continued on Page 32)

you
and conquer.

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CMG Units Plan Meetings

Two separate regional chapters of the Computer Measurement Group (CMG) are planning meetings at 10 a.m. next Wednesday, May 17. The Northeast CMG will meet at the Mitre Corp. in Bedford, Mass., while the Midwest CMG will be at the GSI Building, 222 N. Dearborn St., Chicago.

The Massachusetts session will hear representatives of Mitre discussing "performance engineering and life cycle management" and a "synthetic benchmark evaluation of a data base management system." A representative of Chase Manhattan Bank will describe the bank's computer production control system, and BGS Systems will outline some case studies in capacity planning.

The Midwest group will hear William Hersh of IBM/Chicago present a tutorial on a simulation technique for modeling computer systems for forecasting, followed by summaries of what various CMG members are doing at their companies.

Both groups welcome anyone interested in measurement and evaluation work and registration fees are minimal, but spokesmen ask attendees to contact them ahead of time to arrange seating and meals.

Midwest CMG can be reached through Stephen A. Gierach, Executive Compumetrics, Inc., 15308 Cherry Lane, Oak Forest, Ill. 60452; the northeast group through Jeff Buzen, BGS Systems, Inc., P.O. Box 128, Lincoln, Mass.01773.

User Languages, Data Bases Linked for Economists

(Continued from Page 31)

matting data to mesh with the requirements of the tool. This coupling is accomplished either within the language itself or externally using another problem-oriented langauge for data base maintenance and retrieval called Tailored Retrieval and Information Management (Trim).

The internally coupled languages are MDL and TSP. Both have a syntax that facilitates conversational sessions, and because of their connection to the data base, they can be used in that fashion from computer terminals.

The externally coupled langauges use Trim to retrieve and reformat data from Labstat into a physical organization that best suits the respective language. Trim permits the retrieval of data from Labstat either by the user supplying a list of specific time series codes or by having the user specify selection criteria for retrieval of a subset of Labstat time series.

In either case, Trim performs the necessary operations to navigate through the data base and to restructure the selected time series into a format best suited for the target language. The Trim statements to couple SPSS, SAS and TPL to the Labstat data base are stored in a common library and are automatically invoked whenever these languages are used.

In his next article, Trimble, who directs the Bureau of Labor Statistics group that developed Labstat, will discuss user reactions to the system.

Patent Data Base Added by CDC

MINNEAPOLIS — A centralized data base for individual inventors in the U.S. and abroad has been added to Control Data Corp.'s Technotec line of network services.

The International Inventor's Registry (IIR) lists patents issued in solar energy, agriculture, food processing and other technologies beneficial to developing nations. To subscribe to IIR, inventors must have a patent issued in one of the above fields.

The patent must be currently recognized by the U.S. or a foreign government and accompanied by an English translation if granted abroad, according to a CDC source.

To record an invention in the IIR, arrangements can be made with CDC headquarters here or with any CDC representative throughout the world.

The cost of listing a patent for one year is $100, the firm said from Minneapolis, Minn. 55440.

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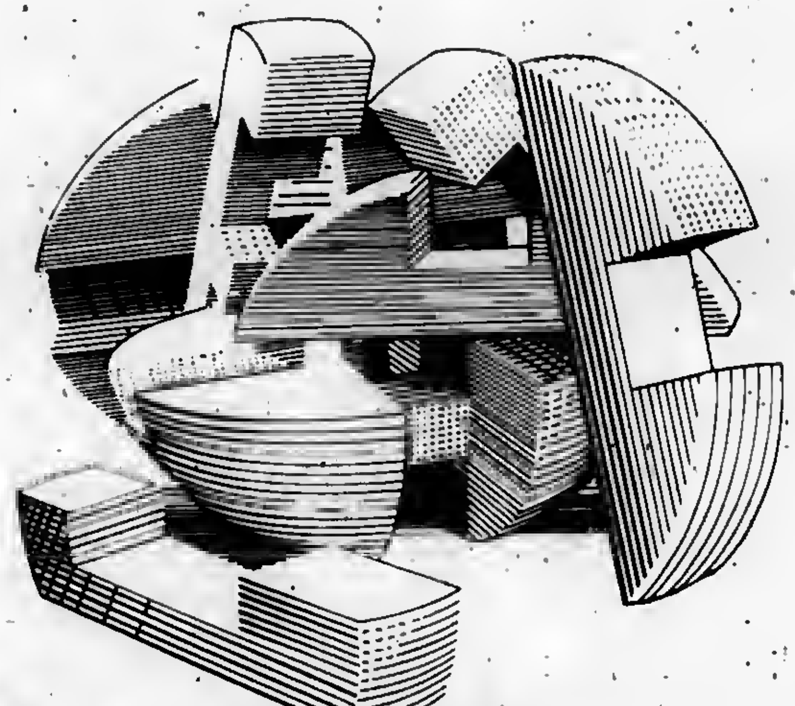

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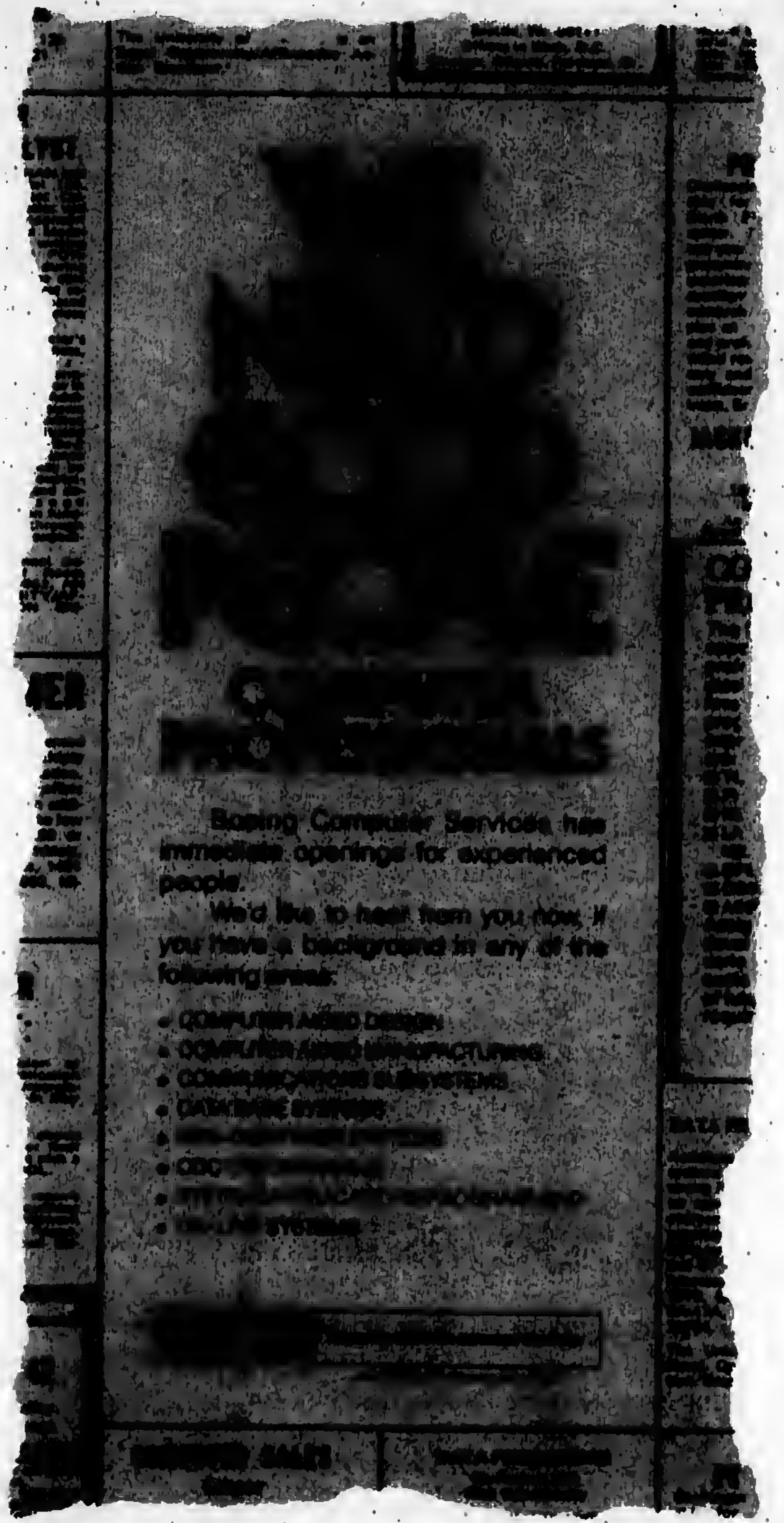

Checklist Shows if APL Is Suitable Language

By Joseph Schengili
Special to CW

The other day I was asked by a friend how I determine whether a proposed application should be written in APL. My friend manages the systems group of a company that has just installed APL on its computer in Toronto.

He has heard the productivity claims made for APL if used for the right applications. But what are the right applications? As a long-time user of APL, my instinctive reaction to his question was, "Well, it's obvious."

On reflection it is not so obvious. It is a rather complex decision that must take into account current and anticipated user needs, APL installation features, alternative processors, conflicting systems and trade-offs. To come to grips with the issues requires not only considerable knowledge of computer systems, but also firsthand experience in APL programming.

Quite frankly, while my friend manages a small but first-class systems group and has many years of DP experience, his experience in APL goes not much beyond the IBM salesman's pitch on the wonders of VS APL. Yet, as manager of the systems group, he has to direct the use of APL within his company.

After giving my friend's case some thought, I prepared a questionnaire for use in assessing the suitability of APL to any proposed application. This rather simplistic questionnaire is shown here. As you can see, there are 10 questions and four possible answers for each question.

APL SUITABILITY QUESTIONNAIRE

	x1	x2	x3	x4
1. The naed tor user interaction with the system Is:	☐ none	☐ little	☐ high	☐ mendatory
2. Trensaction processing volume Is:	☐ vary high	☐ high	☐ medium	☐ low
3. The run frequency Is:	☐ daily	☐ weakly	☐ Intermittant	☐ yaerly
4. Tha life cycle of the system Is:	☐ two or more years	☐ one year	☐ e few months	☐ one shot
5. The progrem logic and systems flow Is:	☐ trivial	☐ ordinary	☐ complex	☐ very complex
6. The epplicetion eree Is:	☐ tried and trua	☐ well defined	☐ Innovative	exploratory
7. The system Interects:	☐ heavily with Batch	☐ only with Itself	☐ some with APL	☐ heevlly with APL
8. The expected CPU load Is:	☐ very high	☐ high	☐ medium	☐ low
9. Tha system completion terget dete Is:	☐ long range	☐ neer future	☐ urgant	☐ In penic moda
10. The programmer's exparlance In APL Is:	☐ none	☐ rudimentary	☐ varied	☐ axtensive

To use the questionnaire, read each question and check the box that most clearly describes the proposed application. Then count the number of boxes checked in each column and multiply each of the four numbers by the appropriate weight 1, 2, 3 or 4.

Finally, sum the resulting values to obtain the APL suitability quotient (ASQ). The lowest possible ASQ value is 10; the upper limit is 40. The higher the ASQ, the more suitable the proposed application to an APL approach.

You can further quantify your decision-making by establishing an APL suitability threshold (AST). The ASQ for a proposed system would have to be equal to or greater than the AST before it could be considered for an APL approach.

Josef Schengili is president of Numetrix Ltd., a Toronto-based consulting firm.

Vendor Backs Package Use On Varied Configurations

BERKELEY, Calif. — Argonaut Information Systems, Inc. has implemented its software packages — the A.S.A.P. payroll/personnel system and the A.S.A.P. accounts payable system — on a wide range of hardware, and users have stretched the range even further.

The payroll/personnel system supports more than a dozen pay categories and as many as 20 nontax deductions per employee. Utilizing the Taxbreak module, which is available as a separate package, it handles both federal and state tax calculations including interstate transfers, the firm said.

Labor distribution, Equal Employment Opportunity reporting and personnel history are also managed by the system, which runs on IBM 360/370s, Burroughs B1700/B1800s and B3500/B3700s, Digital Equipment Corp. Decsystem-10s and -20s; Univac 90/30s and General Automation, Inc. GA-16s. This system costs $6,500.

The accounts payable system, which costs $5,000, provides automatic selection of invoices due based on standard vendor terms — but with an override capability in case of need.

It runs on the same range of CPUs as the payroll system with the exception of the DEC equipment.

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NATIONAL —SPECIAL LEAR SIEGLER ISSUE—

INFORMER

May 8, 1978

DEMONSTRATORS CONVERGE ON ANAHEIM

Dumb Terminal To Have New Smarter Brothers

Page 10

★ ★ ★

What has Project X Done with Garry Strohmeyer?

Page 20

★ ★ ★

Project X Blueprints Recovered

Page 75

★ ★ ★

Are Petrodollars Behind Project X?

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★ ★ ★

Ballistic Printer: Tougher in the Long Run

Page 82

★ ★ ★

Government Denies Involvement With Project X

Page 37

DEMONSTRATORS SWARM

Horde of Anaheim demonstrators, retreating from unsuccessful frontal assault on LSI HQ. Project X personnel remained barricaded inside.

Primed by Lear Siegler's super-secret Project X, and the upcoming National Computer Conference (NCC), thousands of curiosity-seekers, demonstrators, and disbelievers are already swarming into Anaheim.

LSI was caught unawares by the sudden human tidal wave, doubtless spurred by last week's INFORMER exclusive on the project's new ADM 31 and ADM 42 computer terminals. As a result, Lear Siegler HQ has pulled up its drawbridges and is, in effect, under siege. While hundreds of anti-Project X demonstrators parade through its parking lot, LSI continues to work on its clandestine project behind sealed doors.

Initiated as a means to attain complete mastery of this year's NCC, Project X has been from the beginning a mystery wrapped in an enigma. Rumors of two new smart terminals, a stupefying new printer, and even a benumbing data system have filtered down to us here at the INFORMER through various sources, who shall remain anonymous.

Although a tight lid of security had been clamped over Project X, the INFORMER was able to penetrate the cloak of official secrecy surrounding it, and to obtain exclusive information regarding yet another stunning device: the 300 Series Ballistic™ Printer.

Our agent, planted deep in LSI HQ, confirms that the 300 will have a 180 cps, bi-directional capability, will be microprocessor-controlled, and come with programmable formatting. More information was unavailable, as the line suddenly and ominously went dead as our agent was in mid-sentence. Before he was cut off, however, he had been whispering urgently that an optional 2048 character buffer would also be available with the 300. This electrifying option will provide full CRT screen buffering for up to 1920 characters, if our informant's information proves correct, and we at the INFORMER have every reason to believe it will. His last words over the phone were that the wondrous new 300 will, of course, use LSI's already-legendary Ballistic print head.

As sparse as these facts may seem, Project X comes into a little sharper focus with these glistening tidbits of information. It seems clear, as well, that only a corporation of LSI's stature could hope to bring about such a coup in the computer industry as the 300 Series Ballistic Printer. Only a firm committed to providing what users need, and eliminating frivolous bells and whistles, would dare to market devices that are at once cost-effective and highly competitive.

If the ADM 31 and 42, and 300 are only three of the wonder devices nearing completion at LSI, and these are but a few of their attributes, what other mind-wrenching mechanisms does Project X have in store? How will anyone be able to compete with Lear Siegler at the NCC? Is total domination of the industry now Project X's goal? Or will it go so far as to attempt

(Please turn to Page 13, Column 3)

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Shareable Data Bases Key For Effective Mapmaking

By Allan H. Schmidt
Special to CW

Traditionally, maps have been primarily used as descriptive devices to help communicate the results of a study or to include with a report as an illustrative tool. With the advent of computer mapping more than a decade ago, however, the door was opened to use maps, especially thematic types, as a direct part of the analytical process.

Whether it relates to population, land use, soil fertility, health statistics or anything else, the computer-constructed map offers its users the same advantages of data reduction expected of any other graphic representation. It makes readily comprehensible data that would be difficult to interpret in tabular form.

Today there is a growing community using computer-generated maps, with the federal government and educational institutions in the vanguard. Certain federal agencies, such as the U.S. Geological Survey (USGS), the Defense Mapping Agency and the National Oceanographic and Atmospheric Administration, are directly involved with computer mapmaking as one of their principal functions.

Other agencies, such as the Bureau of the Census, perform mapping as only a secondary activity, albeit an important one. Working closely with the various governmental agencies has been the academic community, typified by Harvard University's Laboratory for Computer Graphics and Spatial Analysis.

Last October, the Harvard laboratory sponsored an "Advance Study Symposium on Topological Data Structures for Geographic Information Systems," cosponsored by the USGS.

Common Approach Needed

In the course of the meeting, attendees recognized the growing need for a more common approach to the design of geographic data bases among organizations having similar needs. Information gathered by any one organization and stored in its data base often could not be applied with any ease or confidence to the needs of other organizations without restructuring or adding information.

True, incompatible data bases are not a unique problem. But, in this instance it proved especially perturbing because so many of the data bases were being developed to support federal or national programs. Clearly it would be beneficial for data base designs to permit their application to any of a variety of geographic programs.

Since the data in question is truly a national resource, we must work toward improving its accessibility and utility for all potential users on all levels. It takes but a brief glance at a few projects to appreciate the value of common federal cartographic data bases for displaying geographic information in map form.

For example, the Bureau of the Census developed a topological data structure for use in creating its Dual Independent Map Encoding (Dime) files, which describe polygonal features such as city blocks. Inherent in setting up these files were considerations of how to detect and correct errors automatically in the data base at the time of creation and also to permit use of the cartographic data base in computer mapping.

The topological structure finds its primary application in situations involving predefined zones or regions of any size or shape that can be exhaustively partitioned. In this context, users can map not only land use, but also vegetation, health statistics, national boundaries and industrial distribution, for example.

Because of the wide applicability of the topological data base concept, other organizations, such as the USGS, have also adopted it. The USGS is working on a Land Use Mapping and Data Analysis (Lumda) project built on the notion of the topological data strucutre. This file carries all X-Y coordinates needed to plot out land use areas with continuous boundaries across the entire U.S.

For reasons not unlike those of the Bureau of the Census and USGS, Harvard's laboratory has focused its NSF-funded research on the further refinement of topological data structures. This research has led to the development of software to support a geographic information system.

As reported at the symposium, the most significant aspect of this work was the ability to merge, for the first time, two different cartographic data files into a single data base. This capability allows the merging of two or more different subjects that occupy the same region, albeit with different geographic distribution in that region, e.g., land use and soil type. Furthermore, the software allows queries of the newly created, unified data base.

In addition to the topological data structure approach, there is also another school of thought that records geographic information using a gridded data base that relates information to uniform cells superimposed over a given geographic region. In this category falls the National Aeronautics and Space Administration, for example, which has a massive data base produced by satellites.

Certain geographic phenomena — such as rainfall, natural resources and atmospheric conditions — that do not lend themselves to partitioning into finite regions are frequently handled on a gridded data base. At the symposium, several papers discussed the integration of this approach with the topological data structure — certainly another important issue.

With all of the data being collected or already collected by federal organizations, it becomes obvious how much the mapmaking and map-using communities could benefit if only the various data bases had enough in common to allow for a single cartographic definition of various geographic entities.

Clearly, creation of a national cartographic data base would reduce duplication of effort in data gathering and would open new opportunities for the correlation of diverse, but related geographic information. The benefactors of such sharing would extend beyond the federal establishment to such areas as business, industry and education.

Schmidt is executive director of the Harvard Laboratory for Computer Graphics and Spatial Analysis.

Says $100 Unit Coming in Fall

Modem Maker Eyes Cost Breakthroughs

By Ronald A. Frank
CW Staff

ROCKVILLE, Md. — Modem technology is moving in interesting directions that will lead to significant cost savings for users, according to Joseph Scarpa, vice-president of marketing at Penril Corp.

Today's low-speed modems in the 300- to 1,800 bit/sec range typically cost about $325 to $375, but a breakthrough is coming, Scarpa predicted. Penril is working on a modem chip that will give users the flexibility to change transmission speeds and add diagnostics and other options, he noted.

This basic 300 bit/sec modem on a chip will cost "under $100," Scarpa said, adding such a device is not far away at all. In fact, he pointed out, Penril plans to announce such a unit at the Tele-Communications Association (TCA) in late September.

The LSI chip is already available in limited versions and is being supplied to selected customers for operation at 600- and 1,200 bit/sec. Most features and speeds will be added to the basic modem on a chip by plugging in additional circuit boards, allowing users to configure the exact modem capabilities they need, Scarpa said.

Modifying the LSI modems will be a simple matter of plugging in circuit cards, and this will be done by the users, according to Scarpa, who said deliveries of the first LSI modems will begin in about one year.

Small User Support

Penril is interested in providing modem devices for small users, a sector which many products miss because of economic considerations, he said. The company recently introduced a 2,400 bit/sec modem with built-in diagnostics that can provide network monitoring at lower cost for smaller users.

Called the Diagnostic Controlled Modem (DCM), the unit has manual capabilities instead of the automatic diagnostics performed by larger network monitoring systems. The DCM was designed for the smaller user with a network up to 10 or 15 lines or a total of about 170 modems operating on multidropped lines who can usually not cost-justify an automatic diagnostic capability, Scarpa said.

A DCM controller can share diagnostics over four to six lines and provide network monitoring less expensively than other systems, he added. Scarpa said a four-line DCM system with four controllers and 40 DCM remote units, for example, costs $66,088 from Penril; a comparable system from Racal-Milgo would be priced at $81,500.

In general, users can realize a savings of about 25% with the Penril system because the controller is built into the modem unit, he said.

Penril will also unveil at the TCA show a diagnostic controlled, microprocessor-based modem operating at 4,800 bit/sec which Scarpa said will be an adaptively equalized modem. The company introduced a similar unit about three years ago, but it proved to be ahead of its time and never really worked in a polled environment, he said.

The latest device, to be called the 4800DCMM, will be similar to the 2,400 bit/sec DCM, but it will have multiple microprocessors and include more network diagnostic features. A private-line version will be the first unit offered; a dial-up version will follow.

First deliveries of this modem will begin next January, Scarpa said, noting both Bell 208 and CCITT compatibility and the capability to scramble data will be among the modem's features.

Scrambling capabilities will soon become more important to the data user, Scarpa forecast. It would not be unexpected if the National Commission on Electronic Fund Transfers were to require that certain types of data be scrambled to remain secure, he added.

Intelligent Terminal Activated By Users Speaking in English

ANAHEIM, Calif. — Interstate Electronics Corp. has introduced an intelligent voice terminal that enables operators to speak directly to computers, in familiar English terms, via microphones or ordinary telephones, according to a spokesman.

In some cases, such as verifying telephone-entered data, the computer talks back, repeating the words and figures spoken to it or asking for clarification, he added. The terminal significantly increases the overall accuracy of data entered into data bases since errors can immediately and easily be corrected at the source, the spokesman said.

The system operates with a single operator station vocabulary of up to 900 words, or a 250-word vocabulary for each of four channels, or stations, plugged into the same processor, permitting source data to be entered in the terminology associated with the operator's task, he noted.

Further, because data is entered into the computer by voice, coding, keypunching and other manual means of entering data are eliminated, the firm said.

The unit has a flexible control program in high-level language, allowing the user to write his own applications software without modification to the host computer, the spokesman said.

The basic terminal is comprised of an input/operator feedback station, an intelligent controller (user-programmable processor), an asynchronous output or control interface and executive software. It can be expanded to handle up to four user input stations simultaneously, provided with a voice

(Continued on Page 39)

Net Speeding Judicial Process For Florida's Pinellas County

CLEARWATER, Fla. — Heeding the time-honored counsel of the 18th century English jurist William Blackstone that "justice delayed is justice denied," Pinellas County has instituted a computer-based network to help speed and streamline the judicial process in this fast-growing area on Florida's central Gulf Coast.

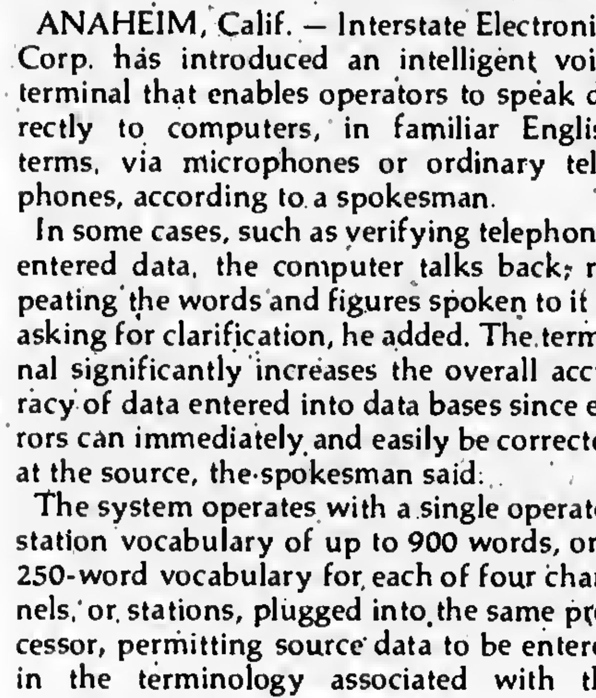
Nearly 60 CRTs or printers are installed in every key element of the Pinellas County Justice Information System — the courts, clerk of the court, state attorney, public defender, parole and probation and law enforcement — allowing officials to follow the progress of every adult offender or case through the criminal justice process.

The system makes use of 34 Harris Data Communications, Inc. 8170 series CRTs with 1,920-character CRT screens and 26 Harris Model 3115 120 char./sec line printers, "with more being added every day," according to Steve Long, system coordinator.

Through a special alert status report, the system automatically alerts court officials to potential lapses in the judicial process by highlighting the names of persons who have not been arraigned or have not been brought to trial within legal time limits.

Similarly, a computer-prepared 24-hour arrest list and a daily jail status report prevents inmates from being "lost" in the judicial system, a spokesman said.

(Continued on Page 39)



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Key-to-Disk System

Net Manages Multiple Sites, Users and CPUs

BEMIDJI, Minn. — At seven locations in the Minnesota State University organization, remote terminal systems are key elements in what officials called a "multinetwork": multisite, multiuser, multiapplication and multi-CPU.

The network uses key-to-disk terminals and card-based remote job entry terminals to provide data entry, batch transmission and output of administrative, financial and student data for more than 30,000 persons in the state university system.

"During the early '70s, our data handling requirements threatened to swamp the punched card and other data entry equipment we were using," Richard Reid recalled. Reid is director of information services for the state system.

After examination of alternative data entry methods and vendors; the Data 100 Corp. Keybatch system was selected and the first installation made here. "Data 100 looked like the best bet. We decided that the overall cost was reasonable, and we were happy with the support reports we got from other users," Reid said.

Terminal Transactions

The current major installations, featuring dual Keybatch/Model 78 systems, are located at the campuses here, and in Marshall, Winona and Mankato. Smaller installations with a single Model 78 are at St. Cloud and the State University Board office in St. Paul. A Model 76 batch terminal is installed at Metropolitan State University in St. Paul.

A typical example of system operation can be found at the DP center at Bemidji State University, one of the earliest installations to use Data 100 equipment. Here, a dual Keybatch/-Model 78 system is on-line to a Univac 1106 in St. Cloud, handling administrative and financial data. This dual system shares a 600 line/min. printer, 600 card/min reader, card punch and 9-track tape drive.

A second Model 78 is on-line to an 1106 in Mankato, providing students and faculty with a program development and teaching facility. This card-based processor has a 600 line/min printer, a 300 card/min reader, punch and tape drive. The predecessor to the Data 100 systems was an IBM 1404 and numerous keypunchers and verifiers.

At the present time, according to Ed Nettestad, director of computer services at Bemidji, there are eight CRT data entry keystations on the Keybatch with four located in the data entry room, one in the terminal room used primarily as a supervising unit, one in the accounting office, one in the financial services office and one in the registrar's office.

Nettestad said the increased data handling capabilities of the dual system have enabled the university to add many jobs to the production schedule. Some departments have doubled the size of their files, which requires faster and more frequent update and report generation.

Training Simplified

Experienced and inexperienced keystation operators have achieved more productive and accurate work habits with Keybatch compared with punched card data entry, Nettestad said. Training of operators has been simplified immensely and operator accuracy rates are very high, he added.

"It's easy for the operators to catch errors because of character, field and record checks the machine makes," he said. Operators can complete a record with fewer keystrokes than before because data constants are automatically entered on a record.

The keystations process each keystroke faster than before and different formats are more easily accessed, he noted.

At Winona State University, computer center director David Forsythe explained his philosophy: "I try to use the computer to its fullest extent to maximize machine efforts and minimize manpower efforts."

Winona State has a configuration similar to Bemidji's, with a dual Keybatch/78 processor on-line to St. Cloud handling administrative and financial data and a Model 78 used by students and faculty. These systems replaced Mohawk Data Sciences Corp. and Honeywell Information Systems, Inc. equipment.

"Keybatch is the kind of system you can push a long way," Forsythe said. He and his staff have developed numerous software packages to enhance and streamline data entry and processing.

Formerly about 80 punched cards containing variable data had to be keypunched and changed daily. The program developed by Forsythe's staff cut the number of cards to one or two. The program fits the data from the cards into the job stream, generating the job control statements that control execution of the program in the mainframe.

The system also includes automatic

(Continued on Page 40)

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Interstate Electronics Has Voice-Input Terminal

(Continued from Page 37)

synthesizer audio response unit and accommodates a number of optional features for computer interfacing, I/O peripherals and mass storage.

Single or multiplexed four-channel Ascii interfaces allow completely interactive operation with "virtually any modern computer or information processing system," the spokesman said.

With Interstate Electronics' telephone compatibility, option, a standard telephone headset becomes a direct voice link with the host computer.

Pattern Classifier

The heart of the voice terminal is an acoustic pattern classifier that produces a digital code in response to a received utterance. The classifier consists of a spectrum analyzer, an analog multiplexer and a analog-to-digital converter, a programmed digital processor, a reference pattern memory and an output interface.

The word boundary detector serves to establish the start and end of each utterance by "experimentally determined criteria." During the training period, the operator repeats each vocablulary word.

After the system has been "trained" to a particular operator's voice, each new pattern from the coding compressor is compared with a syntactically determined subset of all the previously learned reference patterns in memory, the spokesman said.

Accuracy at 99%

At present, the terminal is being tested in a variety of applications by a number of companies; other firms have already put the terminal to work, the vendor said.

In any application, according to Interstate Electronics, the recognition accuracy of the terminal is in excess of 99%. In addition, its syntax processor allows organized vocabulary lists for specific interactions so a rejection rate of 90% to 98% of invalid inputs, including extraneous noise, is achieved, the company claimed.

Price for the basic terminal is $18,750 including software and documentation. Interstate Electronics is at 707 E. Vermont Ave., P.O. Box 3117, Anaheim, Calif. 92803.

Net Speeds Judicial Jobs

(Continued from Page 37)

"This is a total on-line system that uses a single data base and eliminates most of the manually prepared forms that formerly took days to move from one point to another," according to Harold Mullendore, clerk of the circuit court

Information is entered directly into the county's central IBM 370/155 from terminals at user locations. This data is consolidated into a comprehensive status report of the individual or case, providing up-to-date information for authorized users anywhere in the system.

Key elements of the system are a computer-prepared court calendar, a case progress docket and a case status summary. For parole and probation functions, the system lists parole officer caseloads with the ability to transfer one, more or all cases between officers.

In addition to automated booking procedures, law enforecement officers can check the computer for outstanding wants or warrants, either local, state or federal.

The system's reconfigured International Communications Corp. (ICC) Model 4600/48 modems, running at 4,800 bit/sec, have been "very reliable," according to Long. "We've had excellent success with them. They've been tremendous."

Front-ending the system is an IBM 3704 communications controller. Teleprocessing software is IBM's CICS, with Btam and Vsam. All programs are written in Ansi Cobol, Long said.

To help ensure data security and protection of information within the system, all users must identify themselves with special passwords. Also, any changes to a case or an individual's records are identified by who made the change, and the date and nature of the change.

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Processor Lets College Expand Net, Cut Costs

Terminal Transactions

WARWICK, R.I. – Rhode Island Junior College here has increased the number of terminals its system can handle and decreased the cost of adding communications lines by installing a Memorex Corp. 1380 communications processor.

The 1380 has also reportedly improved system checkout and made line switching a simple keyboard entry operation.

The Department of Computer Resources at the college serves a student body of approximately 10,300 at two campuses. At the main campus, the department runs five CPU partitions under DOS/VS on a 1M-byte IBM 370/138 CPU.

At the second campus is a 96K (16-bit word) Digital Equipment Corp. PDP-11/34 system.

The complementary computing systems of hardware and software within the department are currently providing instructional interactive problem solving, using Basic Plus and Fortran IV; on-line inquiry and data entry for a variety of data base files, using IBM's CICS/VS with Cincom System, Inc.'s Total; computer-assisted instruction including remedial or tutorial classroom presentation, using IBM's Coursewriter III; and other applications.

According to Paul Bartolomeo, director of the Department of Computer Resources, "When we reached the full capacity of our hard-wired terminal controller at 96 lines, we began shopping for more versatile equipment. We discovered that by leasing a Memorex 1380 communications processor, we could handle a maximum of 240 terminals and do it at less than our current costs."

A teleprocessing partition uses approximately 30 lines for administrative inquiries into the college's student-oriented data base. The data base consists of 13 Total files and contains the full history of student activity at the college.

All major offices and departments have terminals that permit access using CICS/VS to the data base under certain file security restrictions.

Fitted into the DP operations are two background partitions for production batch processing such as payroll and accounting records for the college as well as a large local school district. Additional processing is performed for the second campus in Lincoln.

It is planned that the PDP/11 system will be used, along with its mathematics problem-solving network, as remote job entry station to the 370/138 with the Memorex 1380 handling communications over leased lines.

"With our multiplexed communications between the two campuses, the CRT console on the 1380 gives us a better way to check the system up and down the lines and to determine vendor responsibility whenever a problem occurs. The communications unit makes it easy to display what is going on with a communications line or to switch lines internally without bringing the system down," Bartolomeo said.

Network Serves Multiple Users

(Continued from Page 38)

report generators and automatic file loading, which ensures that a batch enters the proper file on the 1106 without intervention by the operator, Forsythe noted.

At Southwest State University, where the Data 100 equipment replaced a 32K IBM 1132 system, Director of Computer Services Duane Herrick keeps five keystations in the computer center to handle processing, with a sixth keystation located in the business office.

"The volume we can handle in a day has increased tremendously," Herrick said. "Before, the operators were continually buried." The volume at Southwest, the smallest of the state schools, amounted to 20,700 separate runs on the administrative Keybatch system last fiscal year and 11,000 runs on the Model 78 that handles student and faculty programs.

This "academic" system has been a closed shop operation, with students and faculty handing their source documents to DP center personnel. Later this year, however, the Model 78 will become a hands-on tool for academic users in computer language teaching and software writing, Herrick added.

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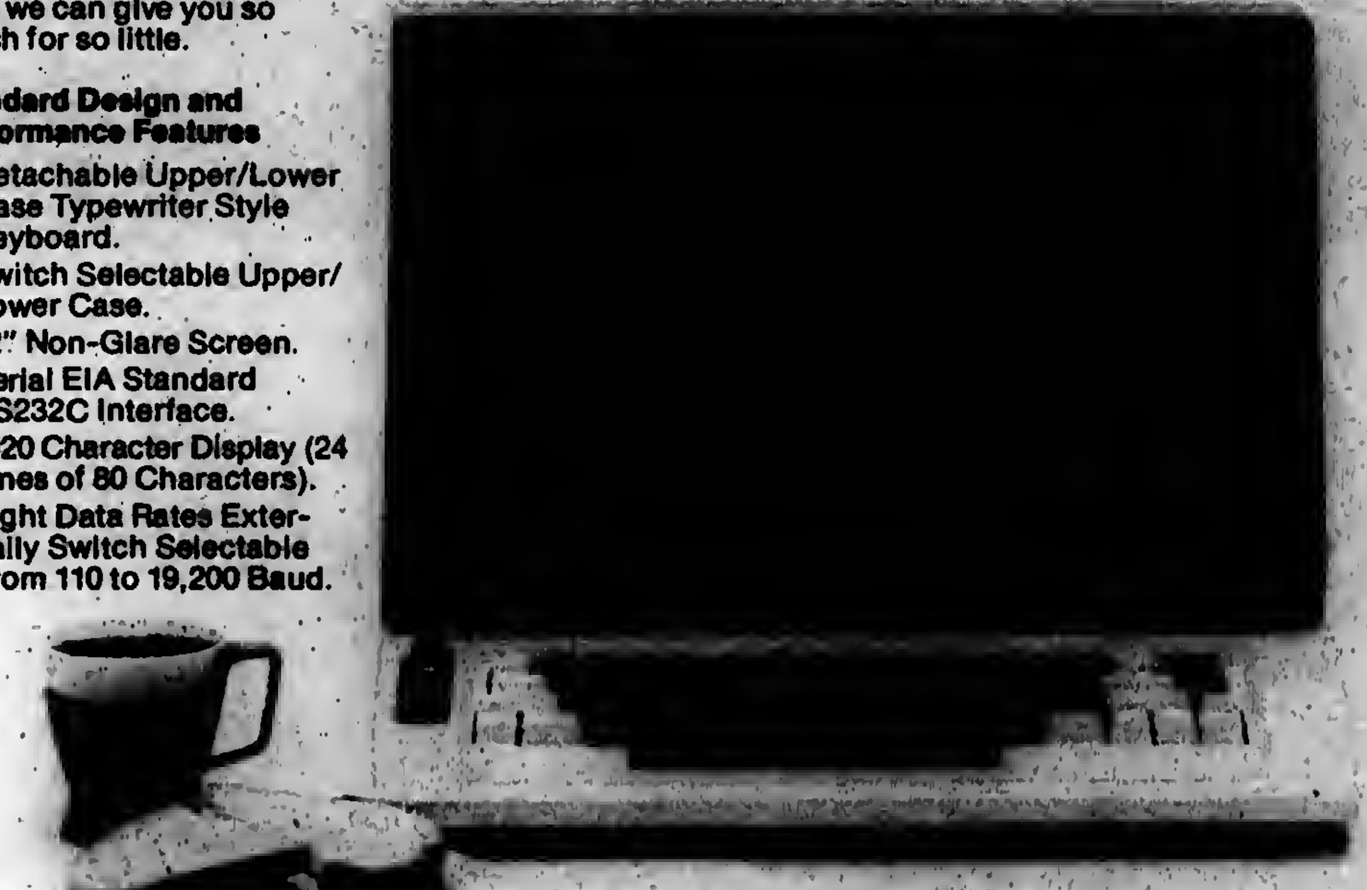

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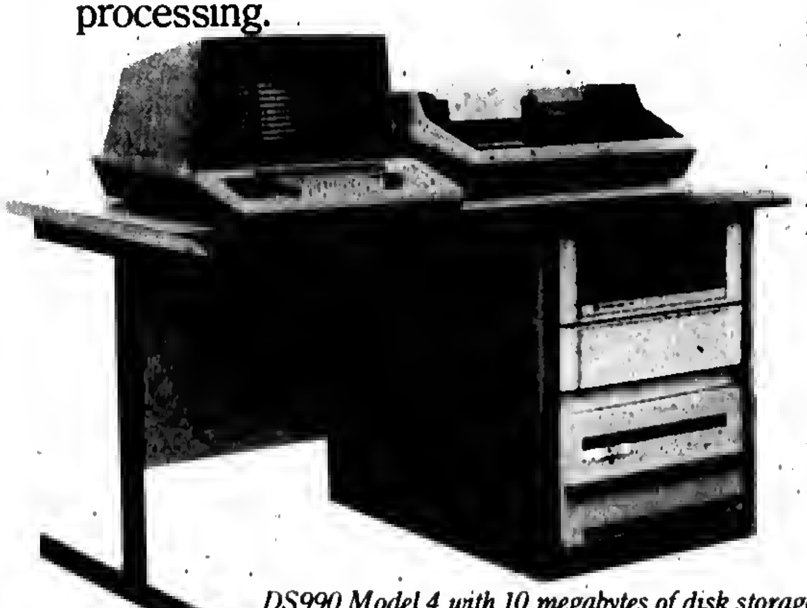

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Elsewhere, consult your White Pages. For literature, write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001.

TEXAS INSTRUMENTS.

Plasma Display Works in Rugged Environment

ANAHEIM, Calif. — A second-generation, rugged-environment plasma display terminal is available from Interstate Electronics Corp.

The PD 3000's software includes a real-time, high-level macroinstruction set that provides subroutines for display control, alphanumeric display, incremental and vector graphics. Custom software and engineering are also available, Interstate said.

Features of the PD 3000 include standard alphanumeric and graphics capability, inherent panel memory (requiring no refresh), single-point write/erase, constant spot size, low operating voltage (less than 150V and a no-flicker image. The terminal has standard Ascii keyboard commands for the operator, dual EIA RS-232C compatible interface ports and optional high-speed parallel I/O facility, according to a spokesman.

Utilizing a 16-bit parallel high-speed microprocessor with a 330 nsec execution time, the unit is able to write a worst case (longest) vector line in 10 msec. Normal address rate is 50,000 dot/sec on a 512 by 512 line display, an official said.

The plasma display terminal consists of six functional replaceable modules including a plasma panel, drive electronics, control electronics, display processor containing interfacing circuits, power supply and keyboard.

The terminal operates by receiving signals from an external CPU or its own keyboard, then interpreting the signals and displaying commands received, performing the addressing, formatting and control operations required and displaying the requested functions on a plasma panel, Interstate said.

Optional capabilities include high-speed parallel I/O (190,000 char./sec), additional function key controls, touch panel, special keyboard, random-access memory installation and read-only memory expansion for programmable character set, scrolling, editing, high-speed data storage and hard copy, the firm said.

Interstate said it supplies the user with comprehensive software that includes subroutines for display control, alphanumeric display, incremental and vector graphics.

The software package is available in computer-independent macroinstruction set, a Fortran IV and Dartmouth Basic display library and a Fortran IV terminal exerciser. A programmer's quick-reference summary guide is included.

Cost of the PD 3000 is $12,000 from Interstate Electronics Corp., 707 E. Vermont Ave., Box 3117, Anaheim, Calif. 92803.

AT&T to Extend Dataphone Link To Six Cities

BEDMINSTER, N.J. — AT&T will expand its Dataphone Digital Service to the first six of 42 additional cities scheduled for the service.

In a filing with the Federal Communications Commission, the company said the six cities are Tulsa, Okla.; Seattle, Wash.; and Anaheim, Inglewood, Mountain View and Oakland, Calif.

Currently available in 24 cities, Dataphone Digital Service is a private-line digital data communications service operating at five speeds between 2,400 bit/sec and 1.544M bit/sec.

The 42 additional cities were approved for the service by the commission last March and all are scheduled for operation by early 1979.

Course to Focus On DDP Design

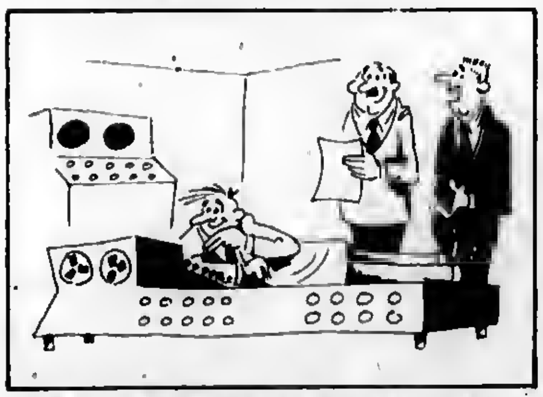
NEW YORK — The Yankee Group will sponsor an intensive two-day seminar entitled "Telecommunications Networking Strategies for Distributed Processing Applications" here May 24-25.

Among the speakers will be Dr. James Martin, who will discuss a technique he helped develop that automates the data base design process.

The goal of the seminar is to provide specific implementation experiences that should help users avoid the pitfalls of others and to "elucidate the migration paths from here to there" in implementing distributed processing, a Yankee Group spokesman said.

Other featured speakers include Dr. Dixon Doll of the DMW Group, Burleigh Cook from Fairchild Camera & Instrument Corp., Ray Topkis of Equitable Life Assurance Society and Howard Anderson of The Yankee Group.

Price for the seminar is $550 for an individual and $450 for each additional attendee from a company. More information is available from The Yankee Group, Harvard Sq., P.O. Box 43, Cambridge, Mass. 02138.



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Megatek Graphics System Features 32-Bit CPU

SAN DIEGO — Megatek Corp. has announced the Megraphic 7000 series of intelligent refresh graphics systems and terminals that feature longer graphic word length, a 32-bit bipolar, bit-sliced microprocessor, self-contained refresh memory, a "more versatile" interface and "advanced" expandable hardware, according to the firm.

The interactive graphic system delivers performance available only in machines costing 40% more, a spokesman claimed.

An interface enables the Megraphic 7000 to be connected to Digital Equipment Corp. PDP-11 minicomputers in addition to Data General Corp.'s Nova and Eclipse, with which the existing Megagraphic 5000 is compatible, according to the spokesman.

The "advanced hardware" features allow the addition of such optional features as rotation, zoom, scale and clip as well as standard features such as hardware blink, translation and dashed lines, the company said.

Basic System

The basic graphics display system includes a rack-mountable chasis with 12-slot mother board, graphics processor and vector generator, 2K of 32-bit-word random-access refresh memory and a direct memory access (DMA) interface to the user's host CPU.

Standard DMA interfaces and software modules are available for DEC's PDP-11 Unibus and Data General's Nova and Eclipse minicomputers, according to the company. A universal interface, which provides the logic required for the 1000's internal bus structure, simplifies connection to other minicomputers, the firm said.

A full complement of interactive devices such as data tablets, joysticks, light pens and digitizers is available, according to the spokesman. An intelligent input peripheral control unit services these devices, reducing the burden on the host CPU, the company said. Incremental and electrostatic plotters are available for hard-copy output.

A Megraphic 7000 system can be made compatible with Tektronic 4010 and 4014 Series terminals, the firm said.

Available Software

The Megraphic 7000 is shipped with software commensurate with the hardware configuration. The standard Megatek Graphics Software (MGS) features Fortran-callable graphics subroutines.

Included are capabilities such as selective erase, clipping, windowing and zoom.

The Megraphic 7000 is currently in production. Prices start at $20,000 to $25,000 from the firm at 1055 Shafter St., San Diego, Calif. 92106.

Watches Voice, Data Issues

Firm Providing Reports on FCC

BOSTON — A monthly reporting service on Federal Communications Commission (FCC) activities in the regulation of voice and data communications is available from Economics and Technology, Inc. (ETI).

Called "FCC/Watch — Telecommunications," the service includes a binder containing "Overviews" of FCC dockets on major voice and data issues, an ETI spokesman said.

Monthly updates provide a chronological listing of docket-related "Event Summaries" reporting all FCC, court and legislative actions plus related comments extracted from more than 60 news and trade publications, the firm said.

All research and reporting is performed by ETI's telecommunications economists, engineers and analysts, according to the spokesman.

Issues covered in the publication include tariffed products and services such as the multipoint private line (MPL), Dataphone Digital Service (DDS), Message Telephone Services (MTS), Execunet, MPL, Wats and Mobile Telephone Service (MTS), as well as long-standing issues such as the AT&T antitrust case and the Computer Inquiry, the spokesman said.

The 12-month subscription fee for the service is $275. ETI is located at 101 Tremont St., Boston, Mass. 02108.

Telxon Has Wand Option

BATH, Ohio — A wand scanning option is now available with Telxon Corp.'s Model 717W portable data entry terminal. This system features a pen-type optical scanner weighing less than 4 oz.

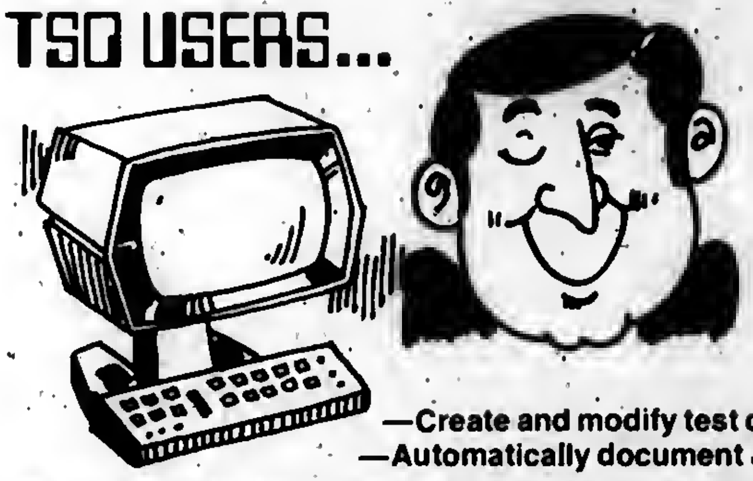
When the wand's optical tip is swept across the bar code label, the coded information appears briefly on the readout and then is stored in the solid-state memory, according to a spokesman.

The wand can read Plessey and Codabar codes at speeds from 3- to 30 in./sec, the firm said.

Additional data can be entered into the Telxon 717W system via the hand-held terminal's keyboard, allowing both wand and keyed data to be subsequently recorded in the 717's 32K random-access memory, a spokesman said.

The overall system can record information for subsequent data transmission over ordinary telephone lines to a centralized location for processing.

Price for the 717W terminal with wand option is $1,350 from the firm at Ghent Sq., Bath, Ohio 44210.



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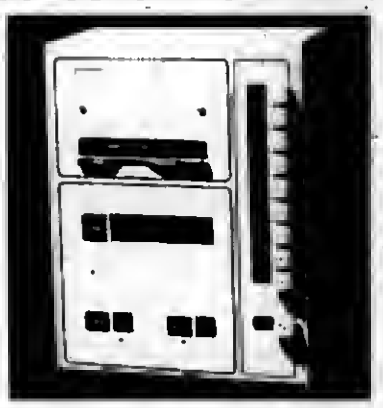

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Double the Previous Power

Mohawk Adds Top-of-Line DDP System

PARSIPPANY, N.J. — Mohawk Data Sciences Corp. (MDS) has introduced the most powerful member to date of its Series 21 distributed data processing (DDP) systems.

The System 21/50 is hardware- and software-compatible with the 21/40, MDS' previously most powerful model, but the 21/50 offers twice the processing speed, twice the memory and twice the local file storage capacity of the System 21/40 and the entry-level System 21/20, MDS claimed.

The 21/50 utilizes multiple microprocessors and an interlaced memory system, a spokesman noted.

A "virtual" keystation allows the system to handle up to three concurrent tasks, including one "background" task such as batch communications with a host CPU or media conversion, he said. A System 21/50 with one operator station can handle one foreground and one background task concurrently, he added.

The system can execute programs written in Mohawk Business-Oriented Language (Mobol), an English-like language compiler that permits custom validation during source data entry or multifunction local processing. Mobol programs written for the System 21/40 will also run on the System 21/50.

Major components of the 21/50 include a 250 nsec CPU, one to four operator stations, one to four diskette drives and peripheral devices including printers, magnetic tape drives and hard disk drives.

The controller console houses the CPU, main memory expandable from 64K to 128K in 32K-byte increments, integral diskette and hard disk storage and all of the electronics required to support the operator stations, including peripheral device controllers and data communications adapters, the spokesman said.

Mohawk Data Sciences System 21/50

The controller console can accommodate four diskette drives with capacities of 242K bytes each or two diskettes and an inte-

(Continued on Page 48)

Used Systems Cited as Upgrade Option

By Frank Vaughan
CW Staff

PENNSAUKEN, N.J. — Users of medium- and large-scale systems rarely switch to an incompatible product line because of heavy investments in software. In today's market, however, this does not mean users have no alternatives when they need to upgrade, according to a report from Auerbach Publishers, Inc.

The report, "Snapshot of Used Computers," notes that an IBM user, for instance, can obtain IBM CPUs not only from IBM, but from third-party leasing firms, used computer brokers and dealers, as well as from "plug-compatible" processor vendors.

Users of other manufacturers' systems do not have plug-compatible processors as an alternative, but they can also deal with third-party leasing firms and used computer brokers, the report stated.

"DP managers who have upgraded or converted to new hardware are saddled with the problem of what to do with previously purchased but unneeded hardware. The used computer market represents the only way to sell for cash, considering that the alternatives are simply scrapping the machine or donating it to some nonprofit institution, perhaps as a tax-deductible gift," Auerbach pointed out.

"Many DP executives are becoming aware of the advantages to be gained through buying or selling on the used equipment market. For the buyer, on the other hand, the potentially huge cost savings in used hardware acquisition may justify the risk and effort," the report noted.

The report covers three broad topics related to used computers: the advantages and disadvantages associated with used equip-

(Continued on Page 48)

Offshore Data Conversions Cheaper

By Norman Bodek
Special to CW

GREENWICH, Conn. — As personnel costs skyrocket, more and more firms are sending very large data conversion projects overseas in an attempt to reduce those costs.

Firms have found it is expensive to automate large manual files on a one-shot basis. A company would have to obtain the additional equipment and hire extra people on a temporary basis just for the conversion. After the conversion, the problem would be what to do with the extra equipment and people.

But firms going overseas for data conversions have different concerns — primarily accuracy, turnaround times, loss of source material and language barriers.

As in dealing with any outside vendor, it is up to the user to ensure and specify the highest degrees of quality. Most "offshore" companies offer fantastic accuracy guarantees ranging from 99.5% to 99.95% or higher.

It is up to the company ordering the conversion to determine just what these guarantees mean. There is a great difference between errors on strokes or errors on records. An accuracy guarantee of 99.5% on strokes would mean one error out of 200 strokes; the same guarantee on records would represent an error rate of one out of 8,000 strokes.

Once the user understands the accuracy guarantees, methods can be developed to ensure the accuracy. For example, vendors could be financially penalized for not meeting accuracy guarantees or could be required to reverify the entire work until standards are met.

It is not too difficult to program and select a random sample of the received data, visually checking the results against the original source material to determine the accuracy. Also, the vendor's track record could be checked by calling past clients.

Loss of Material

Loss is another potential problem that can be eliminated. Usually only copies of the original material are sent overseas. The best and least costly method of copying the material might be microfilming, which can be done at the user site with a minimal

(Continued on Page 48)

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Used Systems Provide Upgrade Alternatives

(Continued from Page 47)

ment; the market; and guidelines for both buying and selling used hardware.

IBM's "used" computer base consists of about 68% of its installed base of approximately 75,700 systems, the report said. It broke down the base as follows:

- About 10,000 installations of 370/-135, 145, 155, 165 and 195 systems.
- About 22,600 installations of the System 3 models 6 and 10.
- About 13,300 installations of 360 systems (first delivered between 1965 and 1971.
- About 3,200 installations of the 1130 (first delivered in 1966).
- About 1,300 installations of the 1401 (including the 1401, 1401G and 1401H).
- About 900 other installations, including the 1410, 1440, 1460, 1620, 7010, 7030, 7040, 7044, 7070, 7074, 7080, 7090 and 7094 (first delivered between 1960 and 1963).

"There are about 38,400 non-IBM installations, including both 'new' and 'used' systems — a total number significantly lower than the total of about 51,300 'used' IBM computers," the report claimed.

In the section on "Risks and Rewards of Used Equipment," the report noted there are only a limited number of options available to users considering ways to dispose of excess hardware.

Hardware rarely commands more than a few hundred dollars in scrap metal value. Although some of the earlier first-generation machines with mercury-delay lines may fetch somewhat more, scrap value rarely covers more than removal costs.

Donating old equipment to a nonprofit institution can gain the user's organization some favorable publicity and goodwill, but few tangible economic benefits, the report said.

Selling — if a buyer can be found and the selling value is higher than the scrap value — provides a virtually risk-free alternative, Auerbach suggested. There are, however, substantial difficulties in selling used equipment, even with the aid of a broker, it warned.

"For the prospective buyer, the advantages of the used equipment market are not so readily apparent and are far more difficult to evaluate," the report contended. The prospective buyer must consider the financial impact of purchasing used equipment, as well as examine a number of noneconomic factors such as reliability, maintenance, the risk of technological obsolescence, the reactions of key personnel and scheduling and configurations.

Used System Market

The "Snapshot" also provides information on "used" systems, that is, systems first delivered five or more years ago and since replaced by newer versions or an upgraded product line and released from their original leases.

The report's coverage emphasizes IBM, with detailed reports on the 370/135, 145, 155 and 165 and on the System/3 models 6 and 10 as well as popular older systems from other manufacturers such as the Burroughs [Corp.] 700 family, the Honeywell [Information Systems, Inc.] 6000 series and the Univac 9000 series."

The report sells for $39.95 from Auerbach at 6560 N. Park Drive, Pennsauken, N.J. 08109.

Cheap Conversions Found

(Continued from Page 47)

disturbance of the working files.

Microfilm offers protection against loss, and a user can always visit the vendor's site and determine that the work is safeguarded and understood.

Some overseas companies are offering seven-day completion of the work. Others need a minimum of two to three weeks to turn around the data. The limiting factors for the user are time lost in shipping the data and the size of the project.

The language barrier can be a problem, but many of the "offshore" companies are in English-speaking areas. Problems in this area will most likely arise on jobs that require interpretation by the operators and a knowledge of English. If the vendor is given ample time, the operators can generally be properly trained on most jobs.

Most of us are creatures of habit and like to follow the way that has served us best in the past. We are very reluctant to experiment with something new, such as sending work overseas. However, today there are probably over 2,000 operators in foreign lands keying work exclusively for American companies.

Bodek is president of Norman Bodek & Associates, an independent consulting firm. He is also president of the Data Entry Management Association.

Mohawk Line Gets More Power

(Continued from Page 47)

gral disk drive able to store up to 20M bytes.

Operator stations include 1,920-character CRTs and movable keyboards available in data entry or typewriter layouts.

Binary synchronous and synchronous data link control protocol adapters will be available for use on the System 21/50, which supports remote batch communications with host CPUs via IBM 2780/3780 protocol.

The system reportedly supports concurrent communications in background mode at speeds to 4,800 bit/sec and freestanding communications to 9,600 bit/sec.

An entry-level System 21/50 configuration leases for $477/mo, including maintenance, on a one-year contract. It sells for $14,950. Such a system includes a controller console with 64K bytes of memory, one operator station and one diskette, the firm said.

A 64K-byte System 21/50 with two operator stations, one diskette drive, 10M-byte fixed disk, a 45 char./sec printer and communications interface leases for $657/mo on a three-year contract, plus $176/mo maintenance. It sells for $30,821.

A four-station System 21/50 with 128K bytes of memory, two diskette drives, 20M-byte fixed disk, 340 line/-min printer, 25 in./sec magnetic tape drive and communications interface leases for $1,225/mo on a three-year contract, plus $343/mo maintenance. It sells for $58,869.

Deliveries of the System 21/50 are expected to begin in the fourth quarter from the firm at 1599 Littleton Road, Parsippany, N.J. 07054.

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Distributed Keystations Cut Service's Costs

Special to CW

ARLINGTON, Va. — Rehab Group, Inc., a four-year-old service firm based here, is using a high-throughput, 32-keystation distributed data entry system to meet the demands imposed by a need to input hundreds of thousands of raw documents each week.

At the same time, the use of distributed data entry has allowed the firm to significantly cut its cost per keystation compared with other types of data entry systems.

Typical of the large-scale data entry jobs that Rehab handles is an ongoing project for the Immigration and Naturalization Service (INS). Rehab is updating the agency's files on foreign nationals visiting the U.S. for extended periods of time.

The company takes the basic data in the form of immigration cards collected at various ports of entry throughout the U.S. and produces an updated listing on magnetic tape for INS' data base on aliens. Any information missing from the entry cards is noted in an exception listing run off on a line printer.

Data Entry Dimensions

To handle this task and other production chores, Rehab uses a Pertec Computer Corp. CMC Division CMC 1800 Keyprocessing system with 32 keystations, a 300 line/min printer, two disk drives, two 1,600 bit/in. tape drives and one 800 bit/in. tape drive.

Before installing the Keystation system, Rehab had considered using its time-sharing system for data entry as well as regular time-sharing chores.

However, the time-sharing system could not meet the data entry throughput demands made by applications such as the INS job, according to the firm.

Essentially, the difference came down to system response to operator errors. In the case of the CMC system, Rehab said, system response was instantaneous, allowing errors to be corrected as data characters were keyed into the system.

In the case of the time-sharing system, however, error correction had to wait until an entire record had been keyed. "This increased system overhead and cut throughput substantially," according to Surinder Dhillon, Rehab's president.

"With the CMC 1800, however, throughput had ceased to be a major concern," he added, noting that "multiterminal general-purpose computers simply can't compare with distributed entry systems in this regard."

Edit Checks

The system also gives Rehab the benefit of edit checks that allow operators to verify alpha or numeric data, ranges and other values. These checks are integral to the CMC 1800 system; while they could have been added to the time-sharing system, a Digital Equipment Corp. Decsystem-10, extensive software modifications would have been required.

"That would have cut throughput further by increasing the amount of data communications control needed to process the job, Dhillon noted. "With the 1800, however, everything is right there."

Aside from system performance, several other factors were considered when it came to choosing data entry hardware. The first was service.

"We have been very pleased with the way CMC handled the system once it was installed," Dhillon said. "We have had a little downtime, but nothing that wasn't fixed in a matter of hours."

The vendor also helped out with the software. "It was always there when we needed help," he recalled.

Problems to Hurdle

But overall, achieving the high-volume data entry production was fairly routine for Dhillon, who has had to overcome many problems, both business and personal. Dhillon's private life offers a striking example.

At the age of 16, Dhillon was in an automobile accident that left him riddled with broken bones. Severe rheumatoid arthritis set in after four years in the hospital, leaving him totally disabled except for some control over his left arm and the fingers on his right hand.

After several years of medical rehabilitation, Dhillon enrolled in a self-study program at George Washington University in Washington, D.C. training at home with a used computer he bought for $100.

With the terminal, he gained enough expertise as a programmer to win a few contracts from some small local companies. From there, Rehab has grown to a $5 million operation occupying five floors in two buildings here.

Customers are now primarily federal agencies including the Department of Health, Education and Welfare, the General Services Administration and the Nuclear Regulatory Commission.

Starting with his first programming work, Dhillon has expanded Rehab to offer a full line of services including

(Continued on Page 52)

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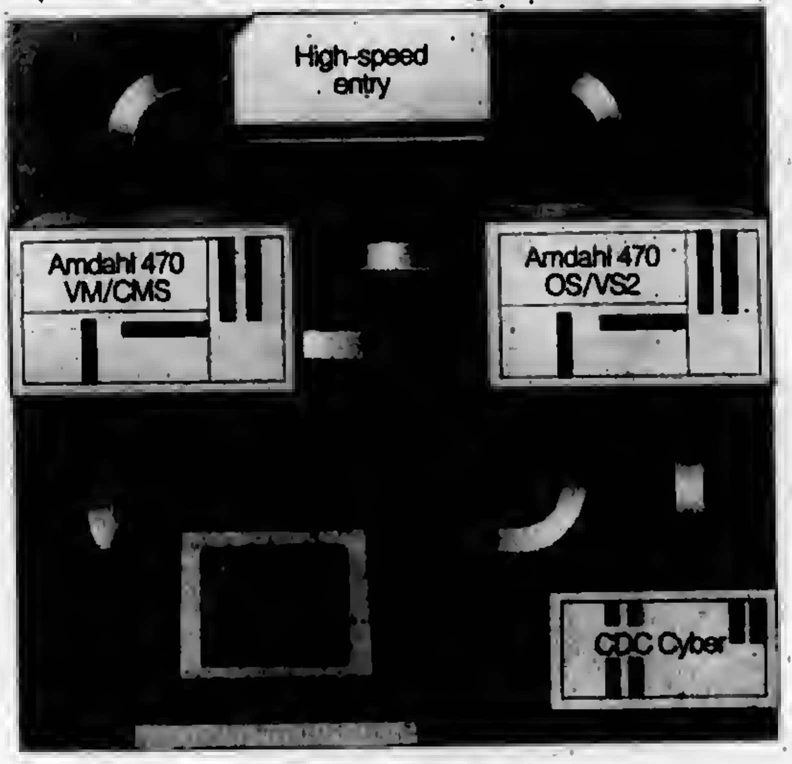

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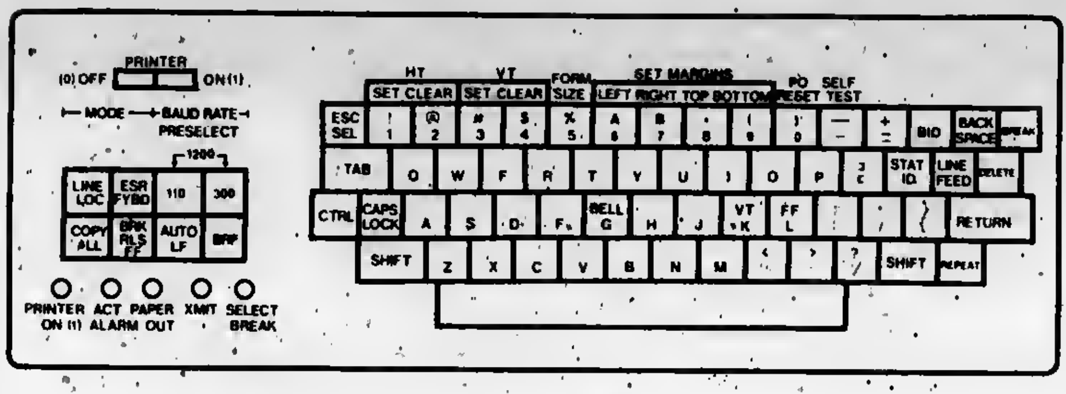

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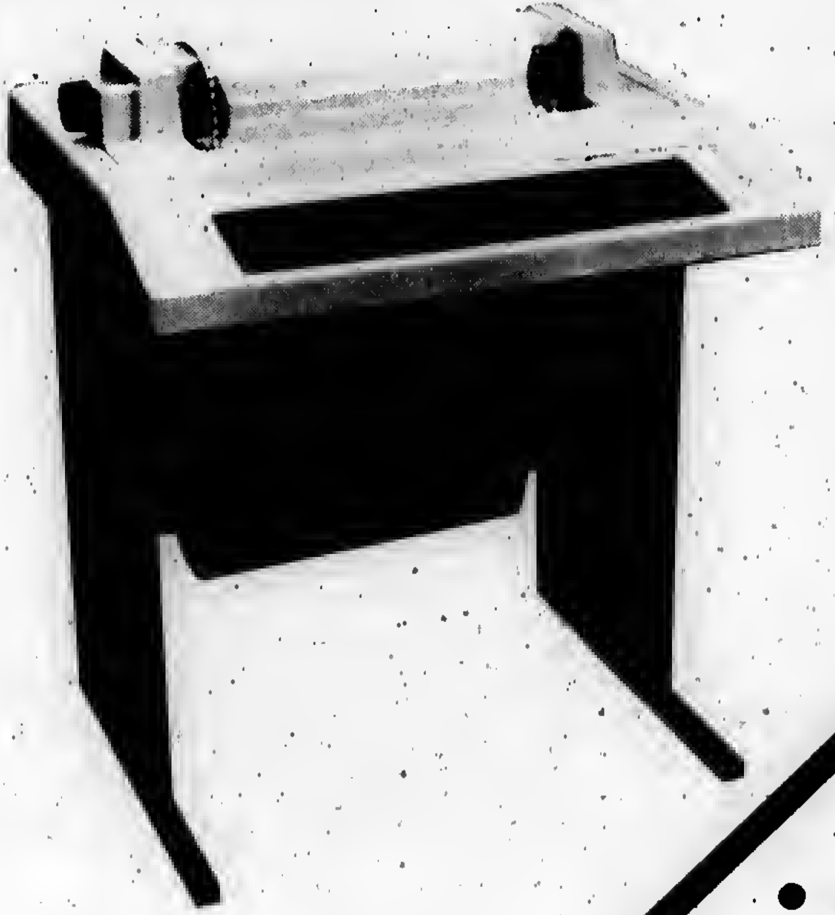

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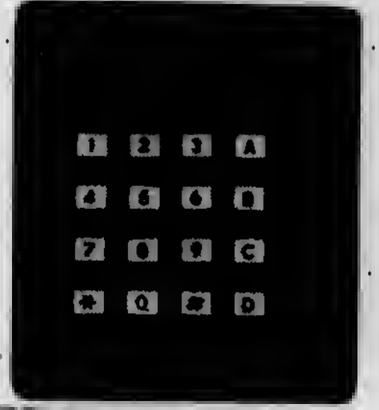

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With CPU Tracking

Group Can Predict Cow's Life-Span

By Frank Vaughan
CW Staff

BRATTLEBORO, Vt. — A nonprofit organization is using a medium-scale, virtual storage CPU to predict the life span and milk production of Holstein cattle. The organization also records information for a subsidiary that exports cattle and frozen semen to foreign countries.

The Holstein-Fresian Association (HFA) of America is a membership organization of dairy cattle farmers that keeps some 20 million records on 6.5 million animals. The data is kept on a linear set of tape files and is processed on an IBM 370/135, according to Abbott Fisher, superintendent of the computer division.

The system, which operates under DOS/VS, is currently configured with six 3420 tape drives, four 3340 disk drives, a 1403 printer, a card reader and punch. It has 144K bytes of memory with 52K bytes waiting to be installed, Fisher said.

In-House Processing

The records were created in-house for the most part, Fisher explained, noting the bulk of HFA's applications center on the registration and transfer of animals. This data must be entered into HFA's animal registry, which maintains the identities of 11 million registered Holstein cattle dating from the first importation of the breed nearly 100 years ago to the current generation.

The second largest chunk of processing comes from the classification program in which HFA preprints classification sheets that are taken into the field by a force of 22 people who score animals on their physical conformations. This information is then keyed in the performance records department and entered into the system, Fisher said.

"We receive data from 10 computing centers around the country. This consists of production records from certain cattle owners who want to participate in our production testing program," Fisher said. "Four times a year we also receive from the U.S. Department of Agriculture data on another group of cattle in a less stringent test program. This usually consists of between 500,000 and 600,000 records,"

Using a medium-scale CPU, dairymen can predict the milk production of Holsteins.

Cow Index

"In addition, we receive a cow index record that is computed for the production on cows, which is about 750,000 records a year. There is also a twice-yearly summary on bulls put together with type summaries computed here and published for the industry in booklet form," Fisher explained.

Once the computer establishes which animals should produce the most milk for the longest period of time, those animals can be selected by farmers for breeding, HFA said.

Commercial Subsidiary

Besides being a nonprofit enterprise, HFA owns a commercial subsidiary for exports. If a country sends the subsidiary certain specifications, requesting a number of cattle whose parents meet certain standards, the CPU can be used to produce a list of the cattle and their owners.

99% Uptime

Fisher noted reliability is a "critical factor" in HFA's operations and with the 370/135 he "finds we have it." The CPU is currently running slightly more than two shifts a day and is powered down between shifts.

In the four and a half years the CPU has been in use, it has had a downtime of "less than .5%"

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Firm Disperses Data Entry Work

(Continued from Page 50)

applications, systems and telecommunications programming, facilities and data base management, real-time and turnkey systems, network analysis and planning, a wide range of educational and training services and, of course, large-scale data entry work.

40% Handicapped

Rehab is also very active in work involving the handicapped, and more than 40% of the company's 200 employees are handicapped.

Dhillon anticipates he and his company will become more involved in work with the handicapped. He is not, however, planning to be handicapped any further by the demands of large-scale data entry jobs.

"The CMC 1800 system has worked out so well," he said, "we're planning to add more."

Reads Salesmen's Reports

Optical Scanner Shines Up Wax Maker's Sales

Special to CW

RACINE, Wis. — By using an optical mark reader to scan its salesmen's call reports, the Johnson wax company here is reportedly getting valuable retailing information from points of sale a lot faster, enabling sales and marketing managers to pinpoint local problems, measure individual productivity and crack competitive efforts.

S.C. Johnson & Son, Inc. markets a wide range of furniture and floor-care products, special cleaners, car waxes, health and beauty aids, air fresheners and insecticides in grocery supermarkets and mass merchandising outlets throughout the country.

Previous Situation

Before Johnson turned to the optical mark reader, salesmen filled out call reports covering their activities each day. Unfortunately, the reports were not uniform, since each salesman emphasized different things. As a result, Johnson management was left with a lot of unanswered questions.

For example, these daily reports looked at a supermarket through the eyes of a salesman, not a customer. A store might not have any "Glo-Coat" on the shelf, but the salesman knew there were cases in the stockroom waiting to be unpacked.

So, according to the saleman, the store was fully stocked. To a customer, however, that store was out of "Glo-Coat." The customer would then buy another brand.

But salesmen's activity reports designed for the scanner look at the stores' shelves from the customers' standpoint, spotlighting items actually on the shelves or at a point-of-purchase display. Besides showing what's on hand, these reports also pinpoint the out-of-stocks.

Eye on the Competition

Along with looking at Johnson products, the new activity reports look at competitive distribution, competitive promotions and competitive pricing. The system gives Johnson management a weekly update on how its product line is doing vis-a-vis competition in the major retail outlets.

With these activity reports, Johnson management can sample 10,000 to 12,000 major outlets in a week's time. To do this in the conventional way — with an audit by an outside company — would cover only a small number of stores — 1,400 to 1,600 — and would take four to six weeks. In addition, it would be expensive.

Every salesman fills out an activity report for each store called on during that day. By simply filling in circles on the form, the salesman identifies the store, the distribution and pricing of Johnson and competitive product lines, and the condition on the shelf.

These reports are sent here,

(Continued on Page 56)

Drum Plotters Get Antistatic Film

WELLESLEY, Mass. — An antistatic, ripple-free drafting film for drum plotters has been introduced by Charleswater Products, Inc.

The film, made of 3.5 mil polyester, was designed to be independent of humidity conditions but produce sharp, distinct lines, a spokesman claimed.

The film is available in several sizes to fit all common plotters, including the California Computer Products, Inc. (Calcomp) 936 and 965 drum plotters. It sells for $80 for a roll 20 yards long by 36.7 in. wide.

Charleswater is at 3 Walnut Park, Wellesley, Mass. 02181.

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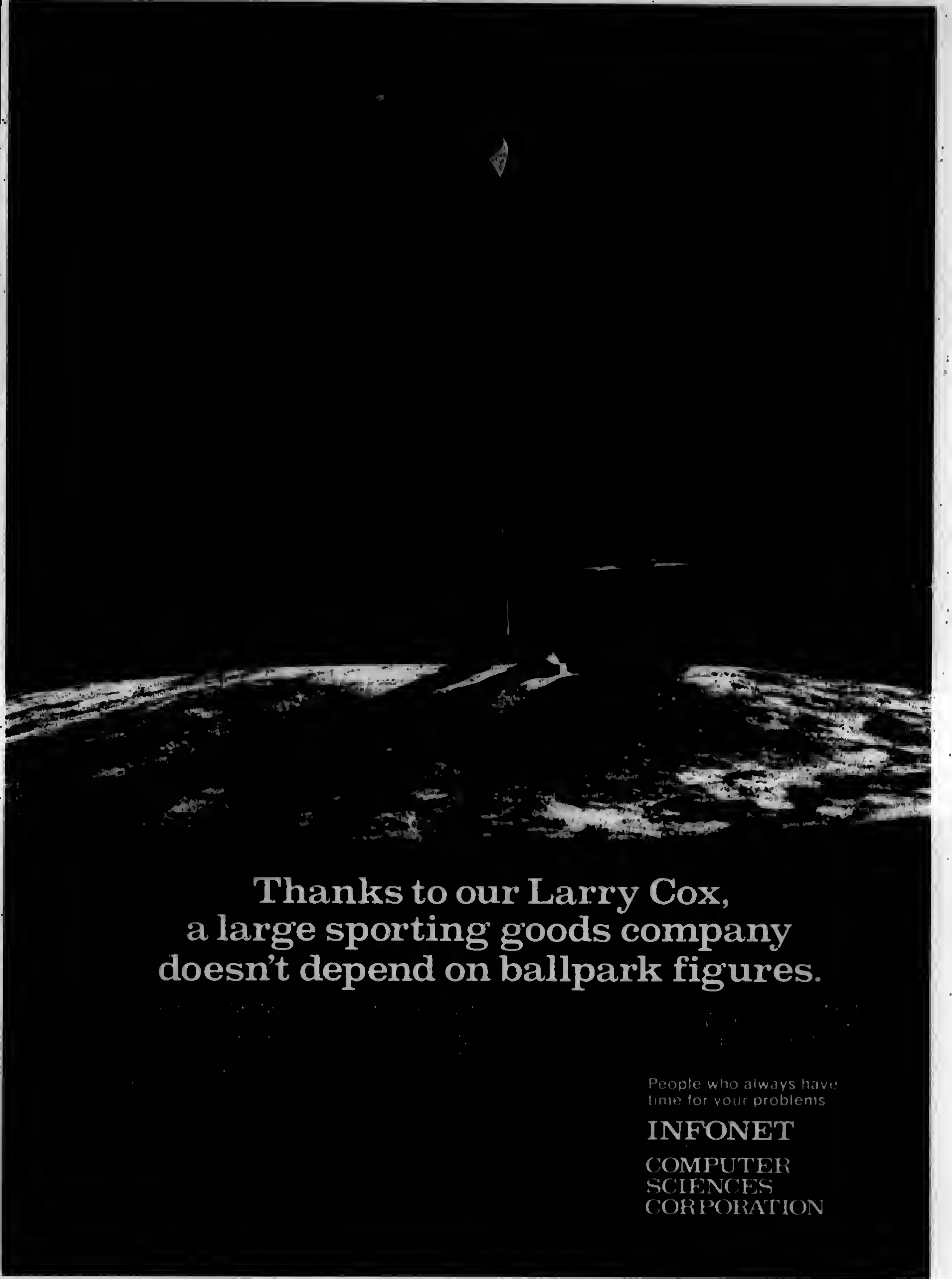

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Prime's family of interactive computer systems offers industry standard software including FORTRAN IV, BASIC, RPG II, COBOL, and a CODASYL-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high-speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes-per-user of virtual memory.

Prime computers are also true multi-user systems: one computer can handle up to 64 simultaneous users in such diverse activities as RJE communications, forms processing, on-line data entry, computational time-sharing, and database management. And the PRIMOS Operating System allows any user to use any language at any time.

For more on how Prime helped ESCO and on how we can help you, write David R. Johnson, Marketing Manager, Prime Computer, 40 Walnut Street, Wellesley Hills, Massachusetts 02181.

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From Designer's Drawing

Graphics System Provides Bill of Materials

SUNNYVALE, Calif. — Calma Co., Inc., has introduced an interactive graphics system that can combine several steps in the engineering process and automatically produce a bill of materials from a designer's drawing, according to a spokesman.

The Computer-Aided Design for Engineers and Constructors (Cadec) system, built around a 16-bit Data General Corp. Eclipse 230 minicomputer, was designed for use by architectural, civil, electrical, process, mechanical and instrumentation engineers.

Core Size

The system comes with a minimum core size of 32K bytes (the maximum is 256K) and can accommodate up to four disks of 80M- or 320M bytes. In addition, there are standard interfaces for flatbed plotters and 9-track, 800- or 1,600 bit/in. tape drives, Calma said.

After a designer has produced a drawing at a CRT terminal, the Cadec system automatically counts the number of parts, lengths and other details in the drawing and processes this data for subsequent use by other personnel involved in the design process, the spokesman explained.

System Features

Features of the system include the abilities to produce a line by specifying its endpoints, to place graphic and text information precisely on a drawing and to give immediate feedback on an attached CRT, he claimed.

In addition, the system can display isometric and perspective views as well as top, front, side and auxiliary views.

Prices for a minimum configuration, which includes one disk drive, one plotter, one tape drive, one input station with an 11- by 11-in. tablet or digitizer and software, start at $200,000. Calma is located at 527 Lakeside Drive, Sunnyvale, Calif. 94086.

Information is digitized and entered into the Cadec graphics system, which incorporates a Data General Corp. Eclipse 230 minicomputer.

Versatec Printer/Plotters Designed for Rugged Sites

SANTA CLARA, Calif. — A family of militarized printer/-plotters from Versatec, Inc., is said to deliver a 132-column printout and full graphics at speeds ranging from 500- to 1,000 line/min from computers or CRT terminals.

Each of the six models in the 7000 series uses a nonimpact electrostatic writing technique and features a self-aligning backplate electrode writing head, toner channel and paper cutting assembly, the firm said.

All printed circuit cards plug into a common printed circuit backplane. The power supply is mounted on one plug-in card.

An Ascii 96-character set is standard; a scientific/engineering 124-character and a typesetting 128-character set are optional. Font styles include standard Gothic and optional Roman, Courier and custom fonts.

The series was designed and tested to meet military specifications for temperature, shock, vibration and noise. They can be applied in such areas as strategic and logistics control, tactical command, telecommunications and mapping, a spokesman said.

In desktop or rack-mountable models, the units range in price from $18,000 for a printer only to $19,500 for a multifunction printer/-plotter. Versatec is at 2805 Bowers Ave., Santa Clara, Calif. 95051.

Optical Scanner Puts Glow On Sales of Wax Maker

(Continued from Page 53)

where they're collated by territory, then put through a National Computer Systems (NCS) Sentry optical mark reader. This reader can scan up to 3,600 reports an hour, extracting information and putting it on magnetic tape.

The tape is fed into a CPU that analyzes the data, then runs a printout or stores it in memory for subsequent processing.

It takes the Sentry scanner less than four hours to process the 15,000 activity reports received each week, according to a Johnson spokesman. Results are immediately available to top management; they go out to the field a day or so afterward.

Johnson officials point out that actually the Sentry scanner doesn't do anything an army of key entry operators couldn't do; the scanner simply does it far faster and at far less cost.

Working with the CPU, the Sentry scanner can sieve out facts that might be overlooked or be too expensive — in time and money — to uncover. It helps monitor distribution of new products, meshing merchandise flow with marketing effort.

And it helps the salesmen boost sales of existing products and accounts, Johnson said.

The scanner is also an excellent sales management tool, the spokesman noted. Printouts show each salesman's calls, sales, display setups and overall effectiveness, enabling management to flag potential problems and to give credit where credit is due.

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HP Official Says

Desktop Computer, Mini Differ Widely

By Jeffry Beeler
CW Staff

PHILADELPHIA — Much confusion has arisen recently about the distinction between desktop computers and minis, but many basic differences separate the two classes of equipment, according to Fred Bode, marketing manager of Hewlett-Packard Co.'s Calculator Products Division.

Although both desktop computers and minis use basically the same technology, they take very different approaches to optimizing that technology, Bode explained during a seminar at a recent conference here. They also serve fundamentally different types of users, he noted, although their applications do not differ substantially.

Focusing primarily on scientific and technical applications, Bode said desktop computers are optimized to be "friendly" and easy to use, especially for individual users. Desktop computer buyers can easily link programs from cartridges, large disks or floppy disks, edit easily and quickly from their keyboards and execute individual programs in memory with the ability to interrupt and branch to service routines.

Minicomputers, by contrast, are optimized for flexibility, speed, power and multiprogramming, Bode said. Users of this equipment class can execute many programs concurrently in main memory and swap many others automatically from disks.

With the resulting increase in operating system complexity, users can maximize hardware and software performance if they have the expertise and inclination to do so, the marketing manager said.

Differences in Users

Because of the differences in how the two CPU classes optimize their technology, desktop computers primarily suit "professional noncomputer users," whereas minis mainly serve DP experts, Bode explained. In the former category, he included users like "scientists, engineers or business people who are experts in their professions [but who] do not necesarily want to become computer sophisticates."

In the latter category, he included users who "are experts at what they do but [who] in general have developed expertise in the use of computers as well." Such users demand flexible and expandable systems because they attack a much wider range of computing problems than users with little or no DP background, he said.

Bode partly attributed the frequent failure to understand the differences between desktop computers and minis to converging product trends. As desktop computers and minis have grown more alike in performance, cost and size, the line separating the two equipment classes has become increasingly blurred, he explained.

Bode also blamed the confusion on the origin of desktop computers. Most of the current leaders in that product market — Hewlett-Packard, Wang Laboratories, Inc. and Tektronix, Inc. — began as programmable calculator manufacturers.

As a result, "many people still regard [desktop computers] as calculators with considerably less power and capability than

(Continued on Page 58)

[illegible]	[illegible]	[illegible]
Keyboard Access	Immediate	Multiterminal Capability
Languages	Interpretive; Requires No Compiling	Multilanguage Capability; Requires Compiling
Packaging	Integrated Package	Usually Packaged As Stand-Alone System
Upward Compatibility	Can Accommodate Added Memory and Peripherals	Can Expand to Multiprocessor Network Using Same Software
Distributive Systems	Unable to Serve as CPU In Multiprocessor Networks	Can Control Distributed Network
Operating Systems	Program Editing Controlled By Firmware	Software Modules Developed by Executive Packages
Operating Personnel	Requires Little Training to Program And Operate	Requires Systems Manager With Specialized Training

Contrary to popular user opinion, many basic differences in product characteristics separate desktop computers and minis.

Take Vendor Claims With Salt, Microdata Executive Advises

By Jeffry Beeler
CW Staff

PHILADELPHIA — Consultants and other disinterested parties have long warned users to challenge minicomputer makers' glowing sales claims, but now the advice comes from one of the vendors — and in unusually hard-nosed language.

"Be an extremely tough negotiator when you're in the market for a system, and make sure you get your vendor's key guarantees in writing," Jack Bertch, Microdata Corp.'s vice-president, warned prospective minicomputer owners at a recent seminar.

Although the DP industry is slowly shedding its reputation for unreliability and inadequate service, "caveat emptor still applies to hardware acquisition, and it will never disappear completely," Bertch said.

Outlining some pointers first-time users should keep in mind when selecting a minicomputer system, Bertch stressed the importance of not underestimating installation costs. "Estimate the total amount you will have to pay for your new system, then double the figure because no matter how carefully you try to predict your expenses, unanticipated costs will invariably arise," he said.

In choosing a prospective hardware supplier, users should list every capability they expect from a reliable vendor and then rate the available candidates in each performance category, Bertch recommended. Some of the selection criteria most frequently mentioned by companies that have already installed minicomputer systems include operating system software, vendor reputation, system reliability, price and field maintenance.

After rating each of the potential suppliers, users should compare their findings with the evaluations of current minicomputer users, Bertch continued.

(Continued on Page 64)

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Plessey Ruggedizes Unit

PHILADELPHIA — Plessey Peripheral Systems, Inc. introduced a "ruggedized" version of its PM-1150/5 computer system at the recent Mini/Micro '78 conference.

Built around a Digital Equipment Corp. PDP-11/34, the PM-1150/5RP provides memory management, hardware multiply and divide, parity memory expandable from 32K bytes to 248K bytes, multilevel priority interrupts, power fail/auto restart and a bootstrap read-only memory loader with Ascii console emulator, according to Plessey. The processor is also hardware and software compatible with a range of DEC and Plessey products, it added.

A minimum PM-1150/5RP configuration consists of a 10.5-in. high chassis, power supply and fans, PDP-11/34 processor cards and DEC DD11-PK processor backplane, bootstrap loader, parity controller, 32K-byte core or semiconductor memory and operator console, officials said.

Users can also specify optional configurations that incorporate a choice of five interfaces, a 5M- or 10M-byte disk drive unit, VT52 Decscope- or LA36 Decwriter-type terminals and other peripherals, Plessey officials noted.

A basic PM-1150/5RP configuration with 32K bytes costs $20,000 from Plessey at 17466 Daimler Ave., Irvine, Calif. 92714.

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HP Unveils Expanded Disk Drive

PALO ALTO, Calif. — A successor to the Hewlett-Packard Co. 15M-byte 7905A disk drive system stores one-third more formatted data than its predecessor, but is plug-compatible with the earlier model, HP said.

The 20M-byte 7906 disk system is software-compatible with HP 1000 systems and with 21MX-based configurations, company officials added.

Power circuit modifications have added design redundancy to critical circuits within the power board, and a prefilter with no fans or other mechanical parts provides an additional level of air filtration with the drive, the firm explained.

Measuring 15-3/4 in. high, the rack-mountable system uses the same type of removable cartridge as the 7905A and accesses data with a 25 msec average seek, 8.33 msec average latency and 7.5 bit/sec transfer, an HP spokesman said.

Because each HP 13037B disk controller accommodates as many as eight drives, users can expand systems to almost 157.3 million bytes as formatted disk storage on as many as eight 7906 drives, without adding another controller, the spokesman added.

Doubled Capacity

To boost the 7906's storage capacity compared with the 7905A's, HP doubled the recording capacity of the latest drive's fixed platter so that it now holds half the product's total capacity, the firm explained.

The drive uses servo track-following positioning, with one surface of the platter dedicated to servo information. But instead of placing a data track directly under each servo track, HP offset the data tracks .033 micro-in. to either side of the servo tracks, HP said.

This design technique allows the 7906's recording surface to hold 80 tracks, with a density of 384 track/in. and a maximum density of 4,680 bit/in., the spokesman explained.

The 7906M master drive with controller and cabinet costs $14,000, while slave drives cost $10,500. Rack-mounted versions of the master and slave drives cost $13,000 and $9,500.

HP is at 1501 Page Mill Road, Palo Alto, Claif. 94304.

Desktop Computers, Minis Vary Widely: HP Official

(Continued from Page 57)

minicomputers."

Elsewhere in his address, Bode further contrasted desktop computers and minis by noting how they differ in the following product characteristics:

• Keyboard access. Desktop computers provide immediate or "live" keyboard access that allows users to perform many operations while running programs.

Minicomputers, on the other hand, provide a multiterminal capability that allows concurrent program development and multistation operation in conversational or batch mode, Bode said.

• Languages. Most desktop computers use an interpretative language like Basic and APL, which users can run without compilation. Language selection depends on the firmware users specify when they buy their systems.

Minicomputers, by contrast, usually use Fortran, Cobol and other languages that require compiling. The language that mini users select is determined by the software they obtain for their systems, Bode explained.

• Packaging. Desktop computers usually come in an integrated package incorporating all the peripherals that constitute a typical system, whereas minis are often configured as stand-alone units without peripherals, the HP executive noted.

• Upward compatibility. With desktop computers, this usually means "transportability of data and programs to larger machines via either data communications or some storage media like tapes, floppies and hard disks." Bode said.

With minicomputers, the concept means users applying the same set of software, can grow from a processor with a small memory base to a very large multiprocessor, multidisk system.

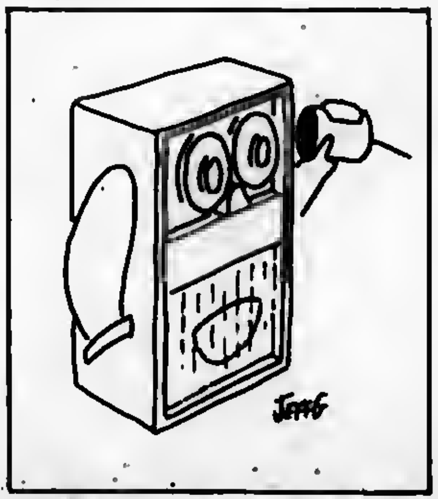
• Distributive systems. Although most desktop computers are compatible with and can report the results of their local processing to larger CPUs, they cannot serve as central processors in multiprocessor networks, Bode pointed out.

Late model minicomputers, however, usually come with operating systems that allow the machines to control distributed processing networks.

• Operating systems. Desktop computers usually provide firmware-controlled editing capabilities that facilitate program development.

With most minis, on the other hand, users develop their software with the help of "very powerful" operating systems, Bode said. These executive packages permit the configuration of software modules like file managers, editors and device drivers.

• Operating personnel. Besides requiring little formal training to operate and program, desktop computers permit easy access and can be easily modified to suit custom applications. With minis, by contrast, users require DP managers with specialized training to configure hardware/software systems and to coordinate the activities of their computer operators, Bode said.



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Controller Lets DG Users Access 1.2G Disk Bytes

SUNNYVALE, Calif. — Users of Data General Corp.'s Eclipse and Nova minicomputers can reportedly access up to 1.2G bytes of on-line storage with a CPU-resident disk controller introduced here recently by Microcomputer Systems Corp.

The Model MSC-1300 accepts as many as four disk drives; by selecting the appropriate strap position on the controller board, users can accommodate 40M-, 80M-, 100M-, 200M- or 300M-byte removable media drives, according to a spokesman.

Equipped with firmware for Winchester-type fixed media drives, the single-board unit provides burst error detection and correction, overlap seek and built-in microdiagnostics, the spokesman said.

With the bipolar microprocessor-based controller, tasks like command chaining, data chaining and sector interleaving and key word searching can reportedly be offloaded from a CPU.

The disk controller costs $2,950 in OEM quantities from the firm at 440 Oakmead Parkway, Sunnyvale, Calif. 94086.

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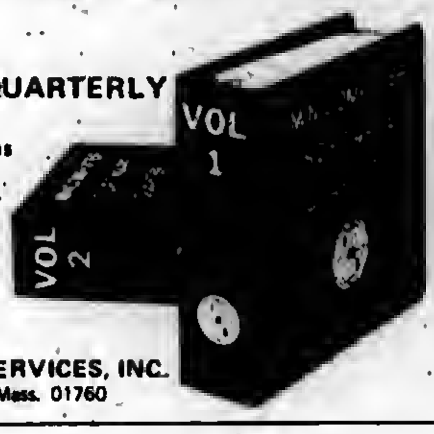

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Southwest, 800-231-8008 (in Tex., 800-392-2221); West Coast, 800-421-1887 (in Cal., 800-262-1312).

Accept Varying Forms Widths

DG Adds Bidirectional Printers

WESTBORO, Mass. — The ability to accept multiple forms widths as well as to vary both the horizontal pitch and vertical line density of their output reportedly highlights two bidirectional matrix printers introduced here recently by Data General Corp.

Both the models 6073 and 6074 Dasher LP2 accept six-part forms 4- to 15 in. wide and up to 16.5 in. (99 lines) long, the company said.

They also provide a selectable horizontal pitch of either 5- or 10 char./in. and generate compressed, normal width, elongated or elongated compressed characters of either 6- or 8 line/in., a spokesman added.

The Model 6074 also produces condensed horizontal pitches of 8.25- and 16.5 char./in., DG said. As a result, the 6074 is said to print up to 132 characters on an 8.5-in-wide form.

Both models provide 132-column output at 10 char./in. and generate 180 char./sec, DG said. That printing speed translates to 80 line/min for 132-character lines and 300 line/min for 2-character lines.

A 16-bit Micronova microprocessor with a 1,000-word random-access memory buffer reportedly allows the 6073's and 6074's print head to jump directly to the next character when it finishes printing a line of text. This logic seeking capability avoids lengthy carriage return delays and maximizes print time, the firm claimed.

Operating from 115 or 240 Vac, the 60-lb units use a 7 by 9 dot matrix to form 96 Ascii upper/lower case characters with true descenders, underscoring and punctuation marks, the spokesman said. Both printers also come with international fonts for France, Germany, Sweden and the UK.

An 8-bit parallel interface permits the receive-only printers to connect to any member of the Eclipse or Nova family, according to the spokesman.

DG estimated the operating life of the products' cartridge ribbon at more than five million characters.

The models 6073 and 6074 cost $3,250 and $3,350, respectively. A Model 6086 printer subsystem with a 6073, programmed I/O controller and wire paper basket costs $3,950. With a 6074, that configuration sells for $4,050.

A Model 6088 printer subsystem with a 6073, data channel controller and paper basket costs $4,650, compared with $4,800 for a 6074-based configuration. DG is at Rt. 9, Westboro, Mass. 01581.

Drives From Shugart Turn Floppy Systems to Fixed

SUNNYVALE, Calif. — Systems designers can reportedly upgrade their small business configurations, intelligent terminals and word-processing equipment from floppy disk units to fixed-disk units with two drives announced here recently by Shugart Associates.

Described as the firm's first rigid disk drive products, the models SA4004 and SA4008 store 14.5M bytes and 29M bytes of unformatted data, respectively, with an optional 144K bytes of additional head-per-track storage, a Shugart official said.

Although compatible with the IBM System/32, System/34 and Series/1, both OEM models weigh 35 lbs and occupy 5.25 in. of a 19-in. Retma rack, the spokesman noted.

Both units are also said to use Winchester read/write head and media technology, transfer data at 889 kbyte/sec, seek in an average of 87 msec, operate with 10.1 average latency and provide 256 byte/-sector with 60 sector/track.

The Model SA4004 provides one fixed disk and 808 addressable tracks; the Model SA4008, two fixed disks and 1,616 addressable tracks, the spokesman said.

Both drive units require +24 Vdc at 2.5A and +5 Vdc at 2.5A, and they use the same interface as Shugart's SA800 and SA850, he added. The band actuator used by the two models reportedly incorporates the same design as the firm's SA850 double-sided floppy disk drive unit.

The 14.5M-byte drive sells for $2,550; in quantities of 250, it costs $1,325. The 29M-byte unit sells for $3,500 or $1,800 in 250-unit quantities.

The head-per-track option, meanwhile, costs $350. Delivery leadtimes for the products are 120 days from Shugart at 415 Oakmead Parkway, Sunnyvale, Calif. 94086.

Printcraft Units House Cartridges

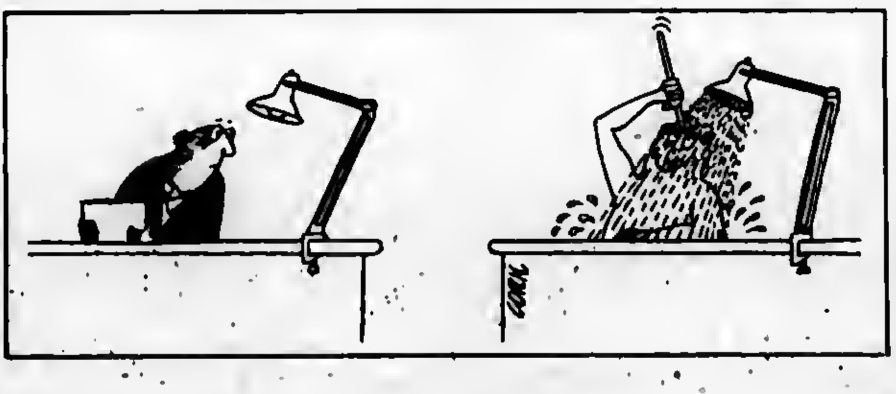
NEW YORK — Two modular desk top storage cabinets for 1/4-in. data cartridges have been introduced by Printcraft Systems, Inc.

The first was designed to house the 300-tape cartridge used with 3M, IBM 5100, Pertec Computer Corp., Tektronix and NCR Corp. drives.

The second houses the smaller 150-ft cartridge used with Hewlett-Packard Co. and Texas Instruments, Inc. equipment.

Each cabinet stores 24 cartridges, each in its own track.

The large cartridge cabinet is designated Catalog No. DCL-24 and costs $40. The smaller cartridge, No. DCS-24, costs $30. Printcraft is at 11-17 Beach St., New York, N.Y. 10013.



Energy Use Programs Updated

ATLANTA — Installations using an IBM Series/1 to monitor and regulate utility bills can reportedly cut systems and programming costs with enhancements IBM has recently added to its Facility Control/Power Management programs.

Designed for users with multiple facilities and demand meters, the enhancements include a program named FC/-PM-4 and two program subsets named FC/PM-2M and FC/PM-4M.

The FC/PM-4 can cut electrical consumption and costs for single facilities with multiple demand meters and for local and remote facilities with single meters, IBM claimed.

One Series/1 with an FC/PM-4 program, for example, can control a facility such as a shopping center with as many as eight demand meters, the company said.

Energy for the meters can come from the same or different sources such as gas, electricity or steam.

The program can also control up to eight local or remote buildings, each with a single meter, IBM officials explained.

User Tailoring

Although the FC/PM-4 requires no user programming, users can tailor the program to meet individual requirements simply by using a fill-in-the-blanks form to answer a series of questions about the devices to be controlled, the initial targets, control periods and alarm condition indicator points, a spokesman said. Users enter information from the form into the Series/1 through an operator workstation.

By entering English language commands at the workstations, operators can also use the program to help add devices to a computer system or change the configuration's operating strategy, the spokesman said.

Application Program Preparation Utilities (Appu) that accompany the FC/PM-4 allow users to modify the program, which controls as many as 128 monitor points and 158 device control circuits, the officials added.

The FC/PM-4M program subset, meanwhile, functions similarly to the FC/PM-4 but was designed for remotely located users who need no program modifications, IBM explained.

Users can install the FC/PM-4 at a central computing site and the FC/PM-4M, which provides no Appu, at remote sites, the company recommended.

With the FC/PM-2M, users with one electric meter can monitor up to 95 alarm or condition indicators and control an equal number of device circuits, IBM said.

Users with multiple facilities can operate IBM's previously announced FC/PM-2 at a central site and the FC/PM-2M at remote sites.

FC/PM-4 will become available for shipment Nov. 24 for a monthly license charge of $225. Shipments of the FC/PM-4M will also begin Nov. 24 for a monthly fee of $100.

The FC/PM-2M will become available for delivery on May 12 and costs $80/mo.

Lockheed Revamps Line

PHILADELPHIA — Lockheed Electronics Co. has scrapped one of the two models that constituted its System III business computer line, slightly modified the remaining unit and reintroduced it as a "single-model" System III.

Since early 1977, the company's business computer family had consisted of two units — the Model A and the larger Model B. At the recent Mini/Micro '78 exposition here, however, the firm announced it had eliminated the Model A and repackaged the Model B with an expandable chassis that reportedly allows users to upgrade their systems by adding or repositioning circuit boards.

A System III chassis holding a CPU, main memory, peripheral controllers and power supply costs $29,950 and is available from Lockheed at Plainfield, N.J. 07061.

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Library Net Puts Minis at Front and Back Ends

COLUMBUS, Ohio — More than 1,300 libraries in 46 states have cut the cost of cataloging materials and speeded the placement of new books on their shelves by subscribing to a minicomputer-based communications network operated here by OCLC, Inc.

Each week, from about 2,000 remote on-line terminals, libraries of all types — college, public, specialized and school — catalog more than 200,000 book titles in OCLC's data base, which holds some 3.6 million records of materials like books, maps, music scores, sound recordings, manuscripts, audio-visual materials, magazines and journals.

Using the contents of this data base the hierarchical network produces machine-readable cataloging tapes and computer-generated accession lists. It also custom-prints about 1.7 million catalog cards each week for the nonprofit organization's customers, according to Don Keates, manager of OCLC's system department.

Front and Back Minis

For front-end supervision, the nationwide network uses four TC-16 Nonstop minicomputers from Tandem Computers, Inc. Together, these front-end processors control incoming communications from more than 65 leased multidrop lines, Keates said.

Back-end data transfer, meanwhile between OCLC's 12G-byte data base and four Xerox Corp. Sigma 9 applications processors depends on 10 Tandem TC-16 minis, Keates added.

All 14 front-end and back-end processors in the OCLC network incorporate 484K-byte main memories, address up to 256 peripherals and access a 6G-byte Tandem disk drive system installed to duplicate the data base and thus ensure system integrity.

Each processor also uses Guardian, Tandem's virtual operating system that reportedly permits parallel processing in separate CPUs and multiprogramming in one CPU.

"Tandem was a logical choice for us," Keates said in explaining why OCLC picked its current configuration instead of rival systems. "Tandem offers the only commercially available uninterruptible computer system. Its systems can be configured with up to 16 interlinked multiprocessors, and the company supplies a data base record manager that gives us access to files and duplicates the data base."

Prospective Applications

When OCLC completes a planned expansion of its existing configuration, the firm will be able to automate several library activities in addition to the ones already on-line. Some of these prospective applications will include interlibrary loan management, materials acquisition, subject searches, remote catalog access and circulation control.

Plans are also under way to increase the front-end supervisor network to eight Tandem computers and to convert the network's CCITT X.25 standard packet protocol to communicate with other library systems throughout the country, Keates said.

To ensure continued data access during systems failure, OCLC has provided each of its peripherals with two paths to the communications network. If one of the paths fails, the configuration automatically activates the backup path, Keates explained.

Interprocessor and data transfers are controlled independently in the OCLC network. A dual communications bus transfers data between processors at 13M byte/sec, while a block multiplexer channel, one for each CPU, oversees 4M byte/sec data transfers.

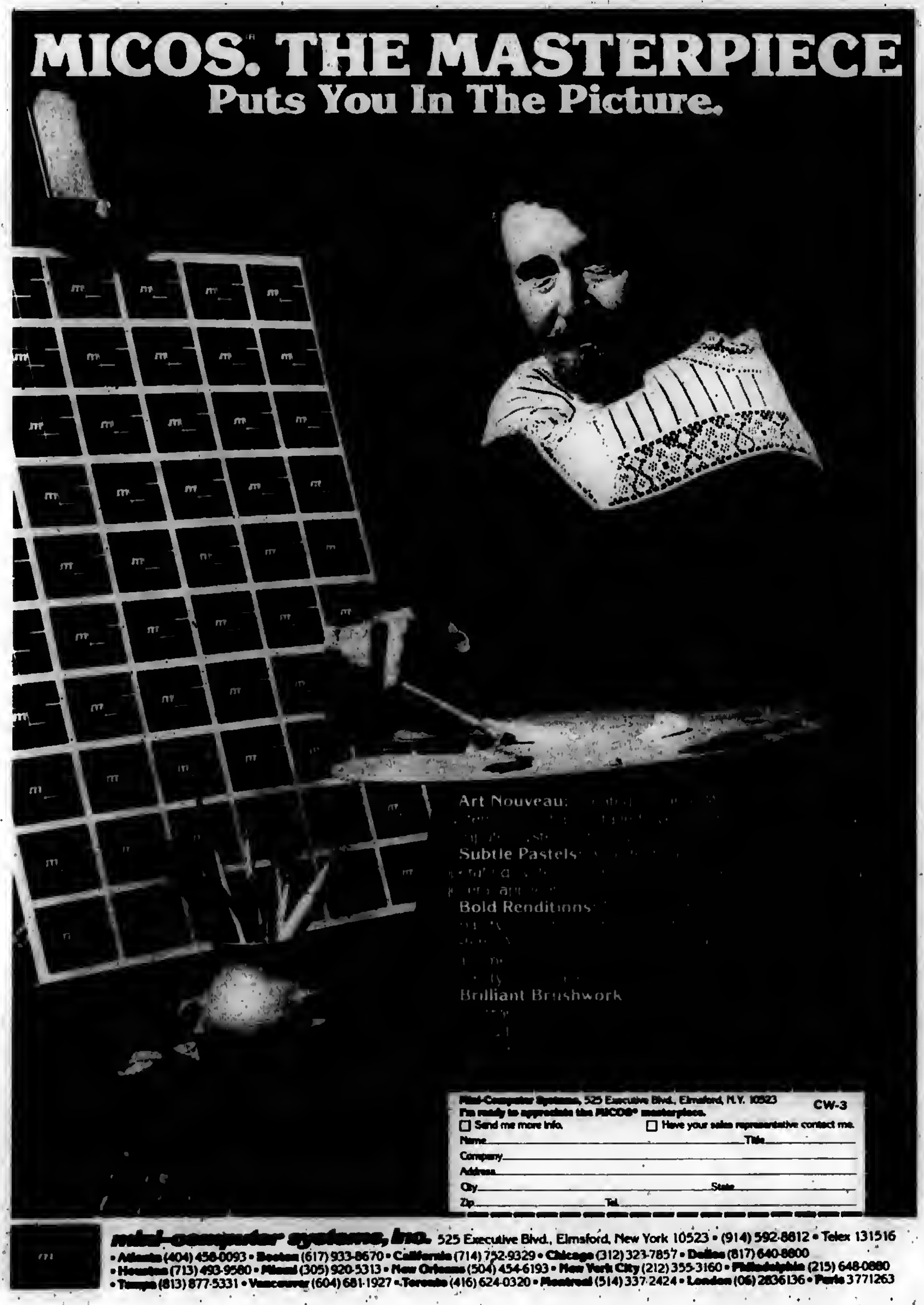
Because of the redundant access paths, OCLC operators can remove, replace or add any peripheral without interrupting network operations, the systems department manager explained.

To further ensure data base integrity, the network uses Tandem's Enscribe data base record manager as part of the Guardian operating system, Keates added. Enscribe reportedly provides a data definition language and a cache buffering scheme that reserves part of the network's main memory as a cache buffer.

With the network's software, applications programmers can write communications programs without knowing which processor will eventually run them. Programmers can also communicate with I/O devices or with other programs without knowing the physical addresses of the devices connected to the network.

As a result, the Tandem software simplifies the usually complex task of writing multiprogramming and multiprocessing application software, Keates noted.

'Mind If I Take It for a Test Run?'



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HI Graphics Plotter Now Fits Minis

PHILADELPHIA — Although designed originally as a module for microprocessor- and microcomputer-based systems, a graphics plotter introduced at the recent Mini/Micro '78 exposition here can also be incorporated into minicomputer configurations, according to a spokeswoman for Houston Instruments, the plotter's manufacturer.

Microplotter 2 moves 2.4 in./sec to produce drawings as large as 8.5- by 11 in. for applications in education, laboratory research, medicine, navigation and mechanical or electrical engineering, the spokeswoman said.

Equipped with an RS-232C or 8-bit parallel interface, the unit performs 240 step/sec at 2,400 bit/sec and 480 step/sec at 4,800 bit/sec, she added. Users can reportedly select a .005- or .01-in. step size by moving a jumper on the product's internal circuit board.

The plotter also accepts lower case Ascii digits to define incremental moves in the standard eight-vector format, the company explained.

Microplotter 2's controls are said to include a power switch, X-axis manual locator and Y-axis locator.

The plotter costs $1,085 from HI at One Houston Sq., Austin, Texas 78753.

Grain of Salt Recommended For Claims From Vendors

(Continued from Page 57)

Consultants can also prove an "invaluable" aid to first-time users, not just in selecting the right hardware vendor, but also in defining the users' needs and generating systems specifications, Bertch said. He advised prospective buyers to rely heavily on their consultants. "Drive your consultant nuts," he urged. "In most cases, it won't be such a long drive."

After a lengthy and thorough vendor evaluation has narrowed the field of potential hardware suppliers to a few candidates, first timers should visit local minicomputer users in their respective industries, Bertch recommended. "But," he added, "you should not limit yourself to the installations chosen by the vendors because they will show you only their most successful accounts."

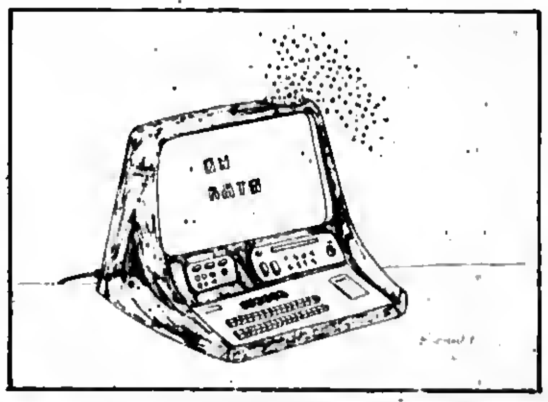
Rather, users should choose for themselves what sites they wish to visit, either by calling companies listed in the yellow pages of their local phone directories or by contacting International Data Corp. (IDC) in Waltham, Mass. "For a small fee, IDC can make available to you its prepared lists of computer users in every major city in the country," Bertch told his listeners.

If the final stage of vendor selection ends in indecision about two differently priced systems — all other factors being equal — users should pick the more expensive configuration, provided the difference in cost does not exceed 15%, he asserted.

Before making the final vendor selection, users should also prepare detailed plans for emergency computer backup, determine how often the hardware suppliers will perform preventive maintenance and how much it will cost, uncover any hidden expenses and find out if the vendors' software would be transportable during subsequent systems upgrades, Bertch advised.

"Very often, users acquire software only to discover later they can't continue to use the package when they expand their configurations," he explained.

After choosing a hardware supplier and specifying a system, first-time users should hire an attorney to review the contract and make sure it does not unduly favor the vendor. "In 90% of the cases, the contract does favor the vendor," the Microdata executive warned.



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Micro Bytes

Vector Graphic Unveils Video Display Board

WESTLAKE VILLAGE, Calif. — Vector Graphic, Inc. has introduced an S-100-bus-compatible video display board capable of generating up to 1,024 characters.

The Flashwriter uses a 7 by 9 dot matrix to produce images and incorporates an eight-bit parallel port with latched strobe that may be used as a keyboard port. The board can produce character-by-character, reversed video, reduced intensity, block and line graphs and also has its own screen-refresh memory, the firm said.

The unit requires 8 Vdc at 1.2A and the board's video output is available as composite video or separate video and sync, the firm noted.

The video board costs $195 as a kit and $235 assembled from the company at 790 Hampshire Road, Westlake Village, Calif. 91361.

Keyboard Goes With Video Boards

TEMPE, Ariz. — Microage has announced a keyboard designed for use with 64- and 80-character display boards.

The MKB-2 features a numeric key pad, upper and lower case controls, cursor control keys, two-key rollover and automatic repeat on all keys, a spokesman stated. The unit also includes a parallel interface, strobe or pulse, on-board regulation and standard DB25S connector.

The keyboard, housed in a steel case, costs $149 from Microage at No. 101, 1425 W. 12th Place, Tempe, Ariz. 85281.

Microage Has Shopper's Guide

TEMPE, Ariz. — A 72-page guide to personal computing, available from Microage, includes tips on system selection and design as well as manufacturers' specifications on selected microcomputer hardware.

The *Byte Shopper* includes an introductory description of personal computing and illustrations of microprocessor functions and applications, a spokesman stated. More than 120 manufacturers are represented and an eight-page price list is included for prospective buyers.

Decision-oriented charts and graphs as well as a glossary of data processing "buzzwords" are also included. Graphic visualizations of microcomputers and their function are provided to help clarify system applications, the firm noted.

The book sells for $3.95 from the company at No. 101, 1425 W. 12th Place, Tempe, Ariz. 85281.

For 8080, Z80, 8085

Microsoft Adds Cobol-80

ALBUQUERQUE, N.M. — Cobol-80, a language developed by Microsoft for users of 8080-, Z80- and 8085-based microprocessor systems conforms to the 1974 Ansi specifications and is said to give users access to computer programs already written in Cobol.

The language provides routines for sequential, relative and indexed file handling as well as library and interprogram communications, the firm said. Other features include the verbs STRING, UNSTRING, COMPUTE, SEARCH and PERFORM along with condition specification by way of condition-names, compound and abbreviated conditions. The programming also allows a packed decimal data representation to conserve memory on the floppy disk, the firm pointed out.

The Cobol-80 system consists of two packages: a compiler for translating source code into relocatable object code and a runtime system containing standard routines needed by the object code at execution time, a spokesman explained.

The system operates in less than 32K bytes with a 250 line/min rate of compilation, the firm added.

Cobol-80 is available to run under the CP/M and Isis-II operating systems for $750 including documentation. The documentation is also available separately for $20 from Microsoft at Suite 819, 300 San Mateo, N.E., Albuquerque, N.M. 87108.

Analyzer With Clip-On Probe Diagnoses 8080-Based Systems

YORKTOWN HEIGHTS, N.Y. — An 8080 microprocessor system analyzer incorporating a clip-on probe that connects directly to a chip under test was unveiled by AQ Systems, Inc.

The AQ8080 is reportedly designed to function without memory allocation, address or I/O port assignment, a special clock or a separate terminal. Built-in controls and displays permit the user to examine or modify all memory locations, I/O ports and internal microprocessor registers, including the program counter and the stack pointer, according to a spokesman.

Debugging capabilities are provided by conditional breakpoint; data breakpoint and monitor functions that can be qualified to respond to memory reference, stack reference, I/O locations and read or write activity, the firm noted.

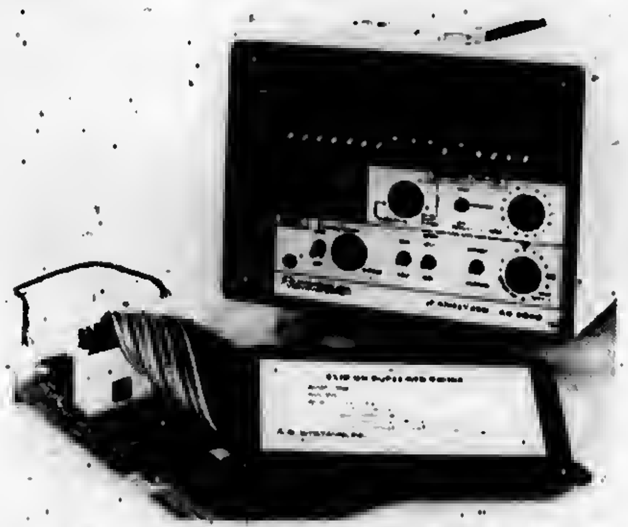
Programs may be single stepped by a machine cycle or an instruction step or run at an adjustable speed of from one step/sec to 4,000 step/sec while examining memory or registers; the spokesman pointed out. Up to 128 instructions can be stored in the system.

Analyzer Function

The analyzer will examine or modify the contents of system memory and the microprocessor's program counter, stack pointer or any other single register or register pair, the firm said. The microprocessor address bus is monitored during program execution, and the AQ8080 can halt execution upon the occurrence of a specified address or breakpoint.

LED displays are provided for analyzer and, microprocessor system status, microprocessor cycle status and binary data, while two hexadecimal displays are included for data, address and switch registers, the firm added.

The AQ8080 costs $2,250 from AQ Systems, Inc., 1736 Front St., Yorktown Heights, N.Y. 10598.



System analyzer from AQ Systems, Inc. connects to 8080-based microprocessors via a buffered 40-pin clip-on probe.

Cosmac 1802 Users Get S-100 Interface Aid

MELBOURNE, Fla. — Infinite, Inc. is offering information to users of RCA Corp.'s Cosmac 1802 microcomputer on interfacing the unit to the S-100 bus.

The engineering package containing schematics as well as signal and component descriptions is available for $9.95 from the company at 1924 Waverly Place, Melbourne, Fla. 32901.

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8080 Users Gain Expander

CANTON, Mass. — A 32-channel analog-to-digital (A/D) expander board introduced by Datel Systems, Inc. works in conjunction with the firm's master converter board and is compatible with Intel Corp.'s MDS-800 as well as National Semiconductor Corp.'s BLV-80 microcomputers, according to a spokesman.

The ST-800ADX32S board acts as a slave to the converter board and is electrically compatible with the backplane pinouts of the host microcomputer. The two boards digitize analog inputs to a 12-bit binary resolution with an accuracy of .025%, the spokesman claimed.

The system accepts 64 single-ended A/D channels with input ranges of +5V, +10V, -5V or -10V, he added.

System multiplexers have a 1 microsec settling time and channel-to-channel throughput is rated at 20 microsec, Datel said.

The unit includes printed circuit board pads and current-limiting resistors or fuses, the firm said. Board options include direct memory access (DMA) operation capabilities offering a total data transfer rate of 38,000 sample/sec and an on-board addressing function that can expand up to 256 A/D channels.

Ribbon cables carrying analog signals from the master board are also available as options.

The expander board costs $395 from the firm at 1020 Turnpike St., Canton, Mass. 02021.

For Prototypes

Zilog Backs Development

CUPERTINO, Calif — Zilog, Inc. has unveiled a stand-alone development system for prototype development of Z80-based microprocessor systems with clock rates not exceeding 2.5 MHz.

The ZDS-1/25 provides the user with a single-chassis microcomputer with dual floppy disk drives for up to 60K bytes of random-access memory (RAM) storage as well as optional peripherals and interfaces, according to a spokesman.

Programmable Module Feature

System features include a 3K programmable read-only memory (Prom) monitor; a programmable hardware breakpoint module to enable suspension of instruction execution at given address or activity; a programmable real-time storage module for storing CPU or I/O port activity or monitoring memory functions; and a relocatable I/O operating system that provides a text editing, assembler, linker and file management system, the firm noted.

Memory Mapping

In-circuit emulation via a 3-ft cable connection and memory mapping in blocks of 256 bytes are also standard with the system, the spokesman added.

The ZDS-1/25 is available in three models: the 1/25A, a single-chassis system with 48K bytes of dynamic memory that costs $7,740; the 1/25B with 60K bytes of memory, priced at $8,340; and the $9,340 1/25C, a 60K-byte system designed to work with 4 MHz microcomputers that includes Zilog's PLZ programming language.

Specifications and applications information can be obtained from Zilog at 10340 Bubb Road, Cupertino, Calif. 95014.

Cross-Assemblers Offered

ATLANTA — Automated Logic Corp. is offering five microprocessor cross-assemblers for use on Digital Equipment Corp.'s PDP-11 minicomputers and LSI-11 microcomputers.

The Microseries runs in 12K words of memory and enables programs to be developed using the PDP-11 with the RT-11 operating system, the firm stated.

A companion program allows the output from the cross-assembler to be transferred directly to burn in the programmable read-only memories (Proms).

Floppy Disk Distribution

The Microseries cross assemblers are distributed on floppy disks and cost $250 from the company at Suite 115, 2675 Cumberland Parkway, Atlanta, Ga. 30339.

System Tests Floppy Disks

SANTA ANA, Calif — Applied Data Communications, Inc. has introduced a programmable floppy disk test system that it said can operate with either single-density or double-density as well as single-sided and double-sided floppy disks.

The 70T-300 system includes routines for read/write maintenance, error testing, variable step rate and window margining for bit shift, a spokesman stated. Each program can perform multiple test sequencing and repeats, he added.

The system's diagnostics are presented in a "ready-to-use" format that can be varied according to user needs, the firm said. Documentation includes step-by-step procedures for writing additional routines if required.

The test program is prerecorded on floppy disk and automatically loaded when the system is powered on.

Tester hardware and software diagnostics are fully documented with supplied operating manuals, the firm said. Technical support and programming assistance are provided through the factory.

The unit is available in two models: the 70T-300-2 for testing up to two drives and the 70T-300-4 for testing up to four drives. The systems, including power cords and industry standard interface cables, are priced at $6,450 and $7,200 respectively.

Applied Data Communications is located at 1509 E. McFadden Ave., Santa Ana, Calif. 92705.

T

TIME-SHARING — 1. A computing technique by which more than one terminal device can use the input, processing and output facilities of a central computer simultaneously. 2. A specific method of operation in which a computer facility is shared by several users for different purposes at (apparently) the same time. Although the computer actually services each user in sequence, the high speed of the computer makes it appear that the users are all handled simultaneously.

TTL — Transistor-transistor logic, a kind of bipolar circuit logic which takes its name from the way the basic transistor components are interconnected.

TTY — Teletypewriter equipment.

TURNKEY SYSTEM — Refers to an agreement whereby a supplier will install a computer system so he has total responsibility for building, installing and testing the system, including hardware and software.

U

UART (UNIVERSAL ASYNCHRONOUS RECEIVER TRANSMITTER) — Refers to a specific device that will interface a word parallel controller or data terminal to a bit serial communications network.

V

VERIFY — 1. To check, usually with an automatic machine, one recording of data against another in order to minimize the number of human errors in the data transcription. 2. To make certain the information being prepared for a computer is correct. 3. To determine whether a transcription of data or other operation has been accomplished accurately. 4. To check the results of keypunching.

VIRTUAL MEMORY — Virtual memory, ideally invisible to the user, involves the transfer of information one page or more at a time between primary and secondary memory and adds only that time required to page swapping to the normal operating time. This procedure leaves the programmer free to address total storage without concern as to whether primary or secondary storage is actually being addressed and effectively includes the large, inexpensive capacity of secondary storage in the system.

VTAM (VORTEX TELECOMMUNICATIONS METHOD) — A special data communications software package from IBM that organizes and simplifies data communications programming to serve remote workstations for a host computer.

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COMPUTERWORLD

National Semi Power Unit Tracks Line Load at .1%

SANTA CLARA, Calif. — National Semiconductor Corp. has designed a multilevel power supply for its Series/80 microprocessor boards that it said combines line and load regulation with current limiting, overvoltage protection and power failure detection.

The BLC 635 has circuits that limit current at 1.2 times the rated values at all levels as well as overvoltage circuits that trip at 1.16 to 1.32 times rated voltage, the firm noted. Load regulation is .1% for a 50% load change and line regulation is .1% for a 10% line variation.

AC Power Detection Circuit

An ac power detection circuit in the unit supplies a TTL-compatible high-level signal when line voltage drops 10% below normal, the firm said. The signal returns low when line voltages reach 8% of the normal value.

All dc levels remain within specification for 2 msec after low line conditions and 7.5 msec after complete power loss for orderly shutdowns, a spokesman added.

The BLC 635 with cables for the Series/80 is priced at $460 from National Semiconductor at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

National Semiconductor Corp.'s multilevel power supply fits Series/80 microprocessor boards.

DEC, Heath Users Get Prototyping Board

SYLMAR, Calif. — A prototyping circuit board from Vector Electronic Co., Inc. is said to permit construction of custom interface circuits for Heath Co. H11 microcomputers and Digital Equipment Corp. LSI-11s, PDP-8s and PDP-11s.

The Model 4607 plug-in board has etched contacts spaced to fit the dual 36-pin connectors used by DEC and Heath, according to a spokesman. To allow unrestricted component placement, the board is bare with an array of .042-in. diameter holes on .1-in. centers.

Dual in-line package (DIP) sockets or discrete components can be placed anywhere on the board, the spokesman claimed.

The board is fabricated of an epoxy-glass composite material with 2 oz. copper cladding, the firm noted. Pin terminations and edge strips are hot-solder-plater while card-edge contacts are gold-flashed nickel plate.

Mounting Holes

Card extractor mounting holes are located to match the outline of standard DEC modules, the firm added.

The board is priced at $15.95 with discounts available for quantity orders. Vector is at 12460 Gladstone Ave., Sylmar, Calif. 91342.

Cramer Arranges Seminar Series

NEWTON, Mass. — Cramer Electronics, Inc. will present a series of microcomputer seminars here beginning June 7. The seminars are to assist technical people, engineers and designers and to provide updates on recent developments that can benefit their applications, Cramer said.

Topics Included

The seminars will cover various microprocessor systems and their related specifications, according to a spokesman. Topics will include the Motorola Semiconductor Products, Inc. M6800 system and peripherals on June 7; the RCA Corp. Cosmac series and related circuits on June 15; and the Advanced Micro Devices (AMD) 2900 bipolar system on Aug. 9.

The courses are offered in conjunction with the related manufacturers and are free on a limited attendance basis, the spokesman explained.

Reservations and information can be obtained from Cramer Electronics at 85 Wells Ave., Newton, Mass. 02159.

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Special Micro System Sale to May 25! The ideal 8080 turnkey development package A POLYMORPHICS SYSTEM 8813! Get 15% off normal price of $3250.00 with a 10% deposit on orders postmarked before May 25, 1978; deposit cheerfully refunded should delivery take any longer than 4 weeks. Only $2762.50 gives you this floppy disk based S-100 bus system with 17K RAM, 3K ROM firmware, video display with dot matrix graphics & lower case, a file handling disk BASIC, room for 2 extra drives. Extra S-100 memory is $400 per 16K; a serial port is $80. A data base management package from STAR SYSTEMS is $250. Sale good only at Computer Mart, Inc., 1097 Lexington St., Walthma, Ma. 02154 (617) 899-4540

NCC. Computerworld's got it covered—as only a newsweekly can.

This year's National Computer Conference promises to be the biggest ever. More than 40,000 people are expected to visit the record-breaking 1400 booths in the main show; and thousands more will be attending the newly-expanded *Personal Computing Festival* — including exhibits, speakers, and technical sessions on this fast-growing area of the computer world. And, of course, *Computerworld* will also be at NCC — to hail it, unveil it, and wrap it up — in three informative, important issues full of NCC news.

May 29th—Preview Issue: A complete rundown of the companies, products and services, keynote speakers and technical sessions you'll see at NCC. Plus — a guide of things to see and places to go in the Anaheim area. This issue will help you make the most of your time at NCC. (If you forget to bring your copy of *Computerworld* you can pick one up free at our booth — while they last.)

June 5th—Show Issue: Our Show Issue will include all the late breaking stories, program changes, intended product announcements and behind-the-scenes show details leading up to NCC. (It will also be available at our NCC booth.)

June 12th—Wrap-up Issue: Cohesive analysis and summary of the significant events of the '78 NCC. This issue will give details on product announcements and will review the content of program sessions, experts' observations and keynote speeches. The important events of NCC will be summarized here.

If you're a manufacturer or marketer in the computer field, don't miss these ad closing dates for *Computerworld's* NCC issues:

Preview Issue: (May 29th)—Color and Insert close: May 12; black & white close: May 19.

Show Issue: (June 5th)—Color close: May 19; black & white close: May 26.

Wrap-Up Issue (June 12th)—Color close: May 26; b&w close: June 2.

For all the details contact your *Computerworld* salesman. He can give you special assistance in NCC ad planning. Or call Terry Williams at (617) 965-5800 to reserve space for your ads.

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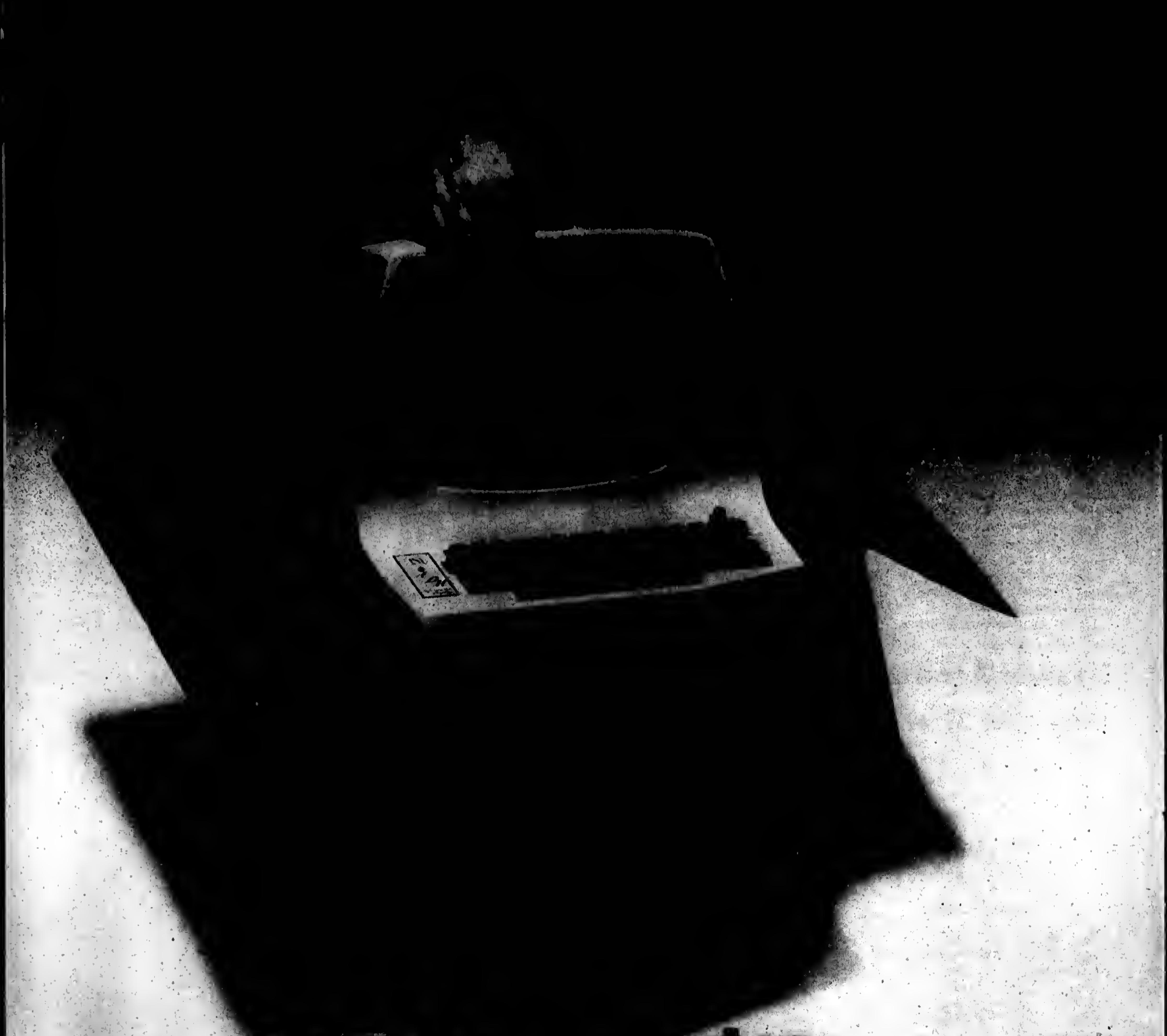

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Despite Its Late Start

China Called Coming Technology Rival

By Marcia Blumenthal
CW Staff

HONG KONG — The People's Republic of China did not develop a computer until 1958 and even today commercial applications are rare, but China could rival the world's most advanced computer technologies by the end of the century, according to an analysis made by *Asian Computer-Yearbook.*

The Institute of Computer Technology, established in 1956 under the Chinese Academy of Science in Peking, played a leading role in developing computer technology, basing its first computer on Soviet Ural-1 designs.

Over the years, several computer-related institutes have been founded, each following the official government credo of developing computer technology to improve the quality of life, the analysis said.

Since the 1958 debut of China's first computer, scientists there have developed large-scale integration circuits with a capacity of 10,000 transistor elements, compared with U.S. and Japanese designs of 12,000 elements.

Presently Chinese computers use only magnetic tape drives, but the institutes are interested in developing disk drives, the analysis pointed out.

For the most part, computer applications are geared to scientific uses such as space exploration, nuclear physics and telecommunications.

Although the development of computers has been at the institute and university levels, scientists regularly spend one or more days building computers alongside factory workers, thereby helping to eliminate the distinction between manual and mental work, the analysis noted.

These factories are often small, collectively owned enterprises in urban areas. One of the more well known is the Shanghai Door Handle St. Factory, which employs about 450 workers, 80% of them women. The factory's unusual name comes from the products it produced before switching to the manufacturers of computers.

A major problem China faces in computerization is the translation of Chinese characters, usually representing more than one word, into computer language, according to the study,. There are more than 4,000 basic characters essential for day-to-day communication.

But help is on the way. Dr. An Wang, president of Wang Laboratories, Inc. has developed a system that identifies characters based on the shapes of their corners.

This coding system reduces any Chinese character to a six-digit, three-corner code, the analysis explained.

Eager to Learn

Although China has proven its ability to build large-scale computers, it is still eager to learn from more technically advanced countries.

According to the industry analysis, China purchased about 50 analog and digital computers between 1962 and 1972.

The *Asian Computer Yearbook* is available for $9 from its publisher, Computer Publications Ltd., at 22 Wyndham St., Hong Kong.

Services Revenues Seen Doubling in Five Years

SAN JOSE, Calif. — Annual revenues of the computer services industry will top $13.7 billion by 1982, more than double 1977 sales, according to a recent report from Creative Strategies International (CSI).

Compound annual growth rates were predicted at 7% to 25% depending on the segment of the industry. Remote computing will lead the race with a 25% growth rate and software products will follow closely behind at 23%, CSI said, forecasting the overall average growth rate at 16.7%.

CSI's study "The Computer Services Industry," divides the service industry into five segments: remote computing, service bureaus, facilities management, software products and software services.

Pointing to the fact that not one of the 4,500 industry firms holds more than a 9% market share and that the top 15 companies generate about 30% of the revenues, CSI contended there is sufficient incentive for small firms (those with less than $1 million in annual sales) to enter the market.

But the market, while promising does, have some barriers, CSI said. The study identified a trend toward mergers as smaller companies try to sustain growth.

Moreover, the study noted, minicomputers are beginning to invade the time-sharing and remote batch markets as customers increasingly opt for in-house capability because of decreasing hardware costs.

The study is available for $695 from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

Milestone for DEC

MAYNARD, Mass. — Digital Equipment Corp. recently celebrated the shipment of its 100,000th computer system. In recognition of the milestone, Kenneth H. Olsen (left), DEC president, affixed a commemorative plaque to the system, a Datasystem 570.
Celebrating with Olsen is Jerald E. Crane, director of information services for Georgia-Pacific Corp. of Portland, Ore., the user.
According to International Data Corp., a market research firm, DEC is one of two companies to produce and ship 100,000 computers.

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Boom Expected for Package, Service Firms

NEW YORK — Independent firms supplying software packages and packaged services can expect a boom through 1982 despite IBM's hold on 50% of the U.S. market, according to forecasts made in a recent study released by Frost & Sullivan, Inc., a New York-based market research firm.

The 230-page study, "Computer Software Packages and Packaged Services Market," projected growth for the software packages segment at 26% annually with dollar volume growing from $969 million this year to $2.4 billion by 1982. Threefold growth was forecast for the packaged services sector with sales estimates of $3 billion for 1982.

Opportunities will abound in the minicomputer sector as computer ownership becomes more prevalent, penetrating into businesses such as car dealerships, radio stations and medical groups. The study further predicted that IBM's unbundling trend will extend to its Series/1 mini and create opportunities for independent suppliers.

Also, demand for software packages by users of medium- and large-scale systems will grow because of increased central and auxiliary storage capacity and the enhanced communications capability of the new systems, the report said.

Particularly heavy demand was forecast for data base management systems, inventory control systems and minicomputer programming utilities as well as specific software for accounting and banking needs.

Burgeoning growth will no doubt attract many new independent software suppliers. The highly fragmented software industry is labor intensive and allows low-cost entry into the market, the researchers pointed out.

In fact, about 50% of the independent software firms employ less than 25 people and generate less than $1 million in revenues annually, according to Frost & Sullivan's industry analysis.

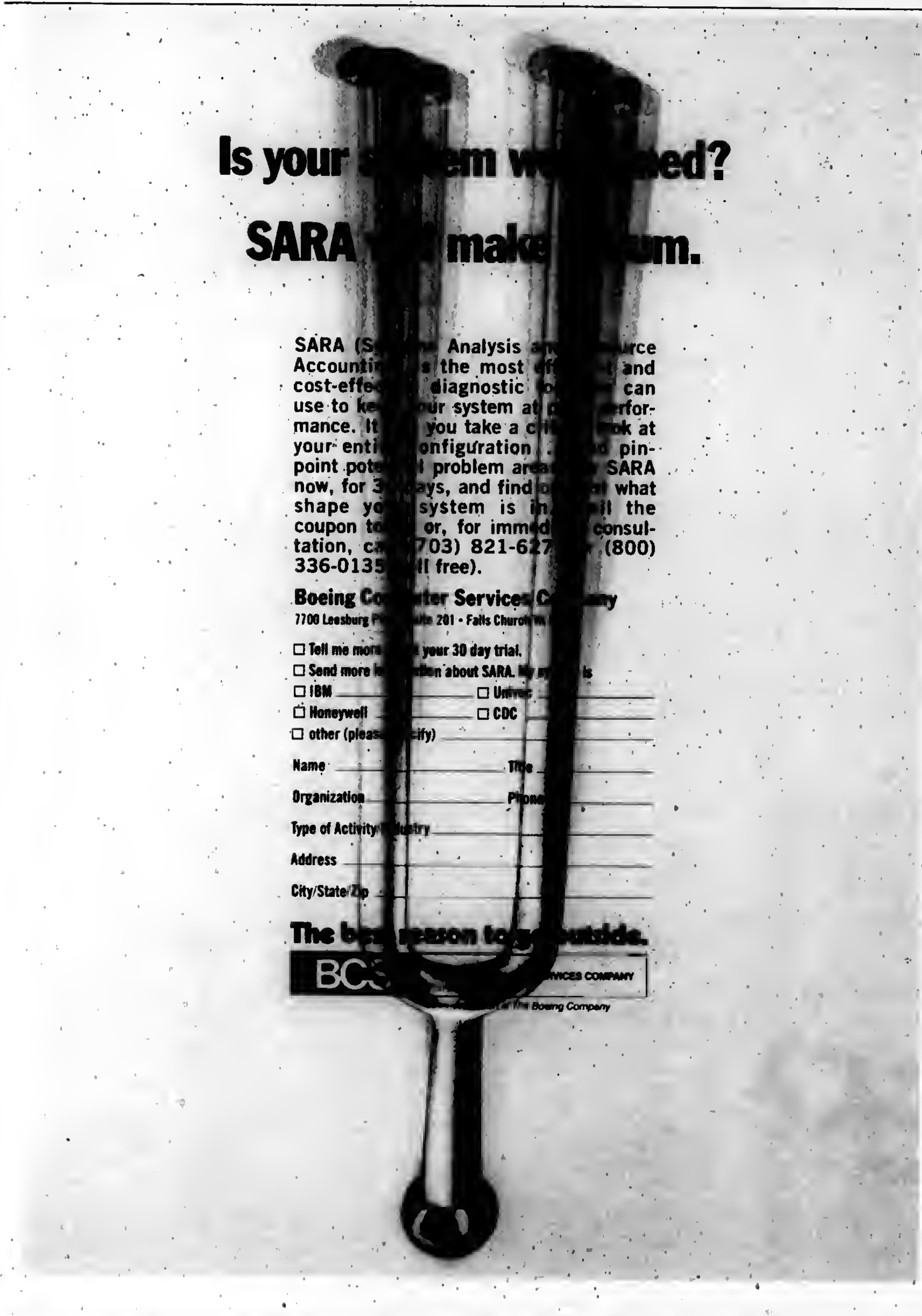
Although fragmented, operating patterns are beginning to emerge. Most firms specialize in creating software to serve users of specific equipment such as the IBM 360/370 or for a specific industry such as banking.

Surveys of vendors revealed that marketing expenses were 28% of sales for software packages and 14% for packaged services, with an average of 5.7 people required to support a package.

Moreover, 68% of the responding users designated independent software houses as being lower priced, having higher quality and being more flexible than manufacturers' offerings; 13% reported the opposite.

Problems facing the software industry revolve around uncertainties concerning state and local taxes on software sales as well as copyright and patent protection. However, the study indicated the dampening effect of these problems will not be too severe.

The study costs $700 and is available by contacting Customer Service, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.



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Foreign Orders & Installations

The Twente Hospital Region based in Enschede, the Netherlands, has ordered a Univac 1100/11 system for handling patient registration and identification as well as for financial and administrative applications. A second Univac 1100/11 system has been ordered by the Dutch Foundation for Medical Registrations in Utrecht.

The Chang Hwa Commercial Bank of Taiwan, has installed an NCR Corp. V-8570 and NCR teller terminals linking five cities.

BASF Braziliers, a subsidiary of BASF A/G, a major multinational West German chemical manufacturing concern, has ordered a Univac 1100/11 valued at $1.1 million. The system is planned for installation at BASF Braziliera's headquarters in Sao Paulo.

Rechenzentrum Graz, Austria's largest computer service center, has purchased a $4 million Univac 1100/81 to handle technical-scientific applications as well as administrative tasks.

Forenede Margarinfabrikker A/S of Norway has ordered a Univac 1100/11 system to control food products from the production stage through the wholesale distribution channels. The system is valued at approximately $1 million. The order was placed with Saab Univac Norge A/S.

Computer Timesharing Ltd. of New Zealand has installed a Hewlett-Packard Co. 3000 Series II Model 6 to provide the first time-sharing computer bureau service in that country.

The Standard Chartered Bank Ltd. of the UK has ordered an NCR Corp. 7750 distributive document processing system.

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At Memorex vs. IBM Antitrust Trial

Witness Says IBM Good on Price/Performance

By Catherine Arnst
CW Staff

SAN FRANCISCO — Hughes Tool Co. in Houston, Texas, makes acquisition decisions for its computer systems solely on the basis of the best price/-performance ratio and considers all vendors, according to Ralph Leatherman, manager of information systems for Hughes and IBM's "user" witness in the Memorex vs. IBM antitrust trial.

A good price/performance ratio is the reason why Hughes' current configuration for its IBM 370/165 Model II system is virtually all IBM-manufactured and contains only one independent product — a Memorex Corp. 1270 communications controller, Leatherman claimed on the stand last week.

Leatherman had nothing but praise for Memorex's products and servicing but, he said, he had written three letters to IBM complaining about various products and maintenance support, Memorex attorneys revealed on cross-examination.

Second Occupation

Leatherman can almost list his second occupation as an IBM user witness. He was scheduled to testify in the California Computer Products, Inc. vs. IBM antitrust case if IBM had presented its defense and is one of the first of some 70 users scheduled to testify in the U.S. vs. IBM antitrust trail now going on in New York.

Prior to testifying in the Memorex case, Leatherman met 14 times with IBM lawyers regarding testimony either in this trial or the government action, for a total of approximately 80 hours from 1976 through April 16 of this year. Letters that IBM employees or attorneys sent him in thanks for his cooperation were warm and contained personal invitations to get together.

Some members of the government's trial team in New York privately claim that Leatherman has been coached by IBM to testify to a "party line" and his recent deposition in that case was a cause for dispute because of his seeming lapses of memory when answering government questions.

Leatherman had no such problem in California. He was a well-prepared and confident witness.

Acquisition Activity

Leatherman testified that acquisition decisions were a major activity of his department at Hughes, a supplier of oil field drilling tools. The firm uses DP in every aspect of its operations, from business applications to manufacturing processes, he said, and "there are some things we do now that we couldn't do before we had computers because of the mass of calculations involved."

Leatherman has a half-dozen people involved in some facet of the acquisition process, particularly in keeping abreast of developments at all times, he said. He has the final responsibility for all DP acquisition decisions.

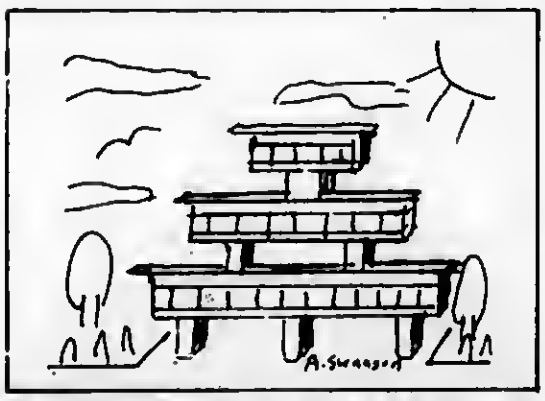
In deciding on an IBM Model 165, Hughes not only considered IBM systems, it also looked at the products of other mainframe manufacturers, the possibility of using minicomputers and the alternative of going to a service bureau. It was considered the most cost-effective to do the job with a large processor, and the Model 165 gave the best price/performance ratio, he said.

Once it leased the system from Comdisco, a third party supplier, Hughes upgraded through a series of disk subsystems manufactured either by IBM, Telex Computer Products or Memorex. The Telex and Memorex subsystems were functional equivalents of the IBM systems, and IBM finally ended up supplying Model 3350 drives for which the two plug-compatible manufacturers had not yet developed an equivalent.

Memorex did offer Hughes an interim proposal of a combination of its own 3330-type drives until its 3350 type was available; in terms of dollars, this proposal was cheaper than IBM's offer, Leatherman said. But that configuration still was not as fast as the IBM 3350s, and "it is extremely important for us to maximize our uptime," Leatherman said.

A major issue in this case is Memorex's charge that IBM CPU users are locked into either IBM peripherals or exact copies made by other manufacturers, so the smaller firms in the industry are always playing follow-the-leader to IBM's product offerings.

Leatherman characterized the computer industry as "increasingly competitive in the last 20 years," which has caused prices to be lower and more technical innovations to be introduced.



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CMI Posts Net

BEDFORD, Mass. — Cambridge Memories, Inc. (CMI) reported earnings of $550,000 or 30 cents a share for the six months. However, this figure included a $276,000 credit for net operating loss carryforwards. Therefore, net operating income was $274,000, or 15 cents a share.

In the six months, CMI posted net income before extraordinary credits of $260,000 or 16 cents a share. Extraordinary credits for that period totaled $2.7 million, resulting in net income of $3 million or $1.79 a share.

Earnings in the second quarter totaled $342,000 or 19 cents a share compared with $264,000 or 16 cents a share in the year-ago period. Revenues increased to $2.5 million compared with $1.7 million.

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Financial News

But Earnings Dip

Amdahl Tops Quarter Revenues

SUNNYVALE, Calif. — Amdahl Corp. posted record revenues of $68.7 million for the first quarter, compared with $38 million in the same period a year ago.

Earnings dipped to $9.5 million or $1.17 a share in the 1978 quarter compared with $10.1 million or $1.30 a share in the 1977 period, but the 1977 figures reflected an extraordinary credit of over $5 million for a tax-loss carryforward, which greatly enhanced earnings.

Without the extraordinary item, 1977 quarter earnings would have been $5.3 million or 69 cents a share.

The prices of Amdahl's computer systems were down 35% from last year at the same time, the company stated.

Amdahl also revealed a price reduction on the memory portion of the 470V/5 and 470V/6-II systems that will lower the price of a typical system by about 5%.

Further the V/5 and V/6 systems are now offered in a minimum configuration of eight channels, and customers can add up to eight additional channels to each system in four-channel increments.

New international markets were opened in Australia, Denmark, France and Italy the firm reported.

Sycor Net Hits $553,000

ANN ARBOR, Mich. — Sycor, Inc. reported first-quarter earnings of $553,000 or 16 cents a share on revenues of $20.5 million compared with last year's first-quarter earnings of $343,000 or 10 cents a share on revenues of $17.2 million.

First-quarter income after taxes was reduced by a one-time expense of $150,000 in connection with Sycor's proposed merger with Northern Telecom Ltd. The merger is still subject to approval by Sycor stockholders and the fulfillment of conditions of the U.S. Internal Revenue Service.

Rental and service revenues were 27% higher than in the same period a year ago. Outright sales to foreign customers increased 47%, but North American sales slipped 28% resulting in an overall outright sales increase of 12%.

NCSS Reports Record Revenues

NORWALK, Conn. — National CSS, Inc. (NCSS) reported record revenues of $48.8 million for the year ended Feb. 28 compared with $41.7 million in the previous year.

Year earnings increased to $3.8 million or $1.68 a share compared with $3.2 million or $1.4 in the prior year.

The services company recently announced its entry into the minicomputer market with its 3200 series system, a 32-bit supermini compatible with the IBM 370 series.

Nickels & Dimes

Beehive International announced increased credit lines with **Wells Fargo Co.** and **Walker Bank & Trust.** The $7 million credit line, comprised of a short-term note and a revolving term note, reflects a $1.5 million increase in credit availability.

$$$

Boothe Courier Corp. sold its capital stock of subsidiary **Courier Terminal Systems, Inc.** to **International Telephone and Telegraph Corp.** After deferred taxes, Boothe will realize net proceeds of about $40 million.

$$$

Inforex, Inc. has filed a registration statement with the Securities and Exchange Commission for a proposed public offering of 15,000 units consisting of subordinated debentures due 1998 and common stock. Each unit will consist of one $1,000 debenture and a number of shares of common stock to be determined at the time of the offering.

$$$

Scan-Data Corp. expects to report a $1 million loss for 1977. The company is in a preliminary discussion stage for a cooperative business arrangement with a major company and a minority involvement in Scan-Data by that company.

$$$

Computer Devices, Inc. (CDI), has negotiated an $8 million line of credit. According to Kendall Wright, president of CDI, $4 million will be available with the New England Merchants National Bank of Boston for lease financing and working capital and another $4 million will come from U.S. Portfolio Leasing of San Francisco for computer terminal leasing.

Pertec Computer Corp. has established new lines of credit and set up a wholly owned unconsolidated financial subsidiary, **Pertec Computer Financial Corp.** The credit agreements provide a total of $55 million in financing, $25 million of which will be used by the subsidiary.

$$$

Itel Corp., in two separate financings, has placed $122 million of 15-year equipment trust certificates with a group of institutional investors led by Aetna Life Insurance Co., Morgan Guaranty Trust of New York, Connecticut General Life Insurance Co. and The Travelers Insurance Co.

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Medical Groups Seen Fertile Market for Micros

NEW YORK — Over the next 10 years, medical group practices, clinics and health maintenance organizations (HMOs) will be the major segments of a projected $1.3 billion market for microcomputer-based medical systems, according to a report released by Frost & Sullivan, Inc.

These groups will account for sales of $1.1 billion, with small hospitals and multiphasic screening centers rounding out the total market, which is forecast to peak in the late '80s, leveling off at $250 million per year by that time.

However, these estimates are considered conservative because they do not include sales of related supplies and software; new technological advances in microcomputing capability or medical science; or secondary care delivery systems such as medical laboratories where microcomputer applications would be suitable, the report said.

To date, the minicomputer option has not been feasible for these sectors of the medical care industry because of the relatively low volume of use compared with the system costs and the added expense of clerks and technicians required to support such systems.

In contrast, a single microcomputer system in combination with related peripherals could emulate the functions of a minicomputer system used in large hospitals, Frost & Sullivan suggested.

Adverse features of microcomputers have been their comparative limitations in speed and capacity and their limited capability to interface with many peripherals simultaneously.

But now, with improved chip structure, a retrieval time of 45 nsec compares favorably with minicomputer performance.

With this one disadvantage disappearing, microcomputers can do most of the smaller jobs now done by minicomputers at considerably lower prices — $500 for a typical expandable microcomputer as opposed to $2,500 for minis, the report said.

Although interfacing a battery of peripherals brings the total costs higher, the micro uses less expensive and fewer peripherals, it added.

Another advantage of the microcomputer cited by the study is that its random-access memory and read-only memories are durable, low-cost chips that can be easily and economically changed for new applications or maintenance.

Finally, the microcomputer has been fitted with floppy disks which are ideally suited for patients' business and medical records data, Frost & Sullivan noted.

Applications Sectors

The two major uses for micro-based medical systems in the primary care medical market (nonhospital) are administrative and clinical DP, with the clinical sector projected to account for more than $1 billion in sales during the 10-year forecast period.

Societal pressure for preventive medicine will fuel the demand for complete periodic medical examinations, which will regularly consist of a battery of tests, many of which could be automated.

In addition, health insurors and governmental payers are demanding greater cost effectiveness for health care and are accepting prepaid health plans (HMOs) and comprehensive group practices as a move in the right direction, thereby creating greater consumer demand for primary health care services, Frost & Sullivan noted.

In fact, the study observed 30 socioeconomic-political factors and 50 technological developments projected to contribute to the demand for microcomputer-based medical systems.

Of the physicians surveyed, 89% expressed interest in an automated system to handle physical exams and related clerical transactions.

Although the market potential is great, marketers have some difficulties to overcome. One particularly important hurdle is that medical instrumentation manufacturers are highly specialized and quite fragmented, with only a few makers interested in integrated instrument systems, the report noted.

The complete report is available from Frost & Sullivan, Inc. at 106 Fulton St., New York, N.Y. 10038.

Executive Corner

- Display Data Corp. has promoted John Cibula to vice-president of product development; Edmund LaRocca to vice-president of engineering; and David Sykes to vice-president for installation management.
- Grant L. Hansen has been named president of System Development Corp.'s Systems Group.
- Eliott D. James has been promoted to vice-president general manager of Harris Corp.'s Data Communications Division.
- Edgar M. Reynolds has been appointed president of Digital Products Corp.
- Robert W. Howe has been promoted to the position of executive vice-president of operations at Savings Management Corp.
- Ralph N. Miller has been promoted to vice-president of financial systems development at Cibar, Inc.
- Louis E. Pfeiffer has resigned as director of marketing at A.O. Smith Data Systems Division to become vice-president of marketing at Data Processing of the South, Inc.
- Karl H. Geng has been appointed vice-president for services in the Computer-Aided Design and Manufacturing Division of the Computervision Corp.
- Process Computer Systems, Inc. has named Tony Thomas vice-president of operations.
- Richard V. Palermo has been promoted to senior vice-president and general manager of peripherals at Datapoint Corp.
- Peter Preuss has become president of Integrated Software Systems Corp. of San Diego, Calif.
- Kenneth H. Agress has joined Computer Systems of America, Inc. as vice-president of marketing.
- Parker A. Stacy III has been appointed senior vice-president and treasurer of Mini-Computer Systems, Inc.
- Vincent J. DeSimone has joined Brandon Applied Systems, Inc. as vice-president of finance and administration. He succeeds vice-president Ronald S. Edwards Jr. who has been named assistant to the president for contractural matters and who will continue as secretary of the corporation.
- Robert J. Deffeyes has been elected president and chief executive officer of Graham Magnetics, Inc. of Graham and Fort Worth, Texas.
- Harry J. Clark has been appointed controller and chief financial officer at Computer Optics, Inc.
- Dean R. McKay, IBM senior vice-president, has been appointed a member of the company's corporate management committee. John F. Akers, IBM vice-president, succeeds McKay as group executive for the Data Processing Marketing Group.
- Evelyn Berezin has been appointed director of planning for electronic systems and equipment with Burroughs Corp.'s Office Products Group. Robert S. Scheidemantel Jr. succeeds Berezin as Redactron's president.
- Raymond E. Valle has been named general manager for Memorex Corp.'s CFI division.
- Gordon F. Gilchrest has become a senior vice-president of Insco Systems of Neptune, N.J.
- Rudolph P. Roscher has joined the Perkin-Elmer Corp. in its Data Systems Group, sales/service division, as vice-president of domestic sales for Interdata products.
- Bernard J. Fisher has been elected corporate vice-president of Data 100 Corp.
- Salvatore J. Cafiero, William J. Barron, Kemerer Edwards and Dwane L. Spohn have become senior vice-presidents at Insco Systems.

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Cross Took ICL Through 'Awe-Inspiring Years'

By **Ivan Berenyi**
Special to CW

LONDON — Early this year — just days before a five-year-old option expired — Geoffrey Cross, departed managing director of the UK International Computers Ltd. (ICL), bought 100,000 shares, at about $2.70 a share, in the company he headed until November 1977. The same day, ICL shares were changing hands on the stock market at about $4.50 each.

That bare transaction says a lot about Cross and about ICL. It was thanks to Cross and his five awe-inspiring years at ICL that the shares had reached such eminence. It was typical of the man that he should both cash in on his success and wait as long as possible before doing so in the hope that the stock would reach a record peak. When it comes to brinksmanship, colleagues testify, Cross is no man to play games with.

The happy position of ICL shareholders at the close of 1977 stemmed directly from the company's immensely improved trading profile in the wake of its takeover of Singer Business Machines' international interests, and of the former Cogar Corp. in the US. Cross had prophesied turnover of about $728 million; in fact it was about $762 million — a phenomenal 45% higher than the previous year. Pretax profits were up, too; at about $55.1 million, 31% above fiscal 1976.

The good news was marred only by Cross' hurried departure from the company. No satisfactory explanation has yet emerged for this. The architect of one of the biggest success stories in Britain for years left his company just 1-1/2 months before the figures that would confirm that success were to be published. It is so unlike Cross that speculation immediately began as to what lay behind his move. The publicly stated reason — his children's bronchitis — was never taken seriously.

There is no doubt that Cross' convoluted financial arrangements with ICL — under which he was repaid double taxation through a shadowy U.S. company called G.R. Cross & Associates, Inc. — had embarassed both him and the UK government, which appeared to have connived at breaches of its own pay restraint policy.

It has been suggested that a too-keen interest in the details of his contract by Britain's tax authorities — together with the ICL board's hesitation to get his bonus paid through Plessey-U.S. once the Cross & Associates laundry operation had been uncovered — contributed to his decision, but that has never been unequivocally confirmed.

Frustrations With Firm

There is no doubt that Cross was beginning to feel frustrated at ICL. He had publicly despaired of ever shedding the 7,000 superfluous workers whom he believed stood between ICL and long-term profitability; Britain's all-powerful unions would never let him remove more than 2,500 employees.

He wanted ICL to continue on the highly lucrative acquisition trail following the Singer deal, but the government — thinly disguised as the National Enterprise Board, ICL's major shareholder — had gotten cold feet and firmly turned down a no less spectacular stalk of minicomputer manufacturer Data General Corp.

What had not emerged at the time — or anyway, what had been ignored in the general euphoria over ICL's recovery from the rocky early '70s — was the growing trouble with the new 2900 range of large systems.

Warning notes had certainly been sounded. One major university user had castigated the top-of-the-range 2980 as so slow that it was outperformed by ICL's obsolete 1906A. The British Steel Corp. had very damagingly announced that the new ICL range was not even going to be considered for the next round of hardware replacements.

But a thick layer of public relations had been laid over the teething problems of the new range. No one disputes the sophistication of the architecture; it is the operating software that causes the headaches.

When Geoffrey Cross took over at ICL, an operating system known as System B was at an advanced stage of development. It was later to become the VME/B operating system of the larger 2970 and 2980 models in the new range.

Credibility Gap

But at a critical point, Ed Mack, longtime associate of Cross with whom he had formerly worked at Univac, was appointed to head software development for the new machines. Mack, whose experience was entirely with transaction-oriented systems, had little sympathy for the all-purpose system B concept and removed many of the most talented software men from the team to work on a new system that was to become VME/K, implemented on the smaller 2950 and 2960 machines.

The result is that a large credibility gap hangs today over both systems, but particularly over VME/B. A report by Edinburgh University, one of the first 2980 users, showed that in mid-1977 the mean time between system crashes was as low as 3.9 hours. Later the university reported that this had actually declined to 3.8 hours after the introduction of the latest release, known as SV21.

At the end of February this year, a UK government watchdog committee on public spending reported that the delays to full operational performance of the new 2900 systems had cost Britain "many millions of pounds." It cited just two Ministry of Defense systems that had incurred costs above their budget of about $18 million because of operational inadequacies.

The report from the comptroller and auditor-general came just days after Reay Atkinson, head of the Central Computer Agency, which buys all the government's hardware, effectively gave ICL notice that it could no longer rely on preferential treatment if its equipment did not come up to scratch.

For American users, much of this is academic, since the change of ICL's ever selling a 2970 or 2980 in the U.S. is fairly remote. Most of ICL, Inc.'s customers are users either of the highly successful 2903 small business system and its derivatives, or — latterly — of Singer/Cogar 1500 intelligent terminals.

But if the large 2900 series should prove complete white elephants, the implications for ICL's long-term survival could be very serious.

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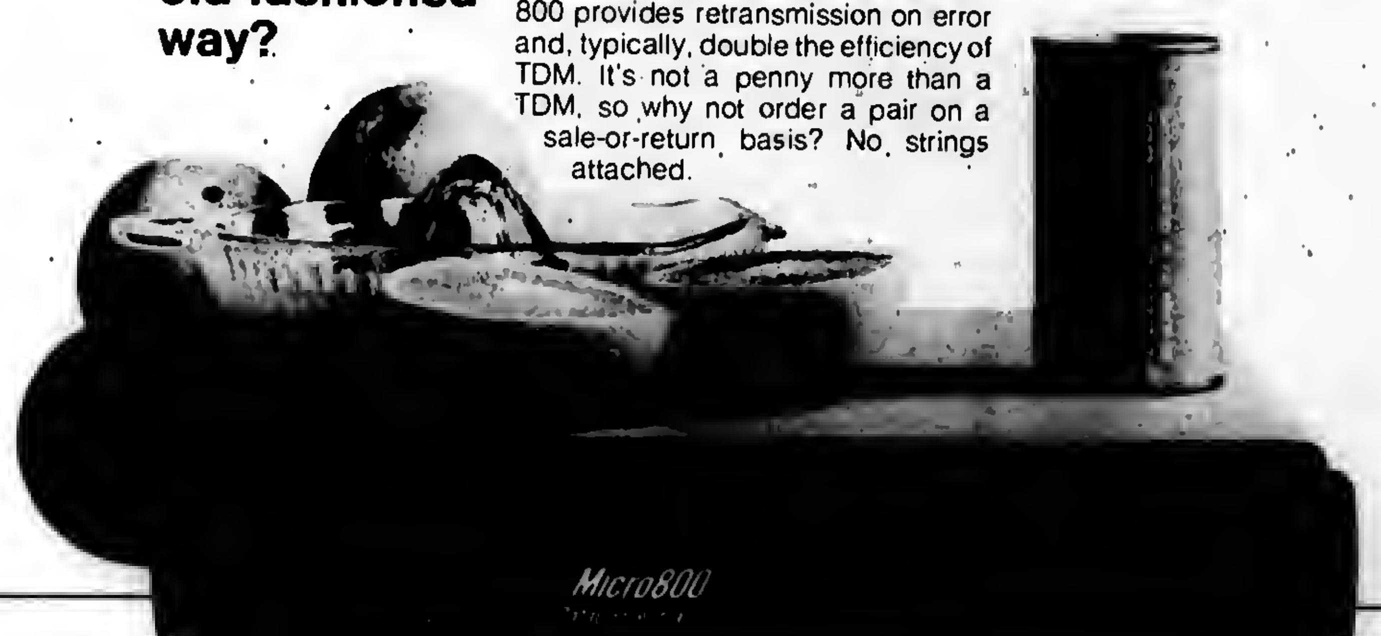

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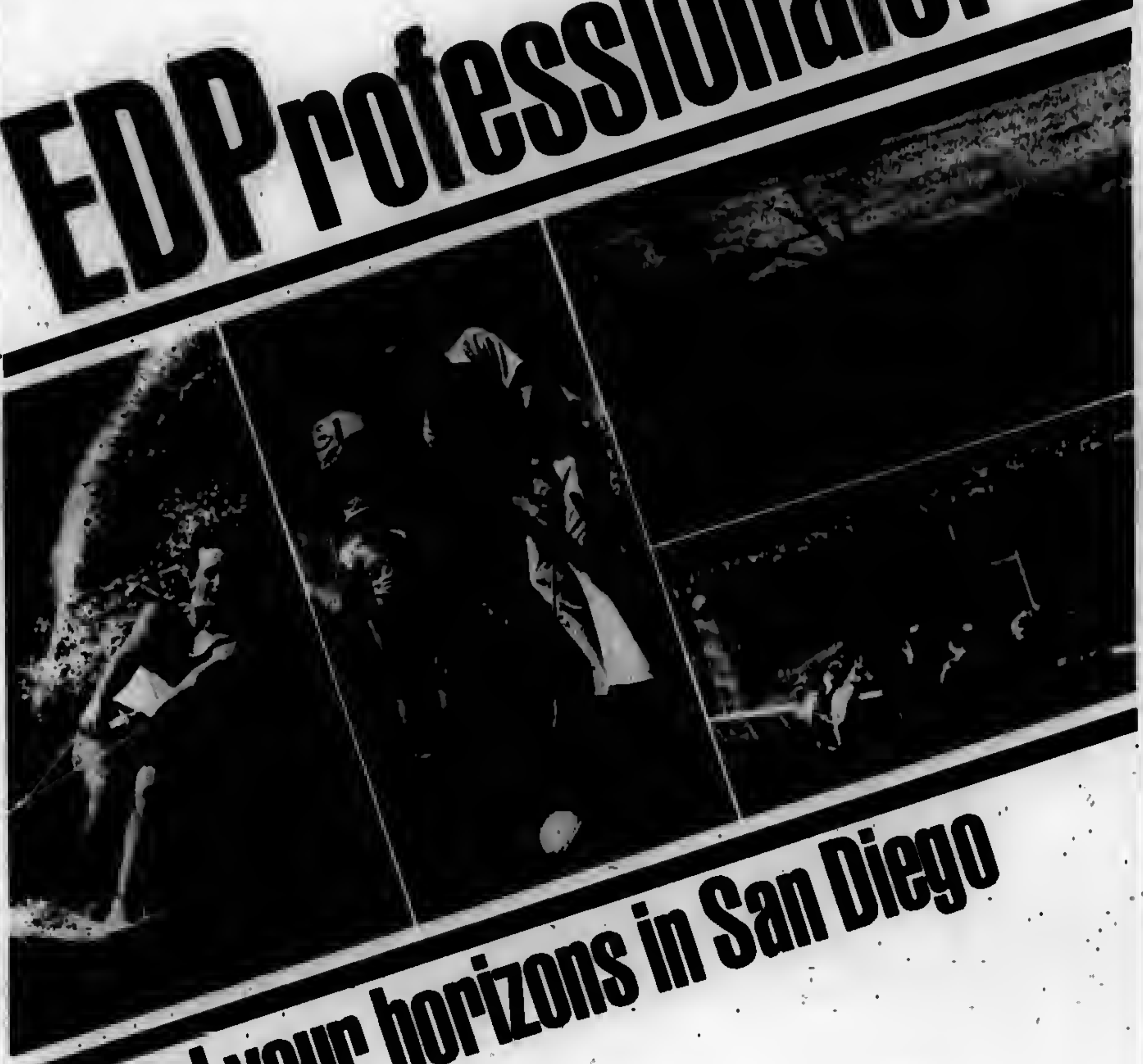

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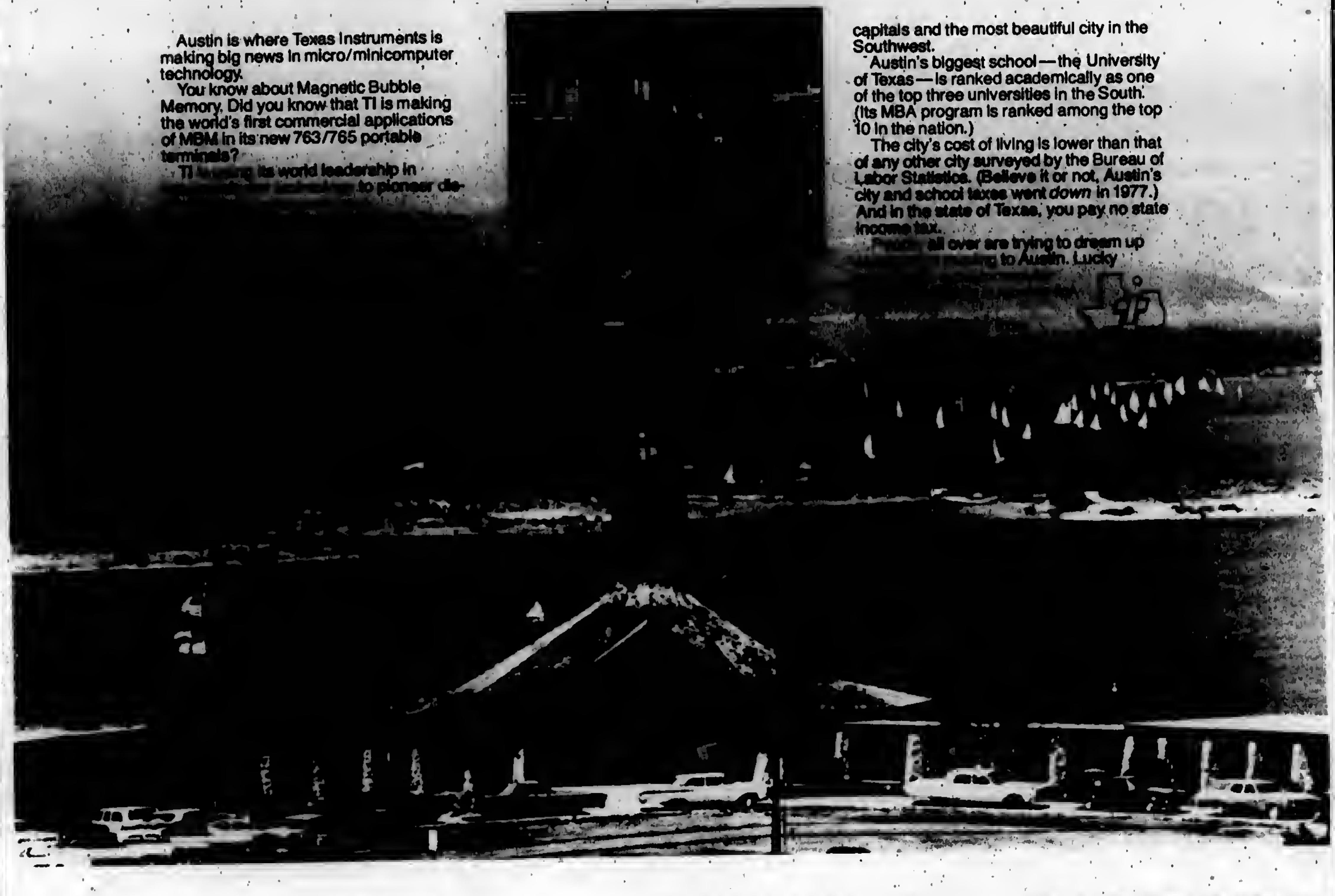

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Perform detail stress analysis, reliability predictions, and life testing of new minicomputer products with 1-4 years' experience and BSEE.

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Support field engineering, analyze customer systems applications, competitive market analysis, and market planning/execution with an MBA and undergraduate technical degree with 1-5 years' computer experience.

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Responsibilities through marketing for software products including research, competitive analysis, and coordination with software development. Must have a CS degree.

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Responsible for long-range planning of computer and systems products, market segment definition, market share studies for minicomputers. 5-7 years' experience in computer marketing.

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(512) 258-7242.

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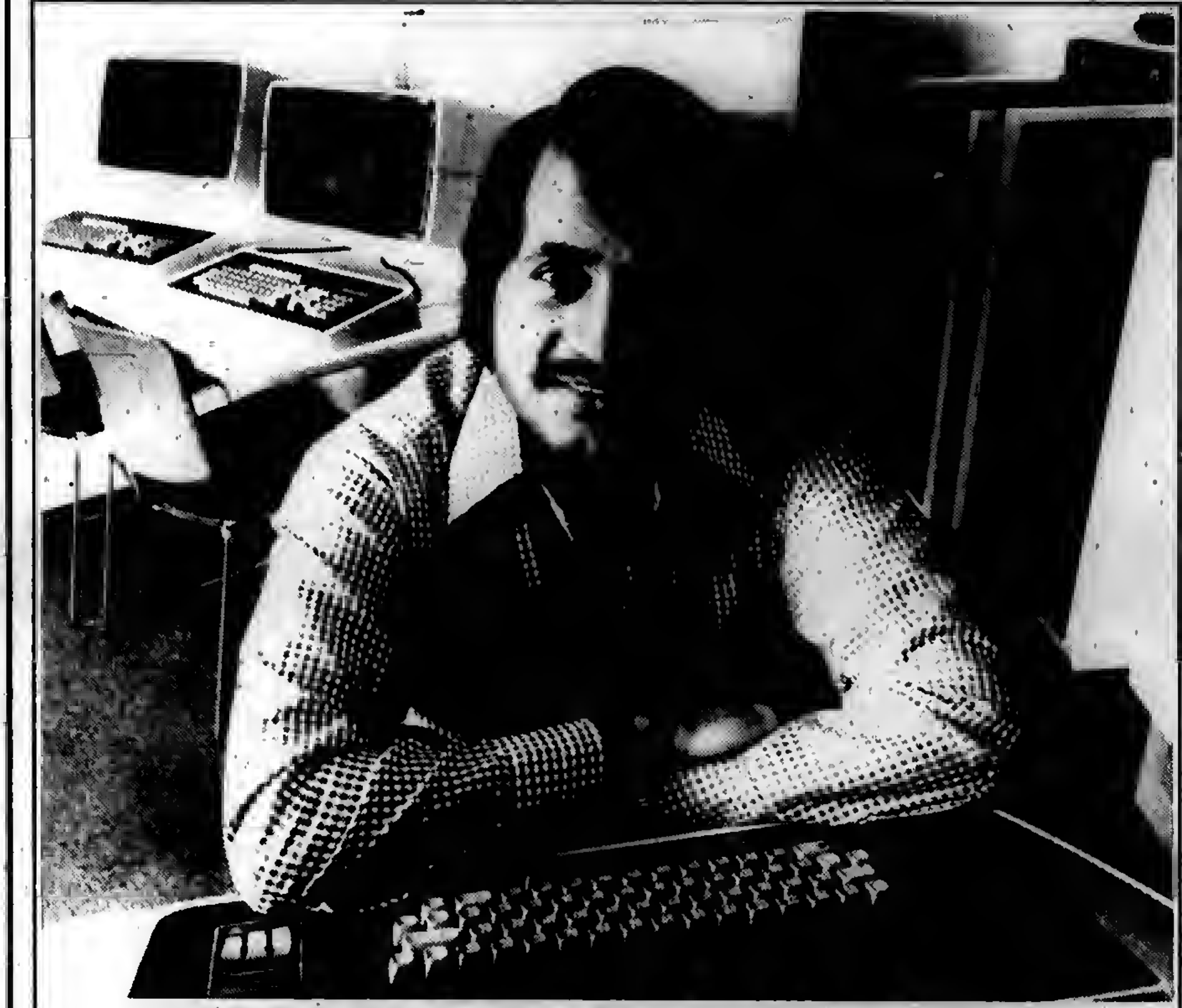

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SYSTEMS ANALYST Dallas	Installation, modification, quality assurance of COBOL and Fortran Compilers and associated execution libraries.
COMPUTER ENGINEERS Dallas	Maintain multiple coupled 1108's.
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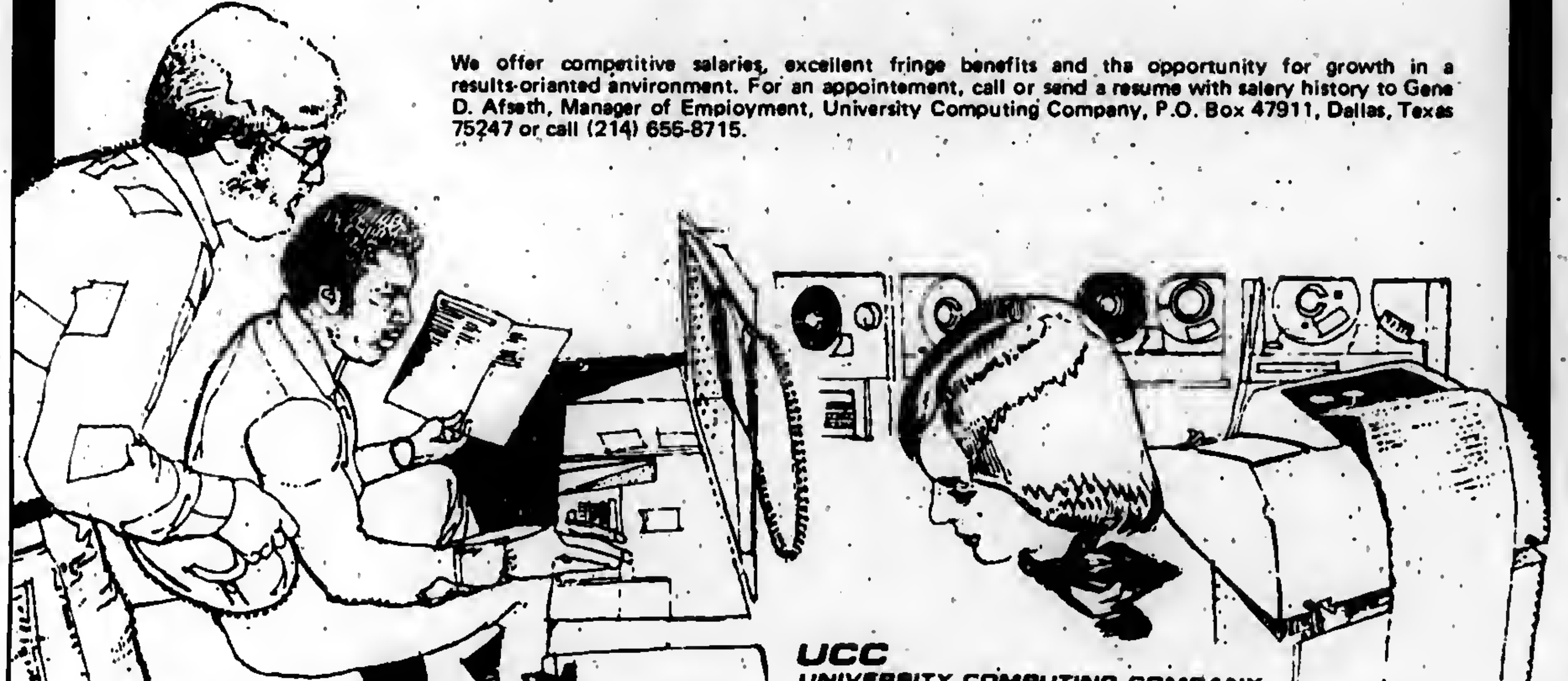
We offer competitive salaries, excellent fringe benefits and the opportunity for growth in a results-oriented environment. For an appointement, call or send a resume with salary history to Gene D. Afseth, Manager of Employment, University Computing Company, P.O. Box 47911, Dallas, Texas 75247 or call (214) 656-8715.



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A SYSTEMS ANALYST

is needed in the Developmental and Special Services Group for the Educational Network in West Virginia. The responsibilities will include consultation on DEC and IBM hardware/software, provision of seminars and documentation, applications analysis and programming. Applicants should have at least one year of experience providing similar services preferably in a mixed vendor network environment and should possess good oral and written communication skills. A college degree in an engineering, scientific, or computer discipline or equivalent is required. Apply by May 26 to Dick Bryan, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505 (304) 293-5192.

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Submit resume or call (714) 571-2102

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Programming Opportunities

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Datapoint is the leader in "Dispersed Data Processing", with profitable sales in excess of $103 million. Datapoint has experienced a continuous annual growth of 45% for the past five years, with the last quarter setting new records in all areas.

About Programming Opportunities:

Positions require a minimum of 1 year of programming experience and a B.S. in Computer Science or equivalent. Your function will be to write new programs and modify existing programs. Duties will include coding, testing and implementing new programs, modifying existing programs, and assisting in the analysis and design of programs. You will also write user documentation for programs and prepare regular status reports.

About San Antonio:

San Antonio, the corporate headquarters, has excellent year round climate, no state or city income tax, low cost of living, excellent schools, hospitals, cultural activities and outstanding residential areas.

We offer an outstanding compensation package and every opportunity for both personal and professional growth.

Qualified applicants are invited to send resume with salary history, in confidence, to Don Haynes, Datapoint Corporation, 9725 Datapoint Drive, Mail Station M-83, San Antonio, Texas 78284.

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Wang is second only to IBM in the small business computer field according to four independent EDP surveys. And now we're no longer satisfied with "small." Witness the tremendous acceptance of Wang's new 2200VS 32-bit virtual memory system. The success of this larger computer in the marketplace has created challenging new opportunities for creative software professionals. If you are looking for a growth computer manufacturer, consider the following positions at our headquarters in Lowell, Massachusetts.

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As part of a team that has corporate responsibility for test software, you will be designing software and firmware test systems for microprocessor control computer systems and associated peripherals. Specific areas include telecommunications, I/O processing, on-line and off-line system testing and much more. In new product development, you will be involved from the design stage through the manufacturing process to customer engineering user interface, solving problems and suggesting design changes where necessary. This is a high-visibility position, offering responsibility and exceptional growth potential. The ideal candidate will have a BS in Engineering and an understanding of computer architecture and logic design, and experience in assembly language programming, preferably 8080, and previous test software developr.ent experience a definite plus.

Systems Programmers

As a leading manufacturer of sophisticated computer systems and related peripheral devices, Wang is constantly on the front line of systems development. Right now, we're redeveloping a microprocessing network into a dynamite general purpose computer. The research and development group engaged in this project requires the immediate aid of several sharp programmers. For generally creative individuals, this is an excellent opportunity to help formulate new technologies in a dynamic environment. To excel in these positions, you should have toptlight experience in compilers, linkers, data entry, word processing, PL/M, PL/1, LISP and/or BASIC. An MS degree is preferred.

If you have insight to offer, the place for you is Wang.

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The advanced research group at Wang Laboratories is investigating new computer architecture for future implementation in our new products. If loose and tightly coupled multiprocessor systems, distributed data management, network architecture and new CPU design are the kinds of problems you wish to investigate, please send in your resume.

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When was the last time you had the chance to design and implement a major new data base project? Well, here's the challenge: we seek expertise gained through experience or education in data base models, higher level query languages, data description and data dictionary support, lower level data sub-languages, storage structures and access methods. While specific experience is important we feel that your desire to go beyond present DBMS state-of-the-art by providing creative solutions for future data base requirements is a plus. If you'd like to contribute in an environment which places a premium on your ideas, send in your resume.

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Design and development of systems software for data communications on Wang's computer and word processing systems in an R&D environment. Minimum 2-3 years experience assembly language and one higher level language, plus BS/MS desired.

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We offer salaries commensurate with experience and ability and comprehensive benefits. Please send resume, including salary history, to Stephen E. Pitt, Manager Professional Recruiting, Wang Laboratories, Inc., One Industrial Avenue, Lowell, MA 01851. (617) 851-4111, and/or call our TOLL FREE NUMBER 1-800-225-0654 (please specify account number 02179).

Interviews can be arranged during the IEEE Conference on Software Engineering. Call Mr. Eugene Cosloy at (404) 577-1760 at the Hyatt Regency Hotel in Atlanta, Georgia on May 10th, 11th and 12th.

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Successful applicant should have at least two (2) years' management experience in computer operations. Manufacturing background desirable. We offer top salary, commensurate with experience, liberal relocation policy, excellent company benefits, and an opportunity to join one of the nation's leading manufacturing companies.

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We are seeking a Manager of National Accounts who is a data processing professional with 7-10 years experience. Supervisory background is required with exposure to national accounts helpful. The ability to deal with top customer executives as well as internal managers is a must. You must be a problem solver with the ability to supervise individuals whose goal will be customer satisfaction. You will report to the Vice President of Field Operations.

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We offer an outstanding compensation package and unlimited opportunity for both personal and professional growth.

Qualified applicants are invited to send resume with salary history, in confidence, to Dan Haynes, Datapoint Corporation, 9725 Datapoint Drive, Mail Station M-83, San Antonio, Texas 78284.

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BASF

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A Houston based Data Processing company has a requirement for an experienced manager of Systems Programming.

Ideal background for this large, multiple - CPU, online, OS/VS installation would include 2-4 years experience in management of a Systems Programming function in a commercial organization with related knowledge in the areas of IMS, TSO and overall communications systems.

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on the San Francisco Peninsula

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An experienced Programmer with a working knowledge of FORTRAN and COBOL from one dialect to another. Candidate must have the ability to work with a high degree of independence.

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Begin your career in technical writing, or allow us to make use of your experience in our technically challenging environment, documenting state-of-the-art software for the world's leading large-scale computer systems. You will be involved in preparing user manuals supporting CDC's software product line, including ALGOL, FORTRAN, PL-1 and data management languages. Ideal candidate will have BS degree in Computer Science with some writing experience, or a combination of equivalent skills/education.

Data Base Management

Participate in the design, implementation and maintenance on a variety of data management projects including new features in the data description language and the data base access product. A working knowledge of block structured languages is required. Familiarity with an assembly language is highly desirable.

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Provide development and continuation support for the STAR computer. Candidates will develop and maintain code written in a higher-level language for the STAR-100 computer. Knowledge of OS, FORTRAN and assembly languages is desirable.

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Join us in developing and improving product testing techniques. You will be involved in developing tests for PL-1, ALGOL, FORTRAN, BASIC and systems utilities, or performing as a team leader in providing technical direction for the software products

If you are ready to work with the best talent and technology the industry has to offer, take advantage of these opportunities now. We provide excellent compensation and comprehensive benefits, including dental and retirement plans. Qualified candidates are invited to send resumes in confidence to Karen Hardy, Dept. 50-A, 215 Moffett Park Drive, Sunnyvale, CA 94086.

CONTROL DATA
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Motorola provides progressive salary and benefits programs. Please send resume to:

Professional Staffing Department 23

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SR. SYSTEMS ANALYSTS SR. PROGRAMMERS

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Individuals with substantial project management experience. Must possess application software knowledge in manufacturing and accounting systems, and skill in customer/client relationships. These candidates will be accountable for full implementation activities as well as cost and schedule performance.

SYSTEMS PROGRAMMER

Will function as system network coordinator and internal technical consultant to application software staff. Requires demonstrated programming experience to include systems programming. Experienced in HP-3000 operating systems software including DBMS and DS.

SR. SYSTEMS ANALYSTS

These individuals will be responsible for application software implementation at division and subsidiary locations. Heavy manufacturing/accounting knowledge is required. Prior experience in software installation is desired.

SR. PROGRAMMERS

Minimum of four years COBOL programming experience preferably in order entry and/or standard cost applications. These individuals will be assigned to major developmental work, and subsequently assist in installation of the systems throughout the company.

Find out more about these positions and the other advantages of working at BOURNS by sending a resume with salary history and requirements to:

Jim Concheloa

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SENIOR PROGRAMMER/ANALYSTS

We currently have openings at our Administrative Headquarters in Columbus, Ohio for Senior Programmer Analysts.

The Candidate:

- Solid OS-COBOL 370 experience
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- BS/BA degree preferred
- Ability to communicate well with all levels of management
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(Operational)

The ideal candidate will possess a B.S.I.E. or M.E. degree and an MBA with more than two years experience in audit of marketing, manufacturing and administration organizations or B.S. degree, C.P.A. and more than two years internal operations audit experience within a large multi-divisional corporation. Position requires more than 25% national/international travel.

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Degrees or advanced educational backgrounds will also be qualifying requirements for this position. Please send resume including salary history in confidence to:

Manager, Corporate Employment

National Can
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Systems Manager

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SYSTEMS PROGRAMMERS

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ATTN: Joe Papa

NORTON COMPANY
SYSTEMS ANALYSTS & PROGRAMMERS

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We are looking for experienced Systems Analysts with indepth knowledge in design, development and implementation of computer-based information systems. These openings offer exciting challenges to individuals ready to accept a project leadership role and accountability for results. Required: degree, thorough knowledge of computer programming techniques, experience in design of data base oriented systems. Experience in Marketing and Manufacturing Systems a plus.

PROGRAMMERS

We are seeking candidates with at least two years of extensive COBOL programming experience. College level education in an analytical discipline is desired. Experience in the following areas is desirable: IMS on-line data base applications; structured design and programming; interactive programming in TSO environment; and systems utilities and JCL. Application knowledge in the area of manufacturing, marketing and finance is also a plus.

Norton Company offers excellent starting salaries and a comprehensive benefit program. Interested and qualified candidates should send resumes to:

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The Computer Center provides services to instructional, research and administrative users throughout the campus. The Director is responsible for the management of all resources, services and personnel of the Computer Center. Candidates should have a bachelor's degree, appropirate technical knowledge and successful management experience. Salary will depend on qualifications and experience. Salary will depend on qualifications and experience. Please forward letter of application, resume and three letters of reference by June 15 closing data to Chairman, Director of Computer Services Search Committee, c/o Vice President for Business and Financial Affairs, Mitchell Hall, Central Washington University, Ellensburg, WA 98926. Minorities and women are encouraged to apply. AA/EEO/Title IX institution

SYSTEMS PROGRAMMER

Challenging opportunity for a programming professional to fill this key position within our company. Responsibilities will include the generation and performance evaluation of DOS/VS, CICS/VS, and VSAM as well as other systems software. We are developing major application software which will provide excellent growth potential in the area of telecommunications. This position offers a salary limited only by your ability, a competitive benefit program, and a chance to work with the latest IBM hardware and software systems. Please contact:

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As a result of expansion, we are currently seeking programmer/analysts for our medium-sized installation which supports TOSCO'S diversified operations throughout the U.S. Our basic hardware/software configuration is IBM 370/145, OS/VS-2, HASP with on-line librarian.

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Large, Houston-based financial organization has a requirement for an individual to assist in long range hardware planning, equipment evaluation and computer performance measurement in a multiple CPU, online enviroment.

Ideal background would include 2 or more years of planning equipment acquisition based on organizational requirements or 3-5 years progressive System Programming/Technical Analysis experience in a large IBM shop.

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Iran

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IBM System 3 and RPG II programming axperience required.

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PROGRAMMER ANALYSTS

Growth company seeks individual with min. 3 years experience & proven problem solving ability from design through implementation. 3 years experience on IBM 370 equipment required. Language - COBOL under DOS/VS. Additional desirable experinece includes RPG, CICS, DL/1, SPMOL, & TP. Salary commensurate with experience & ability. Superior, fully paid benefit package. Send full resume including salary history and requirements to Personnel Manager, P.O. Box 1502, Savannah, Ga. 31402. Equal Opportunity Employer Male/Female.

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SYSTEMS ANALYST
PROGRAMMERS

Altanta-based management consulting firm presently has openings for systems analysts with recent design and programming experience in the implementation of large-scale management information systams. Health care applications experience is preferred. A minimum of 4 yaers axperience including programming design is required. Computer language background should be heavy in IBM COBOL, OS/VS and JCL. A knowlege of TSO would be helpful. Occasional travel is necessary. A college degree is required. Applicants should submit resume including salary history to:

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These are sample listings. We have many, many more, particularly in the PROGRAMMER/ANALYST AREA with good companies and good locations. Agency fee, interview & relocation expenses assumed by client companies.

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Maintain ACP realtime software; evaluate new support requirements/enhancements, develop modifications; minimum of 8 years, ACP internals; working knowledge of the following areas are required: 2305/3340 I/O handling, Tape I/O handling, Hypervisor, VMA support, Capture/Restore, Test vehicle support, System initialization, and ACP generation.

For both positions, prefer experience with ACP Release 8.1 and beyond; and IBM 370/168 hardware. Familiarity with SVS in a PARS support role is a plus; Bachelors degree in Mathematics, Computer Science, Engineering required.

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Send resume to: Personnal Coordinator, P.O. Box 2218, Redding, California 96001.

DATA PROCESSING CAREERS

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Automated Data Processing Division, the computer center for New Mexico state government, has openings in the following areas:

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• Systems Analysts	16 - 24K
• Programmer Analysts	14 - 22K
• Development Programmers	12 - 18K

Hardware consists of 370/158 and 370/145, a teleprocessing network of some 200 terminals. We are using OS/SVS with HASP, CICS, COBOL, ATMS/STAIRS, APL, PL/I, FORTRAN IV, ASSEMBLY, INTERACTIVE PROGRAM DEVELOPMENT VM/370.

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For further information contact
Gene A. Veldes, Personnel Administrator, Room 427, State Capital Building, Santa Fe, New Mexico 87503. (Telephone (505) 827-2601 or 827-2948).

The State of New Mexico is an equal opportunity/affirmative action employer.

SYSTEM PROGRAMMER

(OS/VS1)

We have an immediate need for an experienced System Programmer to complete our system technical services staff. Currently we are operating a 138 running under VM/370 and DOS/VS. We are planning an upgrade to a 3031 and adding OS/VS1. Successful candidate must have the ability to assist in this upgrade and to generate OS/VS1. You will also be responsible for OS/VS1 training.

If you have OS/VS1 sysgen experience and have the desire to enjoy the beauty and recreational opportunities that Montana has to offer, send your resume or call COLLECT to: Mr. Ed Wadsworth, The Anaconda Company, Butte, Montana 59701, Phone (406) 723-4311 Ext. 356.

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data processing

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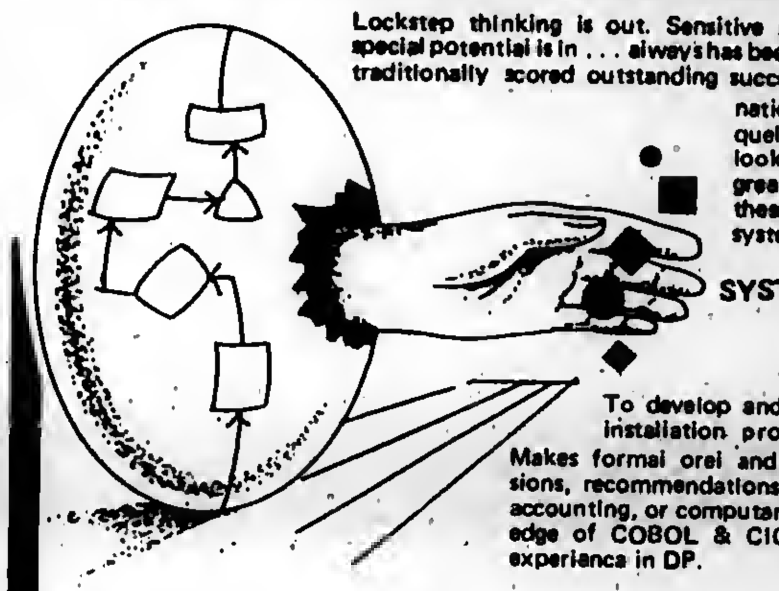

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Responsible for systems design flow and test segments, must be able to translate SA requirements into feasible design. Will write complete programs specifications including flow charts showing systems linkage, data movement and resource requirements. Will also design file structures, forms, reports, and procedures for data collection, processing and control. Needs 2-4 years college plus minimum 4 years experience in programming and systems.

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Minimum of 3 years programming experience. Knowledge of ANS COBOL and IBM 370 DOS/VS.

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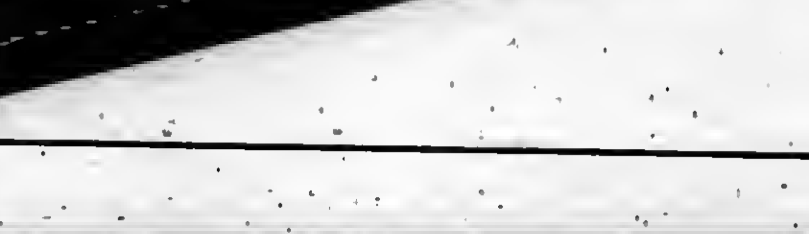
This new Department will play a major role supporting the delivery of criminal justice, welfare, health care, and other essential services to over one million people. It will combine the existing centralized Data Processing Center with a new Information Management Division, which will coordinate Countywide distributed systems, data bases, standards and training.

The Department's budget of ten million dollars will include a staff over over 200, two 370/158's and a 370/155 serving more than 600 terminals in eight Bay Area counties. Distributed equipment will incude twelve minicomputers, and more installations are planned.

Alameda County is located in a lively, beautiful, varied area of great culture, climate, history and dynamic change. It encompasses thirteen cities, including Berkeley, site of the University of California.

To meet the challenge of this position, the Director of the Information Services Department must have strength, intelligence and a flexible, innovative approach; be a good listener and an articulate, dynamic communicator; display and inspire trust; have a broad management background including data processing; work effectively in County government; understand current issues and future trends of this technical field; have a service philosophy and be able to instill it in others; be able to attract, select, and retain quality personnel; and be committed to affirmative action.



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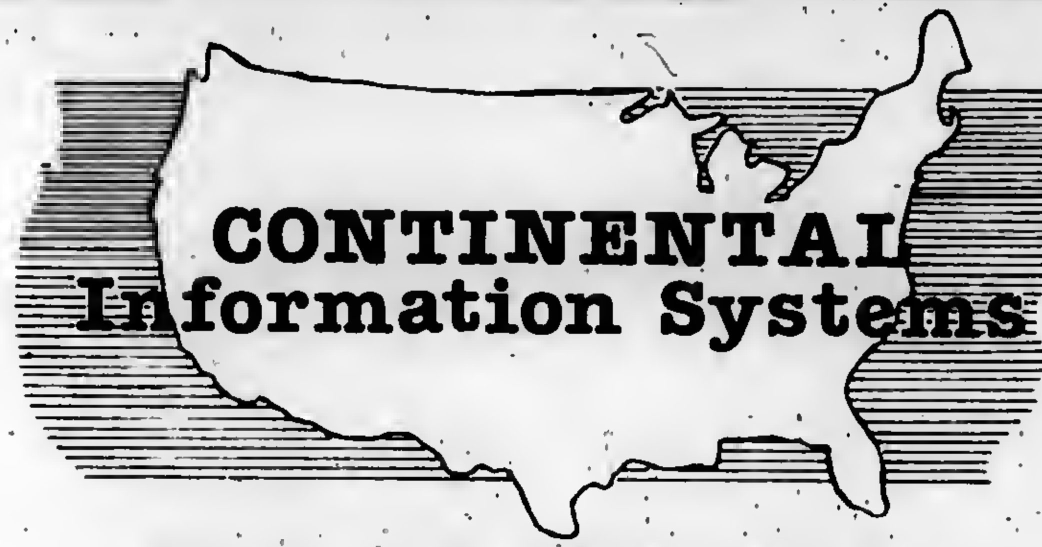

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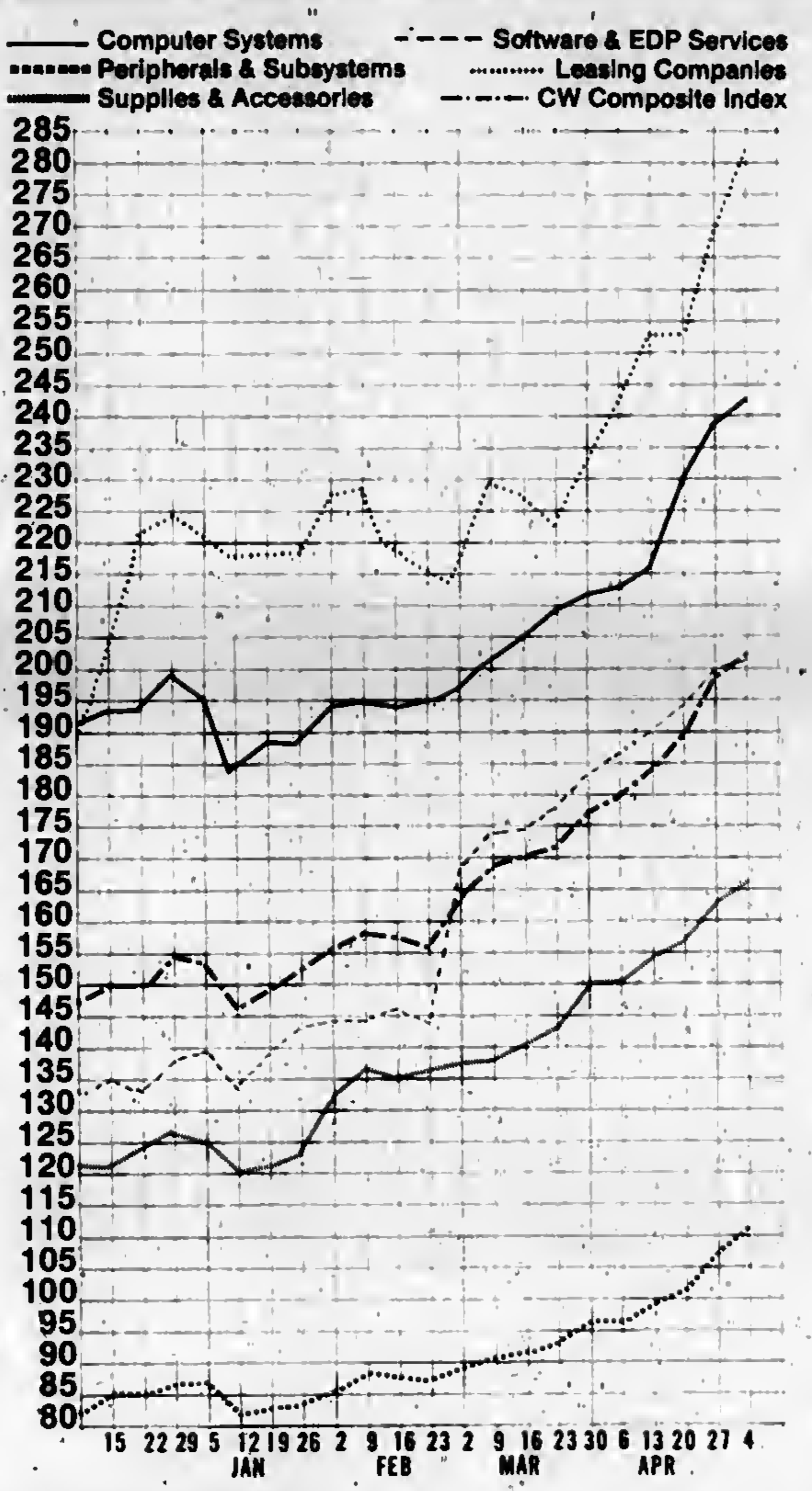

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Three Months Ended March 31

	1978	a1877
Shr Ernd	$.46	$.41
Revenue	77,092,000	64,056,000
Eernings	7,185,000	6,055,000
9 Mo Shr	1.31	1.13
Revenue	217,370,000	180,833,000
Eernings	19,475,000	16,858,000

a-Restated.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 3, 1978

All statistics compiled, computed and formatted by
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Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCN		PRICE 1977-78 RANGE (1)	CLOSE MAY 3 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMOANL CORP	22- 56	55 3/8	+ 7/8	+1.6
N	BURROUGNS CORP	55- 91	68	-1 7/8	-2.6
O	COMPUTER AUTOMATION	18- 30	29 3/4	+1 1/4	+4.3
N	CONTROL OATA CORP	20- 31	30 1/4	+1 1/2	+5.2
O	CRAY RESEARCN INC	15- 42	41 1/2	+3 3/4	+9.9
N	OATA GENERAL CORP	35- 55	52 3/4	+ 3/4	+1.4
N	OATAPOINT CORP	18- 50	49 1/8	+1 7/8	+3.9
N	OIGITAL EQUIPMENT	37- 53	44 3/4	+1 1/2	+3.4
N	ELECTRONIC ASSOC.	2- 5	5 1/8	+ 1/4	+5.1
A	ELECTRONIC ENGINEER.	8- 17	16 7/8	+ 1/8	+0.7
O	FOUR-PNASE SYSTENS	13- 28	27 1/8	+2 1/8	+8.5
N	FOXBORO	28- 54	33 1/8	-2 3/4	-7.6
O	GENERAL AUTONATION	6- 10	9 1/8	- 3/4	-7.5
O	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARO CO	62- 87	75	- 1/8	-0.1
N	HONEYWELL INC	43- 55	50 7/8	+ 1/8	+0.2
N	IBM	236-286	263 1/4	+ 7/8	+0.3
O	MANAGEMENT ASSIST	5- 15	14 3/4	0	0.0
O	MICROOATA CORP	7- 18	12 1/8	+ 1/2	+4.3
O	MINI-COMPUTER SYST	5- 12	5 3/4	0	0.0
O	NOOULAR COMPUTER SYS	5- 13	12 3/4	+1 1/8	+9.6
N	NCR	32- 52	50	0	0.0
O	PRIME COMPUTER INC	12- 38	37 3/8	+ 5/8	+1.7
N	PERKIN-ELMER	17- 22	19 1/8	-1	-4.9
N	RAYTHEON CO	16- 42	40 3/8	-1 1/4	-3.0
N	SPERRY RANO	30- 42	39 1/4	- 1/4	-0.6
O	SYCOR INC	8- 23	22 7/8	+ 3/8	+1.6
A	SYSTEMS ENG. LABS	5- 16	15 1/2	+1	+6.8
A	WANG LABS.	10- 20	18 1/2	- 1/8	-0.6

LEASING COMPANIES

EXCN		PRICE 1977-78 RANGE (1)	CLOSE MAY 3 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 6	5 7/8	0	0.0
C	BOOTNE COURIER CORP	8- 16	16 5/8	0	0.0
O	COHOISCO INC	9- 17	16 1/4	+ 1/4	+1.5
A	COMMERCE GROUP CORP	1- 5	7/8	0	0.0
A	CONPUTER INVSTRS GRP	1- 2	1 1/8	+ 1/4	+28.5
M	OATRONIC RENTAL	0- 2	1 5/8	0	0.0
A	OCL INC	1- 4	3	+ 1/4	+9.0
N	OPF INC	6- 11	11	+1 1/8	+11.3
N	ITEL	13- 24	23 1/4	+1 1/2	+6.8
N	LEASCO CORP	19- 34	32 3/4	- 1/4	-0.7
O	LEASPAC CORP	1- 2	1 3/4	0	0.0
A	PIONEER TEX CORP	5- 11	5 5/8	- 1/4	-4.2
N	U.S. LEASING	10- 16	15 1/8	+1	+7.0

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EOP SERVICES

EKCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 3 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCEO COMP TECN	0- 2	1	0	0.0
O	ANACOMP INC	7- 12	11 1/4	0	0.0
A	APPLIEO OATA RES.	5- 13	11	-1 1/2	-12.0
N	AUTOMATIC OATA PROC	23- 30	29 1/2	- 1/4	-0.8
O	COLEMAN AMERICAN COS	1- 2	1 1/2	+ 1/8	+9.0
O	CONPU-SERV NETWORK	7- 15	7 1/2	0	0.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
C	COMPUTER NORIZONS	1- 2	2 1/4	0	0.0
C	COMPUTER NETWORK	6- 11	9 7/8	+ 3/8	+3.9
N	CONPUTER SCIENCES	7- 12	11 1/8	- 1/2	-4.3
C	CONPUTER TASK GROUP	1- 2	2 3/4	+ 1/2	+22.2
O	CONPUTER USAGE	1- 3	3 3/8	+ 3/4	+28.5
C	COMSNARE	5- 12	11 1/2	+1	+9.5
O	OATA OINENSIONS INC	3- 5	3 5/8	- 5/8	-14.7
O	OATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC OATA SYS.	14- 20	19	+ 7/8	+4.8
O	INSYTE CORP	2- 3	1 3/8	- 1/8	-8.3
C	IPS COMPUTER NARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 1/2	- 1/4	-6.6
C	KEYOATA CORP	1- 3	2	- 1/8	-5.8
A	LOGICON	7- 17	13 1/8	+ 3/8	+2.9
A	NANAGEMENT OATA	1- 2	1 1/8	- 1/8	-10.0
A	NATIONAL CSS INC	10- 22	22	+2	+10.0
O	HATIONAL OATA CORP	4- 12	11 1/4	+ 3/4	+7.1
A	OH LINE SYSTEMS INC	16- 24	22	+ 5/8	+2.9
N	PLANNING RESEARCN	3- 6	5 1/4	+ 3/8	+7.6
O	PROGRANMING & SYS	1- 1	3/4	0	0.0
O	RAPIOATA INC	2- 5	4 1/2	0	0.0
O	REYNOLOS & REYNOLO	17- 25	23 1/2	- 1/2	-2.0
O	SCIENTIFIC COMPUTERS	1- 4	5 1/4	+ 3/8	+7.6
O	TYMSHARE INC	14- 23	22	+ 3/8	+1.7
A	URS SYSTENS	4- 6	5 3/4	- 1/4	-4.1
N	WYLY CORP	1- 5	4	- 3/8	-8.5

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 3 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	AOORESSOGRAPH-MULT	10- 20	18 1/2	+ 1/8	+0.6
O	AOVANCEO MEMORY SYS	7- 12	11 3/4	- 1/8	-1.0
N	AMPEX CORP	8- 15	14 5/8	+ 3/8	+2.6
O	ANOERSON JACOBSON	3- 8	7 7/8	+1 3/8	+21.1
N	APPLIEO OIG OATA SYS	10- 20	13 7/8	- 1/2	-3.4
O	BEENIVE INT'L	5- 12	5 5/8	+ 1/4	+4.6
A	BOLT,BERANEK & NEW	6- 9	8	+ 3/4	+10.3
N	BUNKER-RANO	8- 17	16	+1 3/8	+9.4
A	CALCOMP	3- 7	7	+ 3/4	+12.0
O	CAMBRIOGE MEMORIES	1- 5	4 5/8	+ 7/8	+23.3
N	CENTRONICS OATA CONP	16- 30	22	+3	+15.7
C	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER CONMUN.	5- 8	8 5/8	-1	-10.3
C	COMPUTER CONSOLES	4- 7	6	0	0.0
A	COMPUTER EQUIPMENT	2- 5	4 1/2	- 1/4	-5.2
O	CONPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 21	20 3/4	+2	+10.6
N	CONRAC CORP	19- 28	23 1/8	+2	+9.4
O	DATA ACCESS SYSTEMS	4- 5	4 1/2	0	0.0
O	OATA 100	6- 16	15 1/2	+1	+6.8
A	OATA PRODUCTS CORP	9- 20	18 3/4	- 1/8	-0.6
O	OATA TECHNOLOGY	3- 4	4	0	0.0
O	OATUM INC	1- 4	3 7/8	0	0.0
O	OECISION OATA CONPUT	2- 3	1 5/8	- 1/8	-7.1
O	OELTA OATA SYSTENS	1- 1	1/4	0	0.0
A	OOCUNATION INC	6- 16	15 3/8	+ 3/4	+5.1
O	OATARAM CORP	2- 24	19 1/4	- 3/4	-3.7
N	ELECTRONIC M.& M	4- 6	5 1/2	+ 1/8	+2.3
O	FABRI-TEK	1- 2	1 1/2	+ 1/2	+50.0
O	GENERAL COMPUTER SYS	0- 2	1 1/8	- 1/8	-10.0
N	NAZELTINE CORP	8- 15	13 5/8	+ 3/8	+2.8
N	HARRIS CORP	28- 54	50 3/4	-2 3/4	-5.1
O	INFOREX INC	4- 9	8 5/8	+1 1/8	+15.0
C	INFORMATION INTL INC	8- 14	9 1/2	- 1/4	-2.5
O	INTEL CORP	38- 57	51 1/2	+ 1/2	+0.9
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	NSI OATA CORP	6- 15	15 1/4	+ 1/4	+1.6
N	NEMOREX	23- 43	41 3/4	+3 1/8	+8.0
N	NOHAWK OATA SCI	5- 10	10	+1 1/8	+12.6
O	PENRIL CORP	2- 8	7 1/2	+ 1/4	+3.4
N	PERTEC CORP	7- 13	12 3/4	+1	+8.5
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3 5/8	0	0.0
O	RECOGNITION EQUIP	6- 10	8 3/4	+1	+12.9
O	SCAN OATA	1- 3	2 1/2	+	+2.5
O	STORAGE TECHNOLOGY	10- 38	37 3/4	+4 5/8	+13.9
O	T BAR INC	7- 19	17 1/2	+ 1/2	+2.9
C	TALLY CORP.	4- 9	9	+ 1/8	+1.4
A	TEC INC	6- 10	8	0	0.0
N	TEKTRONIX INC	29- 41	41 7/8	+ 1/8	+0.3
N	TELEK	2- 5	4 5/8	- 3/4	-13.9
O	TESOATA SYSTENS CP	13- 20	16 1/4	0	0.0
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EKCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 3 1978	WEEK NET CNNGE	WEEK PCT CNNGE
A	ANERICAN BUS PROOS	6- 9	8 1/4	0	0.0
O	BALTIMORE BUS FORNS	1- 4	3 1/4	0	0.0
A	BARRY WRIGNT	10- 21	21 1/4	+ 3/8	+1.7
O	CYBERMATICS INC	1- 1	1	+ 1/8	+14.2
C	DUPLEK PROOUCTS INC	14- 21	20 1/4	- 1/4	-1.2
N	ENNIS BUS. FORNS	6- 12	12 1/4	+ 1/4	+2.0
N	3M CONPANY	43- 56	50 3/4	- 1/4	-0.4
C	MOORE CORP LTO	24- 37	28 3/4	- 3/4	-2.5
N	NASHUA CORP	16- 29	28 3/8	+1 3/8	+5.0
O	STANOARO REGISTER	18- 26	25 1/4	- 1/4	-0.9
O	TAR PROOUCTS CO	8- 19	12	+1 1/8	+10.3
N	UARCO	18- 24	24 1/4	+ 1/8	+0.5
A	WABASH NAGNETICS	10- 15	12	- 1/4	-2.0
N	WALLACE BUS.FORMS	17- 23	22 3/4	- 1/4	-1.0

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– John Jacobs, ADDS Chief Engineer

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NEWSPAPER

User Emulating IBM 370 on Mini

By Edith Holmes
CW Washington Bureau

VIENNA, Va. — Stentran Systems, Inc. — a firm that employs a computer system to turn court reporters' tapes into transcripts of legal proceedings — is weaning itself from its service bureaus' IBM 370 mainframes by emulating 370 instruction sets on in-house minicomputers.

One of the first users to emulate the 370 on a mini, the company would have spent three times as much by leaving its computer operation on the IBM 370/168s at Martin Marietta's service bureau in Orlando, Fla., and Litton's computer center in Reston, Va., and exercising IBM's Time Sharing Option (TSO) to access and update its data base online, according to Fredrich R. Butts, Stentran's vice-president for research and development.

Instead, Stentran purchased an Interdata, Inc. 7/32 minicomputer and firmware that allows the Interdata machine to run any IBM 370 application program, Butts said. Developed by Kardios Systems Corp., the firmware arrived at the user's location configured with the 7/32 to form a product Kardios calls the "Duo Up."

Stentran already had a 7/32 which it employed for on-line text editing.

Under way since February, Stentran's effort to bring its entire computer operation in-house will require a few more months of work. But the stenographic translation firm is already realizing the benefits of its mini, which eventually will run the IBM applications programs Stentran uses with 100% transparency, Butts said.

The Interdata CPU requires 20% to 30% less core per application when the 370, rather than the Interdata, Assembly language

(Continued on Page 6)

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National Semi Reneges

SUNNYVALE, Calif. — National Semiconductor Corp. has apparently changed its mind about entering the end-user marketplace with its System 400, as reported here last week.

The company now says a "clerical error in translation" caused the release of information about plans for end-user marketing and service for the IBM-compatible computer.

Originally National Semi said it would be marketing the System 400 directly to end users and would be establishing a sales and service network — a new direction for the firm. Several top marketing people in the company stressed this aspect of the announcement in meetings with reporters and the public.

The company is now claiming the press release on the service was put out at the "11th hour" and the mistake crept in at that point. However, marketing officers of the firm told

(Continued on Page 8)

Burglars Pluck Boards From College's 360/40

By Don Leavitt
CW Staff

NEW YORK — Burglars broke into the data center at Herbert Lehman College here recently and plucked more than 1,000 printed circuit and other control boards from the school's IBM 360/40, completely disabling the machine.

The boards were removed "very carefully" from the system's 2040 CPU, 2821 I/O control unit, 2314 disk controller and 3803 tape control unit, New York Police Department officials said.

All the boards — including 24 with 128K bytes of main storage from Cambridge Memories, Inc. (CMI) — were removed with such care that police and college officials think the missing pieces may be offered for sale somewhere.

Vandalism does not seem to be involved because neither the now-gutless cabinets nor any other parts of the data center were damaged in any way.

The college didn't need any other damage: replacement of the missing boards is going to cost in the neighborhood of $200,000 "and that's a pretty expensive neighborhood," Administrative Dean Jack Weiner commented last week.

Parts replacement is also a questionable approach, he said, noting that replacing that much of any system as old as the Model 40 is "like putting $10,000 into a used car that's only worth $100."

So Lehman is looking around for

(Continued on Page 6)

Future De Facto Standards Feared

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The Presidential reorganization project's inquiry into federal data processing has led to the conclusion that unless the federal DP standards program improves soon, the government and industry will be faced with a series of de facto standards under the control of a handful of hardware and software vendors.

The first of 10 DP study teams to release its draft report, the DP reorganization's standards team last week said it considers de facto standards "dangerous" because such control by one or a group of manufacturers would be unreasonable and would have serious economic impacts internationally as well as in the U.S.

The standards team also concluded that the maintenance of the status quo in the standards program will lead to increasing "limited competition" procurements by federal agencies.

Brooks Act Affirmed

In offering its draft report for public comment before finalizing its recommendations at the end of May, the standards group poked and probed at the weaknesses of the federal standards program, but affirmed the basic thrusts of the law that established the federal DP management program in 1965.

The Brooks Act — Public Law 89-306, which allocates the broad authority for federal DP systems among the Commerce Department, the General Services Administration (GSA) and the Office of Management and Budget (OMB) — is "sound, adequate and appropriate" in principle, the report said.

However, interpreting the statute chiefly in terms of procurement of DP and communications equipment and services and broadening competition has hurt and confused the standards effort, according to the team.

While many hardware standards may help by increasing competition, "it is often forgotten that an equally impor-

(Continued on Page 4)

Attempts to Deny Execunet Use of Bell Lines Rebuffed

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — MCI Telecommunications, Inc.'s beleaguered Execunet service won another round in a continuing battle last week when a federal appeals court let stand a lower court ruling ordering AT&T to provide local interconnection facilities to MCI.

Execunet is an alternative to the Bell System's dial-up message toll service and provides users with MCI intercity long-haul connections while relying on Bell local loops between MCI terminals and user premises.

AT&T had challenged the legality of the MCI service, claiming it infringed on the "natural monopoly" of the phone company to provide message toll service. The Federal Communications Commission also objected to the service, charging that the right of MCI to provide such service had never been heard before the commission.

However, by refusing to hear the case, the U.S. Court of Appeals for the District of Columbia allowed the lower court ruling to stand, clearing the way for MCI to obtain additional lines from the Bell operating companies to serve additional users.

Bell will reportedly ask the U.S. Supreme Court to review the case. With the refusal of the appeals court to rehear the case, a hearing before the Su-

(Continued on Page 2)

IN DEPTH
IN DEPTH
IN DEPTH

Are you having trouble dealing with end users? Rita Shoor has a few hints to help you see it their way. See 'Close Encounters of the First Kind: Technician vs. User' beginning on Page 15.

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On Datapoint Worker's Tip

Creek Yields $200,000 Parts Haul

By Marcia Blumenthal
CW Staff

SAN ANTONIO, Texas — Computer components worth nearly $200,000 were recently salvaged from Cypress Creek about 70 miles from here. The goods were thought to be part of the estimated $500,000 haul stolen from Datapoint Corp. over a period of several months during the latter part of 1977.

A former Datapoint employee, one of three men indicted for the theft, assisted police with the recovery.

All three men charged with the theft had worked at Datapoint, but at the time of the robbery, only one of them was still employed there, according to Robert S. Flaniken, corporate attorney for the firm. The "inside" man, a lead technician in the card test area, provided the information leading to the underwater recovery.

A note indicating there was internal theft had been dropped into a company suggestion box, starting the chain of events that led to the arrest of two of the men last Jan. 20 at the San Antonio International Airport. They were caught selling five Datapoint 5500s to a company security person posing as a buyer, according to Assistant District Attorney Nelson Atwell.

The selling price for the five stolen units was reported to be $33,000 compared with the market price of $125,000-$150,000 for the typewriter-type processors, which have 32K to 48K bytes of memory.

Easy Exit

After receiving the suggestion box tip, Atwell said, "The company made an initial investigation and found there was substantial evidence that it was comparatively easy for employees to carry parts of computers out of the company when they left at night."

In all, components for between 10 and 15 5500s were stolen along with sizable amounts of components used for a range of Datapoint processors. The thieves allegedly assembled the components into the finished product.

The next tip, Atwell said, was from a local businessman who contacted Datapoint and the Federal Bureau of Investigation after being offered a unit at about one-quarter of its market price.

After that, the district attorney's office, in cooperation with the company, a manufacturer of distributed DP systems, set up continuing surveillance and placed a Datapoint security consultant posing as a "willing buyer from out of state" in touch with the alleged thieves through the informer, Atwell explained.

The undercover go-between first purchased one unit from the thieves and then made arrangements to buy five more 5500s to be delivered at the airport. The two ex-Datapoint employees arrested during the transaction at the airport informed on the inside employee, who was arrested Feb. 17, Atwell said.

Atwell said he could not release the names of those charged because two of them are cooperating with the district attorney's office and would plead guilty to third-degree felony. The third man has requested a trial.

Commenting on the case, Flaniken said, "We think we got in and discovered the theft organization at its inception." He further indicated the company has taken measures to implement a new corporate security program.

MCI Wins Appeals Round

(Continued from Page 1)

preme Court remains the only legal avenue left to the telephone company, an MCI source said.

MCI has actually been providing Execunet service since January, according to the spokesman. The service to new users continued because MCI still had spare lines available in most cities.

At present, MCI has between 1,500 and 2,000 business lines on order from Bell System operating companies. Since the appeals court action last week, some Bell companies have been providing new facilities to MCI, but others have balked, stating MCI will have to wait for the new lines just as if the orders were first being processed.

It will probably take the various Bell operating companies about three to four weeks to provide MCI with the business lines that have been pending during the various legal proceedings, according to the MCI spokesman, who said that in most cases new Execunet customers have been hooked up despite the many legal challenges.

At present about 9,000 customers are using Execunet, which MCI claims can provide a user with a savings of 30% compared with comparable service from the phone company.

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Independent Agency Suggested for Federal DP

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – The federal government might have more "meaningful, timely [DP] standards" if responsibility for those standards were placed in an independent agency that would also oversee all federal DP and communications procurement and management.

That was one option suggested last week by the team studying the standards aspect of President Carter's federal DP reorganization project.

At present, these responsibilities are split among the Commerce Department, the General Services Administration (GSA) and the Office of Management and Budget (OMB) as a result of the Brooks Act, the 1965 law that established a federal DP management program, the team noted in its draft report.

Originally suggested to the President's DP reorganization team by the American Federation of Information Processing Societies, the independent agency would manage policy procurement, technical support and standards development and implementation. This federal body would also perform long-range planning for DP and communications operations as part of the regular budget cycle and execute mandatory periodic system performance evaluations and analyses of DP and communications operations in all agencies, the standards report said.

In addition to providing the technical support needed by other agencies, this independent entity would maintain a software library of well-documented software packages along with information on their performance.

It would take a reorganization plan proposed by President Carter and approved by Congress to bring about this "option" for the improvement of standards and other aspects of federal DP management, the standards team noted in its report.

Standards Planning Board

To meet the demand for setting goals and objectives for the federal standards program and anticipating those standards that agencies will require in the near and distant future, the reorganization team suggested the establishment of a standards planning board as an option. Consisting of representatives from the GSA and user agencies, the board would set goals, anticipate necessary standards and establish priorities for the development of each.

The director of the Institute for Computer Sciences and Technology within the Commerce Department's National Bureau of Standards (NBS) would appoint someone to chair this board, the standards team suggested.

Another option to meet the problem of establishing goals and standards would be to have the institute participate actively in major DP procurements through its technical advisory and support role, the report noted.

Two additional options would permit goals and priorities and the anticipation of standards to be decided by a triumvirate consisting of the institute, GSA and OMB representatives or by the institute's active solicitation of suggestions in these areas from user agencies, the team said.

The institute might satisfy another issue — the development of high-priority standards — in an expeditious way by establishing procedures that would place a greater emphasis on the development of federal DP standards by government-only task teams or committees, the standards report said.

Another option identified by the team would be to abolish the reliance on voluntary participants and use a full-time staff on the Federal Information Processing Standards (Flips) task groups.

Options for ensuring the adoption of standards throughout the federal government range from placing this responsibility with the Secretary of Commerce, the administrator of GSA or the OMB to a "standards management office" located in each agency. In all of these options, the standards team stressed the need for a software library and a means for testing systems and applications programs to be shared throughout the government.

Coordination Options

The problems attending the coordination of computer and communications standards development could be solved by giving all communications-related DP standards work to the National Communications System/Federal Telecommunications Standards Committee, to the NBS institute or to a third agency or office that would include the functions of both these organizations, the reorganization team recommended.

Still another option would be to retain the present mechanism for separate but coordinated DP and communications standards while increasing the joint planning these agencies do, the standards report said.

Support Centralized

Finally, technical services provided by the federal Cobol compiler testing service, the Federal Simulation and Performance Evaluation Center (Fedsim) and similar groups could be placed under one management to provide centralized DP technical support. These services could retain their identities or be consolidated into one organization under the Department of Commerce, the reorganization team suggested.

Still another option would be to maintain the status quo, creating such groups as Fedsim and the Cobol testing service on an as-needed basis.

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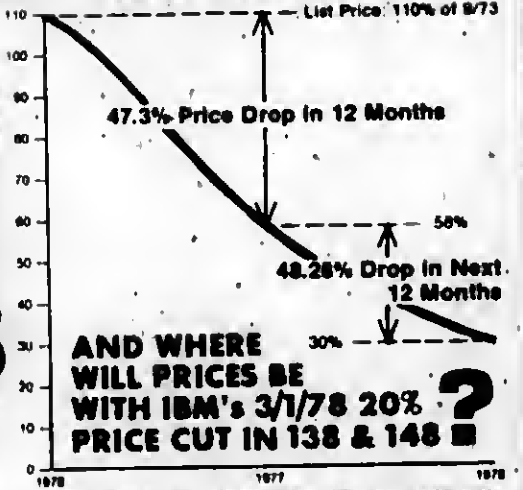

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Standards Monopoly Feared By DP Reorganization Team

(Continued from Page 1)

tant function is to ensure that the government is purchasing tested, proven products," the standards team observed.

The team noted that insufficient emphasis has been placed on standards for software development and maintenance, even though these areas constitute 50% to 70% of total DP costs in and out of government.

Conclusions reached in recent studies of the federal standards process, such as the work done by the General Accounting Office (GAO) [CW, Jan. 30], were challenged by the reorganization team: "A tally of the number of [DP] standards developed to date (29) has led a number of people and organizations to conclude that progress in the standards program has not been good.

"We have found little evidence to suggest that were this number to be 50 or 100, the standards program would be making a greater contribution to the effective accomplishment of agencies' missions per se; neither can we conclude that had more standards been developed entirely within the federal government community, the quality of the program would be any better," the report stated.

Funds provided for the National Bureau of Standards (NBS) Institute for Computer Sciences and Technology, which is part of the Commerce Department, have not been sufficient for a "comprehensive standards development effort."

Misconceptions over the purpose of DP standards have led to an overemphasis on "product" standards and an unfortunate slighting of standards dealing with terminology, functional characteristics, measurement techniques and procedures, the reorganization team indicated.

For example, instead of concentrating on a structural standard for data base management systems (DBMS), more emphasis could first be placed on a terminology and a standard functional description of a DBMS, the team suggested.

Disagreement Over Roles

Another key problem behind the push for reorganizing the federal standards effort is the general confusion and disagreement over the enforcement roles played by GSA, OMB and the NBS' Institute for Computer Sciences and Technology, the report noted.

Responsibility for ensuring implementation of DP standards belongs to the Secretary of Commerce. In the event of noncompliance, "the only effective sanctions . . . are the procurement process for . . . products being purchased and the budget process for operational standards," the team concluded, thus bequeathing the final enforcement responsibilities to GSA and OMB, the report stated.

The shortcomings in the federal DP standards program are the responsibility of all of its participants.

There has been "too much tenacity in adhering to the voluntary standards development process," resulting in unnecessary delays, the report also said.

The standards team further determined that technical support groups such as the federal Cobol compiler testing service and the proposed federal conversion support center perform useful functions. The placement of these organizations in operational agencies, however, should be reviewed on a case-by-case basis for the present.

Eventually, their continued high level of performance may require that they be placed within a central agency, the report stated.

"The level of software sharing in the federal goverment is minimal, if existing at all," the team declared. "A mechanism is needed to foster a greater degree of software sharing."

For Disease, Treatment Analysis

Mass. Health Officials Plan Patient Data Base

By Marguerite Zientara
CW Staff

BOSTON — Within a year, most of the major powers in the State of Massachusetts' health care establishment hope to have collected in one place sensitive health information about the 950,000 patients who pass through the state's 130 hospitals each year.

This information would be used statistically to make determination-of-need decisions for health planning by state agencies. In addition, health systems agencies would use it for planning epidemiologic work and it would also serve as the "central analytic point" for the analysis of "case mix," that is, the mix of patient types and the severity of cases different hospitals treat, according to Louis Freedman, acting executive director of the Massachusetts Health Data Consortium, Inc. (MHDCI).

It could also help detect the changing pattern of diseases and treatment, he added.

Implementation of MHDCI is being delayed by pending state legislation as well as "mere technicalities" in voting on the part of member organizations, according to Elliot Stone, director of the Office of State Health Planning. Stone will assume the executive directorship of the consortium in July.

Privacy Qualms

Although spokesmen for the organizations involved said the information collected would not include any identification of individual patients or physicians, there is at least a minority faction of the Massachusetts Medical Society opposing the consortium on the grounds of privacy. "Some of the members are a little bit concerned about the privacy and confidentiality question. There's a minority that's afraid this whole thing is leading to socialism," John Byrne, president of the Massachusetts Medical Society, said. The medical society will have a final vote May 17 at its annual meeting.

Items of information that would be included in the consortium data bank include the patient's date of birth, sex, race, residence (general geographic, not street address), hospital identification number, patient admission date, discharge date and several diagnoses.

Other data would include procedures performed on the patient and their dates, disposition of the patient (where he went), expected source of payment, admission status (emergency, elective basis, etc.) and types of special care units the patient was in (particularly intensive care), Freedman explained.

Each of the 21 member organizations will provide, either by contribution or contract, 40% of the total operating cost of the system, according to Freedman. In return, the organization will receive at no cost a certain package of information, the elements of which each organization will determine itself.

The consortium's policy on access is "in the process of development," according to Freedman, but he indicated that it is envisioned as being "within the public domain." He foresees organizations representing consumers as having "generalized access on a cost/-reimbursement basis."

The consortium's bylaws provide for distributing 18 of the 21 board of directors seats as follows:

- Four representatives of hospitals.
- One from the state medical society.
- Three from the state's five physician-run professional standards review organizations (PSRO) mandated by the federal government to monitor care provided to Medicare and Medicaid recipients.
- Three from regional health planning agencies, the Health Systems Agencies.
- One from the statewide Health Coordinating Council, the state's umbrella health planning agency.
- One from Blue Cross, which provides hospital coverage to about half the state's population.
- One from the Health Insurance Association of American, representing commercial health insurance companies.
- Four at-large members.

The three remaining seats are each to be held by one representative of the following state agencies that are involved in the planning, regulation and financing of health care: the Department of Public Health, Department of Public Welfare and the Rate Setting Commission.

Legislation is pending that would allow these agencies to participate in the consortium without violating the state constitution's separation of powers clause, Freedman explained. The bill has passed the House and is now before the Senate.

It was the Office of State Health Planning in the Department of Public Health that two years ago set in motion the negotiations to create the consortium. Freedman has been the principal investigator under contract with the Cooperative Health Statistics System of the National Center for Health Statistics, which is "trying to bring some order to the area of hospital discharge data," according to Freedman.

Similar health information data banks exist in Maryland, Illinois, Missouri, Rhode Island and Maine, and the oldest started six years ago in Vermont, Freedman noted.

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Any Leads?

NEW YORK — "Frankly, we're looking for any leads, ideas or information we can get on this one," a New York detective said last week as he reported one of the oddest burglaries he had ever encountered.

One or more burglars broke into one of the city's colleges and took "more than 1,000" printed circuit boards out of its IBM 360/40 and related control units. Det. Donald McNaulty speculated that the boards will be put up for sale somewhere.

He said that if any *Computerworld* readers are offered the boards, or equipment that might have been restored through use of the stolen parts, he would appreciate hearing from them. And the city would find some way to show its appreciation, McNaulty added.

Both McNaulty and Det. William Larkin, who is also working on the case, can be reached at the Bronx Burglary Squad, New York Police Department, 900 Fteley Ave., Bronx, N.Y. 10473. The telephone number is (212) 822-5660.

Burglars Disembowel College's 360/40

(Continued from Page 1)

other possible solutions. Weiner and others are working with people from the central DP facility of the City University of New York — of which Lehman is a member college — in hopes that someone there may know of a Model 40 or any of the control units that is available.

The dean hopes that some city or state agency has gone through an upgrade but never gotten rid of the earlier equipment, storing it instead in "some closet" somewhere until the agency could decide what to do with it. If so, Lehman would like to hear about it.

Meanwhile, however, life goes on and within five days, Weiner and DP director Susan Kliavkoff located another installation with an operational 360/40 to run much of the college's work. Lehman's programs — the center was for administrative work only, not academic computing — were prioritized and modified as necessary to run on this temporary backup site.

All things considered, the college was lucky the attack took place when it did. Weiner noted that the work load in early May is relatively light but that later in the month "things get kind of hectic" with grade reporting for the spring term and the start of preparations for the summer session.

Although Lehman appears to be leaning away from any major attempt to restore its disabled system, which it owns, CMI's marketing vice-president Kent Crombie has assured Weiner that both the company and Raytheon Data Services, which handles CMI product maintenance, "stand ready to do anything the college wants" to get back to full operation.

Commenting on the idea that the boards might have been stolen for resale on the black market, Crombie said "four out of the five boards" that make up the IBM-compatible memory system could be used in any of the lower end 360 CPUs. Only the timing and control card is unique to a particular CPU.

But he also speculated that resale might not have been the motive behind the attack. The effort needed to remove and then care for 1,000 circuit boards and to move them away from the center "must have been incredible" since the CMI boards, for example, are each about a foot square.

In any case, a lot of planning obviously went into the attack. Center director Kliavkoff noted that the 360/-40 was in a one-story building located right near the guardhouse at the campus, which is in the Bronx.

Mini to Emulate IBM 370

(Continued from Page 1)

is used, Butts said. In addition, overall execution time has been decreased because the machine is able to handle storage-to-storage instructions through the 370 microcode.

Since IBM coding requires fewer instructions than Interdata coding, Butts has found the productivity of his programmers has increased.

In switching over from service bureaus to an in-house operation, the nine-year-old firm didn't have to convert any of the applications programs originally developed on 370 equipment, he added.

Stentran is the first user of Kardios firmware. The company has sold its concept to two other users — a service bureau in Raleigh, N.C., and an insurance company in California, according to William I. Parks, Kardios vice-president.

Announced last summer [CW, July 18], the enhancement to the Interdata mini permits the machine to run both Interdata applications programs under the Interdata instruction set and IBM application programs under IBM's basic, commercial and scientific instruction sets, Parks explained.

The firmware runs under Interdata's OS/32 multitasking operating system, however, which switches in-stream jobs between Interdata and IBM instructions.

Because the Interdata operating system remains unmodified by the addition of the 370 microcode, it can be upgraded with any future OS releases, Parks said. In addition, Interdata maintains the 7/32 system configuration with the enhancement.

Stentran paid approximately $50,000 for its second 7/32 with the 370 microcode. The firmware with all three IBM instruction sets costs $23,900.

The basic system comes with 256K bytes of real core; the machine can accommodate up to 1M byte at a cost of about $35,000, Parks said. At present, the system won't run under virtual memory, but Kardios is examining that possibility.

Multiterminal Mini

The Interdata system includes a multiterminal monitor that can accommodate up to 16 terminals. Stentran has 11 terminals — 10 CRTs plus one console — hanging off one of its minis. This "production" mini handles the actual translation tasks and turns out transcripts for 14 court reporters by operating on two shifts, Butts said.

This production system also employs three California Computer Products, Inc. 40M-byte disk drives, two 1,600 bit/in., 75 in./sec tape drives, a 600 line/min printer and miscellaneous communications gear. Two 4,800 bit/-sec lines continue to connect this system to the Martin Marietta Service bureau in Orlando.

Stentran's second 7/32 contains the Kardios enhancement — physically a circuit board with the microcode that plugs into the Interdata mini's CPU "B" board. A single peripheral — a 20M-byte disk drive — interfaces to the mini.

The disk drive stores Stentran's universal dictionary which consists, for example, of all the court reporters' individual dictionaries, numerous tables of syntactical relationships in grammar and source and object code for about 200 programs now being developed, Butts stated. The dictionary is paged into the mini's memory as it is needed.

No JCL Rewrites

Before Stentran acquired the second 7/32, its developmental effort constantly tripped over its production work, Butts recalled. The two minicomputers are connected through a processor interface; the Stentran vice-president hopes to use IBM's job control language (JCL) to control communications between them.

Until now, users have had to rewrite JCL to utilize Interdata's equivalent Command Substitution System (CSS), according to Dr. John J. Cabouch, Kardios treasurer. However "we have a JCL-to-CSS converter routine almost complete" and, as of mid-May, the user won't even have to do this, he added.

Butts hoped to complete Stentran's move in-house over the next three months, putting an end to the $10,000 to $11,000 the firm spends each month at the computer centers.

Stentran is pleased with the quality of Interdata's hardware. Butts noted his firm experienced only one system failure in a year's time.

The firm has tried to bring 370 capability in-house before without using the IBM mainframes. Stentran had an Interdata 70 mini — a 16-bit machine — and a software package that simulated IBM instructions.

The company found, however, that the system worked "extremely slowly" under this software — "so slow that we converted back to Interdata applications programs," Butts said.

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Can't Communicate With DPers

Line Bosses Hit for Abdicating Responsibility

By Marcia Blumenthal
CW Staff

PHILADELPHIA — "Who's in charge here, anyway?" appropriately describes the confusing relationship between line managers and DP staff, according to recent conference attendees here.

Currently, line managers abdicate the responsibility for determining information needs to the DP professional because they don't have the technical expertise to communicate with the DP department, Bruce J. Wright contended. Wright, an international management consultant, was a seminar leader for the recent American Management Associations' (AMA) three-day course, "Fundamentals of Data Processing for the Non-Data Processing Executive."

CW Photo by M. Blumenthal

Bruce J. Wright (left) and Alan Freedman discuss materials for course for the non-DP executive.

"I get the feeling when I leave a meeting with DP people that I don't know what happened," Al Sprague, director of operations for the Gillette Co., complained.

That sentiment was echoed by most of the other 37 managers taking the course, which the AMA offers about 40 times per year at locations throughout the country. However, teaching managers to communicate with DP staffs is not the primary goal of the course, Alan Freedman, senior program director of the AMA's Information and Technology Division, pointed out.

According to Freedman, who is responsible for the ongoing development of the program, "the managers should leave with the feeling that it is their ball game. The user/manager is the reason for the computer, but the user gets the short end of the stick because the technicians take over."

Analysts Not Omniscient

During the two-hour keynote session, Wright continually stressed that operating managers must take the responsibility for defining the requirements of the information sytsems developed for their companies and should view the systems analysts as consultants rather than omniscient beings.

Using statistics from a survey from McKinsey and Co., Wright showed the group line managers were not involved in the development of 78% of the systems judged by companies to be ineffective. Furthermore, 85% of the systems developed at the request of operating managers were considered cost-effective while only 48% of the systems suggested by systems analysts were found to be cost-effective.

The only reason for having an information system, Wright asserted, is to add to profit or to increase efficiency. The computer equipment itself is a vital but only a very small part of the total system.

Mincing no words, he told the group a major objective of a DP department is to develop as many systems as possible in order to convince management it needs newer, bigger and more expensive equipment.

Wright laid out a painstaking, five-phase method for evaluating feasibility of DP projects. Decision analysis — evaluation of the decisions made on specific information — and a yearly review of systems in use within the company are particularly vital to this process.

"After all," he observed, "a company is dynamic, but a computer system is static."

Task Force Method

The task force method was suggested as the most efficient way of evaluating and developing projects. The captain of the task force should be the major user of the proposed information system with all other user groups and a systems analyst rounding out the crew, thereby ensuring that everyone using the system shares the responsibility for its performance.

No sympathy was offered to students who balked at the commitment of time necessary to follow this regimen. Although the students represented a diversity of enterprises — a president of a small North Carolina College, a financial analyst with Occidental Research Corp. of California and a training coordinator from Pennsylvania Power & Light Co. — they had one thing in common: a desire to unravel the mystery of computers.

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Consumers Union: Hold Loan Records Longer

By **Brad Schultz**
CW Staff

WASHINGTON, D.C. — Consumers Union (CU) has petitioned the Federal Reserve Board here to require U.S. lending institutions to retain loan payment records longer than the current two-year minimum.

The consumers' rights group said many borrowers have no opportunity to prove they have been overcharged because lenders erase the pertinent computerized records.

Overcharging by U.S. banks alone has generated a cumulative restitution liability of several hundred million dollars, according to CU attorney Mark Silbergeld.

Silbergeld, who wrote CU's petition, noted that Section 130 of the Truth in Lending Act grants a borrower one year from the time he overpays to discover the mistake and file a civil suit for restitution. After that, the lendor is free from liability to the borrower.

However, enforcement agencies are not bound by this one-year statute of limitations, Silbergeld pointed out. In prosecuting lending institutions, they can use payment records more than one year old as admissable evidence at the time charges are filed.

An extension of the minimal record retention period would make lending institutions more accountable to regulatory bodies, since they could then more easily acquire evidence of overcharging violations.

ABA Stance

The American Banking Association (ABA) is opposed to the CU petition, but its reasons are not based on cost, according to spokesman Bill Moroney. The ABA has not estimated how much more U.S. banks would have to spend to maintain such data longer.

In a formal statement sent to the Federal Reserve Board, the ABA said adoption of CU's proposal would violate the Administrative Procedures Act, which requires solicitation of public comment in the process of altering such regulations.

"To circumvent this requirement, [CU] relies on the exception in the act which states that the procedures do not apply when the agency [in this case, the Federal Reserve Board], for good cause finds [them] impractical, unnecessary or contrary to the public interest," Moroney said.

"ABA asserts that good cause does not exist in this situation to issue an emergency rule, and in fact the public interest demands that public comment be solicited," he added.

The CU petition asks that lending institutions be subject to review by a government agency and states that, after payment records have been accessible for two years, they should continue to be accessible until two conditions are met:

- The review agency has established guidelines on how lending should be managed.
- The institution has had at least one examination by its review agency and made all restitutions the agency requires.

The petition requests, however, that an exception be allowed on the second point: After the examination, an institution should be able to dispose of records relating to transactions the agency has not questioned.

The Federal Reserve Board has notified the CU it will rule on the petition after appropriate study, Silbergeld said.

"We have not attempted to determine the subjective intent [of lending institutions in destroying such records. However] the effect of their destroying the records [is] that there will be no opportunity to determine whether violations have occurred . . . after the retention period has expired," he added.

The amount borrowers pay in finance charges is often greater than the amount they should pay according to the posted annual percentage rate, Silbergeld said, calling this the most serious form of misrepresentation.

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System 400 Just for OEMs

(Continued from Page 1)

Computerworld of the end-user aspect of the announcement a day before the release was allegedly prepared.

It is difficult to tell why there was a change in plan after the formal introduction of the System 400, but now it is clear the firm will neither market or service the system to end users. Instead, the system will be sold to OEMs, which will provide marketing and service for users.

National Semi said the confusion may have occurred because the company will be selling its IBM add-on memory to end users for the first time.

The company's original statement that it had "plans to form a subsidiary corporation to service the new computer" was also incorrect, the company stated. "Rather, National is forming a corporate-level group to service" certain products which the company directly markets.

The company apologized for any inconvenience that was caused.

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May 19-20, Hanover, N.H. — **Conference on Naval Academic Computing and Dartmouth College,** sponsored by Dartmouth College. Contact: Conference Coordinator, Kiewit Computation Center, Dartmouth College, Hanover, N.H. 03755.

June 7-9, Las Vegas — **Contracting for Services,** sponsored by the Loyola University School of Law. Contact: Loyola University School of Law, Seminar Division Office, Suite 500, 1725 K St. N.W., Washington, D.C. 20006.

June 27-28, New York — **Implementing Advanced Office Information Systems,** sponsored by the Yankee Group. Contact: Kate Cogswell, The Yankee Group, P.O. Box 43, Harvard Sq. Cambridge, Mass. 02138.

June 28-30, Washington, D.C. — **Conference on Computer Systems Productivity,** sponsored by the Institute for Professional Education. (IPE). Contact: IPE, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

DP Competency Definition Changing With Functions, ICCP Official Maintains

By Frank Vaughan
CW Staff

CHICAGO – "The DP function, like many other things around us today, is continually changing. Along with – and to some extent because of – that change within our practice, our definition of what we consider to be a competent practitioner is also changing," James M. Brown of the Institute for Certified Computer Professionals (ICCP) recently said at a Computer Expo '78 presentation here.

"Once upon a time, a reliable guide in measuring DP competency was to look at how many tab cards a person could lift out of the pocket of the sorter in one hand without dropping any. You could always measure how productive a programmer was by counting how many rubber banks were around his wrist," he recalled.

"Novices in DP needed to learn the 'tricks of the trade' and spent weeks writing and rewriting the same routines to make maximum use of each byte of memory and each second of execution time. Having mastered these various tricks and shortcuts, the practitioner resembled the village witch doctor, making his living from spells, incantations and curses – lots of curses," Brown said.

Standards Have Changed

"These measurements and standards have seen a great deal of development and change since the early days of the stored program computer, and no doubt the coming years will see much more evolution," Brown suggested.

That change is a symptom of the emergence of DP as a true profession. The ICCP is testing for DP knowledge within that emerging profession, he said.

"I don't know of the availability or even the possibility of a DP test for true competency. An example of a test for competency might be a swimming test when someone is thrown into the deep end of a swimming pool.

"If the person doesn't drown, then you might call that a successful test for competency – but not necessarily excellence – in swimming," he said.

However, there are a lot of us who have been thrown into the deep end of DP and some are drowning, but that's as far as I want to take that analogy," he said.

Testing for knowledge, therefore, is different from testing for competence, but not entirely unrelated, he explained. Knowledge is a primary component of competency, but competency is a broader term, including a willingness and ability to apply that knowledge in a consistent and conscientious manner in one's everyday work, he said.

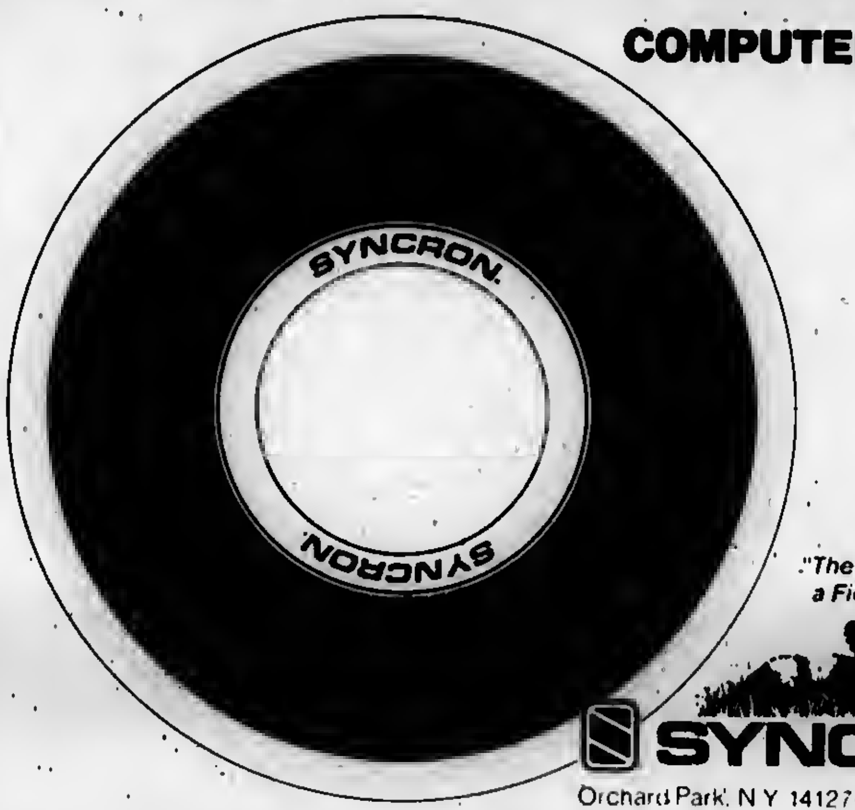
Currently, 17,500 people worldwide hold the CCP's Certificate of Data Processing (CDP) and the number will soon be increased once the results of the February testing are available.

Consistent Yardstick

The ICCP emphasizes our role in serving as a consistently applied yardstick across employers within the field," Brown said. "No other such standard gauge is currently available.

"We talk about a mix of formal educational background and work-acquired practical knowledge. We believe either one, within limits, can balance the other and there is a need for both," he said.

"The standards are a desirable personal objective. Employers have a stake in this measurement and standardization; but if the DPer doesn't augment and complement the role of the employer, and make it a personal goal, then the worker is at the whim of the employer," he continued.



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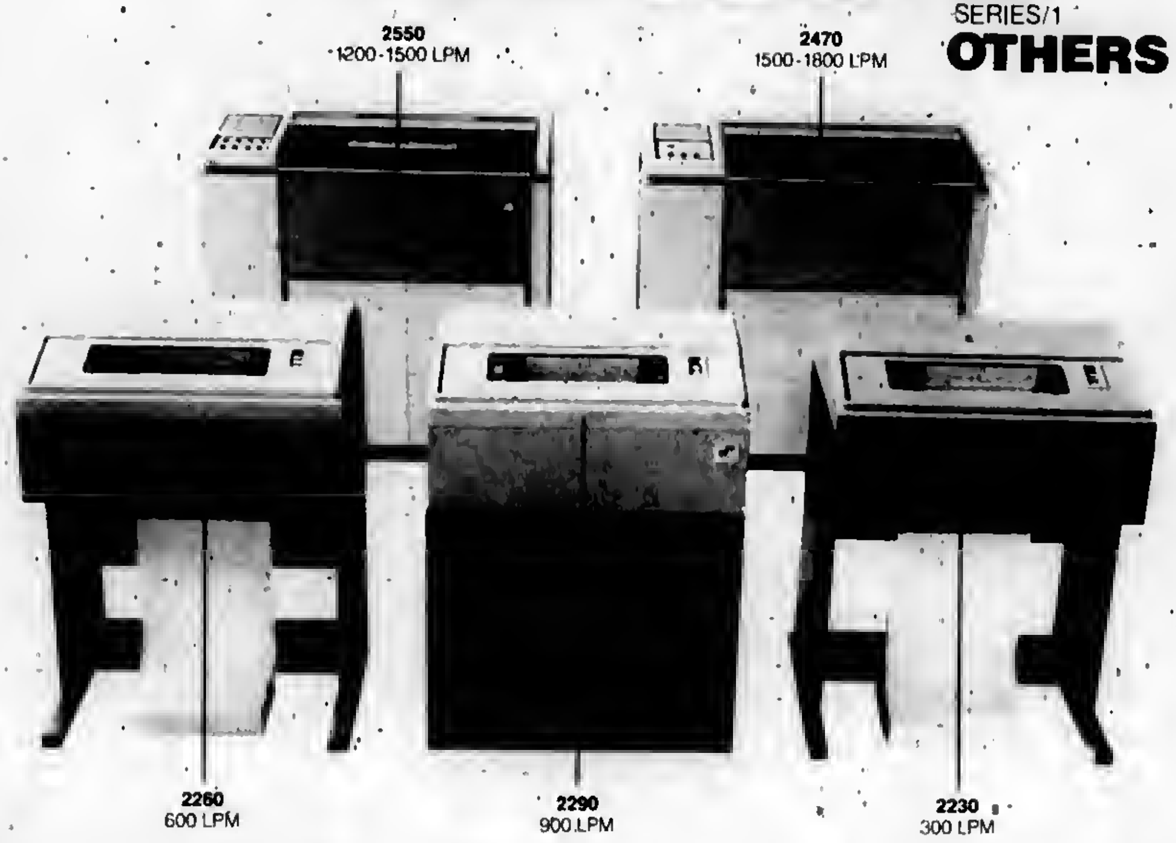

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Managers on the Move

DELANIE PATRICK has been named director of computer services and RAYMOND LIN has been promoted to data center manager at the spice firm McCormick & Co., Inc. in Hunt Valley, Md.

Patrick joined McCormick from Carling National Brewery, where he was director of information services. Lin was acting supervisor of technical systems at McCormick.

Patrick received a B.S. in industrial engineering from the University of Alabama and has done graduate work at George Washington University (GWU) and Johns Hopkins.

Lin received a B.S. from the University of Maryland and has also done graduate work at GWU.

•••

DR. ANATOL HOLT has been appointed director of the Boston University Academic Computing Center and professor of mathematics in the university's College of Liberal Arts.

Holt was director for the Information Systems Theory Project at Massachusetts Computer Associates, Inc. He received a B.A. in math from Harvard, an M.S. in math from MIT and a Ph.D in linguistics from the University of Pennsylvania.

•••

TERRENCE E. BOEHME has been appointed manager of data processing for Season-All Industries, Inc. of Indiana, Pa.

Boehme was DP manager for the Isaly Co. in Pittsburgh.

He is presently working on a B.S. in business administration at the University of Pittsburgh, and his technical training includes experience with IBM, Honeyell and RCA.

•••

HANS SANDBO has been named DP manager at the Augsburg Publishing House, Minneapolis.

Sandbo was senior systems analyst at 3M Co., also in Minneapolis, and graduated from Augsburg College.

Blake

Tobey

Sandbo

Battista

•••

RONALD D. MASTROGIOVANNI has become director of management information services for Teleprompter Corp. after working for several years as a consultant with Arthur Young & Co., both in New York.

The new Teleprompter DPer earned his B.S. at Fairleigh Dickenson University.

•••

ROBERT V. NEARY has been named director of corporate systems and data processing for Harvey Hubbell, Inc., a manufacturer of electrical products in Orange, Conn.

Neary comes to Hubbell from IBM, where he worked for 27 years in various sales, marketing and accounting management capacities.

Neary attended Iona College.

•••

DR. ROBERT G. TOBEY has been named vice-president of DP at Publishers Clearing House in Port Washington, N.Y.

Tobey is presently finishing his commitment to the Illinois Institute of Technology in Chicago, where he has been professor and chairman of the Department of Computer Science and director of the Information Processing Center.

He holds a Ph.D. in applied mathematics and an M.A. in mathematics from Harvard University. His B.A. is from the College of Wooster.

•••

CHARLES A. AVERA has been appointed director of corporate information systems planning, ALLEN G. CALLOWAY has become director of corporate information systems development and BOBBY G. HEMRIC has become DP manager as part of a reorganization at R.J. Reynolds Industries, Inc. of Winston-Salem, N.C.

Avera was manager of corporate revenue accounting, Calloway was director of information systems and Hemric as manager of corporate computer planning operations.

Avera earned a B.S. in industrial engineering at North Carolina State University and did graduate work at Virginia Polytechnic Institute.

Calloway holds a B.S. in business administration from High Point College, and Hemric holds a B.B.A. from Wake Forest University.

•••

MATTHEW J. BATTISTA has been named division vice-president for management information services (MIS) at B.F. Goodrich Co. in Akron, Ohio.

Battista joined Goodrich's DP department in 1954, assumed more and more responsibility over the years and was named executive director of MIS in 1975.

The Akron, Ohio, native attended Montgomery College.

•••

ROBERT A. STARK has been named a vice-president by Coldwell Banker Commercial Brokerage Co., a Los Angeles real estate brokerage firm.

Stark will continue to direct DP activities for the brokerage firm as well as Coldwell Banker Property Management Co., Coldwell Banker Management Corp. and their parent company, Coldwell Banker.

Stark is a graduate of California Polytechnic College in San Luis Obispo, where he earned a B.S. degree in mathematics.

He worked as a systems manager for a bank and as an IBM marketing representative prior to his move to Coldwell.

•••

LEMON F. CLARK has joined Philip Morris U.S.A. in Richmond, Va., as computer center manager.

Clark joined Philip Morris after a five-year stint as data center manager for M. Lowenstein & Sons of Rock Hill, S.C.

•••

Managers on the Move is a new column that will be published occasionally to recognize those DP managers and vice-presidents who have assumed new professional responsibilities.

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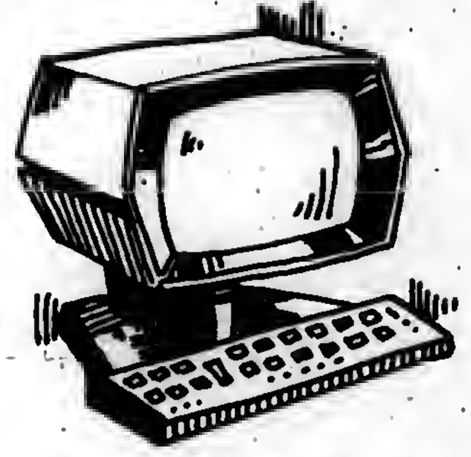
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Users Need True Costs

Realism Urged in DP-User Deals

By Frank Vaughan
CW Staff

CHICAGO — DP managers must look at the true costs of both developing and operating additional user projects and must determine a realistic time requirement for developing the functions users want, Sheldon Fisher, president of SF and Associates, told a computer Expo 78 audience here recently.

DP management has to look at several other important aspects of the user-DP relationship if it is going to meet its users' needs, Fisher said.

The management must look at the interaction between DP and user disciplines as well as the interaction between users and DP projects. When assuming new user projects, the effects of these projects on other existing projects and procedures should also be examined, Fisher added.

Potential Problem Areas

There are several potential user problems DP management must face if its expects to have a reasonable interaction between operations and the user, he said. These potential problem areas include:

- The language of DP. Users don't use DP jargon and they don't understand the terms, so there is a reluctance on their part to talk to people (DPers) they don't understand.
- The power limitations of DP. Users don't really know what DP can do and this causes them to be less than specific or unrealistic when asking for something. They need to be educated about what a system can and cannot do.
- Rules and definitions. The users haven't always taken the time to determine just who is responsible for what in a project.
- Parochial interests. Both sides of a project (DP and the user) have different interests and, although the goals may be the same, the concerns may not be mutual. These interests need to be thought out in advance.
- Responsibility and authority lines. Who can sign off what? Who has authority to change things? These, and similar questions have to be discussed in advance so the lines of authority can be set up early — not only for system management, but also for system use.

In a discussion of user problems, one attendee noted that a loss of communications once a project begins has been plaguing that attendee's operations. Top management tends to drop the ball on projects once they seem to be progressing, leaving the workers with little or no additional guidance, the attendees complained.

Fisher suggested that built-in checkpoints be implemented into future projects to ensure there will be periodic sign-off by upper management.

Another attendee noted that users keep adding requirements or features to projects, which causes sections of the projects to be redone or modified. Fisher suggested the solution might be to take more time in explaining the language of DP so the users will know that additional specifications require more than just pushing a button.

Some overall solutions to user DP relationship problems were suggested by Fisher. These include using the systems approach throughout the entire project, including flowcharting the entire process.

Committee selection is another important area. Committee action can be appropriate if the committee has the proper representation, he said.

In some cases, more than one committee is necessary. For example, a high-level decision making committee and several working committees at lower levels might be needed.

Presentations to internal users are fine and have their time and place, but whenever possible, especially if involved in an operation that has outside customers, DPers should try to have one of the outside users come In and make the presentation, he said.

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College Uses Games To Teach English

By Marguerite Zientara
CW Staff

RAYMOND, Miss. — "The students used to play 'Star Trek' and blackjack down there, and now they're using the computer to learn how to punctuate sentences and spell," according to Dr. George Abraham, chairman of the Humanities Division at Hinds Junior College, who last fall instituted computer games to help teach spelling and grammar.

As part of a revamped English program at the two-year college, Abraham is overseeing the programming of games for nine areas of grammer and usage study: compound sentence, punctuation, complex sentence punctuation, essential elements of the sentence, correct placement of modifiers, verbs, subject/verb agreement, auxiliary verbs, correct use of the pronoun and spelling.

Ability Grouping

The games are an outgrowth of an approach to the teaching of English that Hinds started two years ago. Before entering any class, a student is required to write a basic theme that is graded by faculty members.

Based on the theme, a student is placed in one of four English classes — developmental, basic skills, ready for college and outstanding potential. A student may question his placement if he feels it is wrong, Abraham noted.

Incoming students also take a basic grammar test developed by a faculty member. The results of these exercises help determine areas in which a student may need help.

Once weaknesses have been determined, the student has access to the English department's worksheets covering each area of grammar. Cassette tapes, giving directions and answers to questions are used in conjunciton with the worksheet. As a result, the exercises are self-paced with immediate feedback, Abraham said.

After completing the necesary worksheets, a student can play the appropriate computer game on one of two Texas Instruments, Inc. 733 Silent Series terminals "to make sure he is proficient," Abraham said. After the computerized "practice," the student can take a test to see how much progress he has made.

The game's answers are randomized, Abraham explained, so the correct multiple-choice answer will not be identified with the same letter evey time the game is played. There is also an item analysis component that indicates how many times a particular game has been played and which numbers were missed. In this way the instructors know what grammar points need more attention.

In addition, since each game program asks the student's name, the department can determine who has the highest score on games played. The high scorer is announced as a reward incentive.

Hinds' terminals are linked to Jackson State University's IBM 370/145 as part of a dial-up network connecting all the high schools, colleges and junior colleges in the state.

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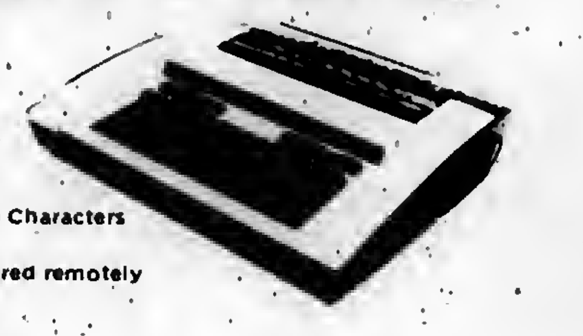

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Multiplexers Aid in Training Handicapped

HEIDELBERG, W. Germany — Data communications equipment has enabled the development of an unusual education and rehabilitation program for the physically handicapped here.

The program was conceived and developed by the Berufsforderungswerk (BFW) Center here. In rehabilitating physically handicapped individuals, training must be conducted on a one-to-one level since the students in the program suffer from a wide variety of difficulties, and many are immobile. The answer was a computer-based system that could deal with each student on an individual level no matter where the training sessions were held.

In the BFW system, facilities situated in major German cities and in Linz, Austria, communicate with the computer installation in Heidelberg. Each remote facility contains a number of terminals that let the individual student communicate with the CPU on a one-to-one level.

For example, a braille terminal has been developed for blind students. Each student studies in a separate cubicle, 30 to a room, with a supervisor who acts as coordinator. A communications network gives each student access to a professional rehabilitation program originating in Heidelberg.

The students access the program stored in the CPU and then perform the exercises as directed. The system guides each student to the correct solution by recording, analyzing and correcting the exercises. The success of the entire program depends on a communications network that is reliable, efficient and economical, and multiplexers are the key to such a network.

Multiplexers enable one telephone line to transmit data between a CPU and several terminals located at remote facilities. Without multiplexers, each terminal would communicate with the CPU via a separate phone line.

Since there are as many as 30 terminals located at each of BFW's remote facilities, telephone costs would be prohibitive. One multiplexer at each remote facility permits all 30 terminals at that facility to communicate with the CPU via a single phone line.

At the computer end, an identical multiplexer demultiplexes or breaks down the transmitted data into individual components before the data is fed into the computer. By multiplexing and demultiplexing, each of the 30 terminals is able to communicate with the CPU on an individual basis. To ensure communications in both directions, each multiplexer is capable of multiplexing and demultiplexing.

Crime Nets Bag Texas Fugitive In Pennsylvania

PENN TOWNSHIP, Pa. — The sharp eyes of a local policeman coupled with information furnished by the National Crime Information Center's (NCIC) computer resulted in the capture of a convicted felon here recently.

The capture occurred when a van with an expired inspection sticker was stopped by a police officer who ran a routine check of its license plate number with the Pennsylvania Commonwealth Law Enforcement Assistance Network (Clean). Clean's record on the plate indicated the vehicle was stolen, a spokesman said, but the van was not the same vehicle identified in the record.

A second inquiry was entered using the vehicle identification number. It was then discovered the van had been reported stolen in Delaware County, Pa., the spokesman continued.

The policeman then received a wanted person record in response to a procedural inquiry to the NCIC on the driver of the van.

The record revealed the operator of the vehicle was wanted by authorities in Orange County, Texas, where he had been serving time for several felonies, the spokesman said. A search of the van resulted in the recovery of a 12-gauge shotgun and other articles that had been stolen in Penn Township.

The subject was subsequently extradited to Orange County, Texas.

Texas Joins CCH System

WASHINGTON, D.C. — Texas has become the 12th state to join the National Crime Information Center's (NCIC) computerized criminal history system (CCH).

The other "fully participating states" include Arizona, California, Florida, Illinois, Michigan, Minnesota, Nebraska, North Carolina, Ohio, South Carolina and Virginia.

To be "fully participating" a state must enter and then regularly update its records.

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NATIONAL INFORMER

-SPECIAL LEAR SIEGLER ISSUE-

May 15, 1978

EXCLUSIVE PHOTO REVEALS:

PROJECT X WONDER DEVICES CAPTURED IN DARING PRE-DAWN RAID

The Ballistic Printer— If You Haven't Seen It, You Haven't Seen Ballistic Printing

Page 47

★ ★ ★

Top Aides Deny Involvement In Project X

Page 14

★ ★ ★

The Dumb Terminal— Now an Even Smarter Buy

Page 7

★ ★ ★

Farrah To be New Project X Angel?

Page 20

★ ★ ★

Lear Siegler, Inc. Provides Marketplace Everything Within Reason

Page 35

John Poglioro, mostermind of Project X roid, ond unidentified commondo, seen here with Project X wonder devices. Some of them proved incomprehensible. INFORMER PHOTO

The INFORMER learned early this morning, from a press conference held by an unnamed government agency, of a daring, pre-dawn raid launched against Project X.

The raid, conducted with squads of grim, highly-trained commandos was launched in an attempt to capture some of the secret Project X's astounding computer devices. The devices themselves, purportedly developed by Project X for total domination of this year's NCC (National Computer Conference), were successfully seized, although some of them defy understanding.

John Pagliaro, a key architect of the raid, explained that even his highly intelligent and experienced agents were unable to decipher the purpose of some of the Project X apparatus. The marvelous new ADM-31 and ADM-42 CRT terminals were among the few that were recognizable to the INFORMER staff, based on information leaked to us over the preceding few weeks. Others, however, simply proved too esoteric and baffling to allow comprehension. They are currently being studied, nonetheless, by the unnamed government agency responsible for the raid, and by experts on the INFORMER staff.

Shortly before this morning's raid, our undercover contact at LSI HQ placed a call to us here at the INFORMER. Even though the impending raid made such an act highly dangerous, our agent managed to transmit a few details of yet another astonishing device nearing completion at Project X.

The device is a low-cost, 16-bit CPU, memory, and I/O for OEMs. Called the VDP-410, this stunning new addition to LSI's arsenal is actually a building block for complete systems development. Before our courageous operative was forced to terminate his phone call in mid-sentence, he was able to convey that the amazing VDP-410 would also come with 32K words of memory.

It would seem safe to assume, however, that the articles captured in this morning's raid were (Please turn to page 6, column 3.)

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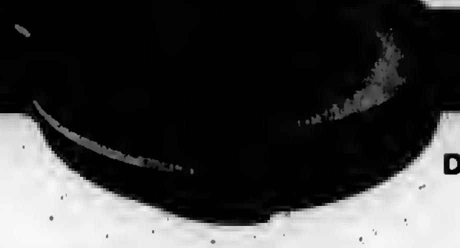

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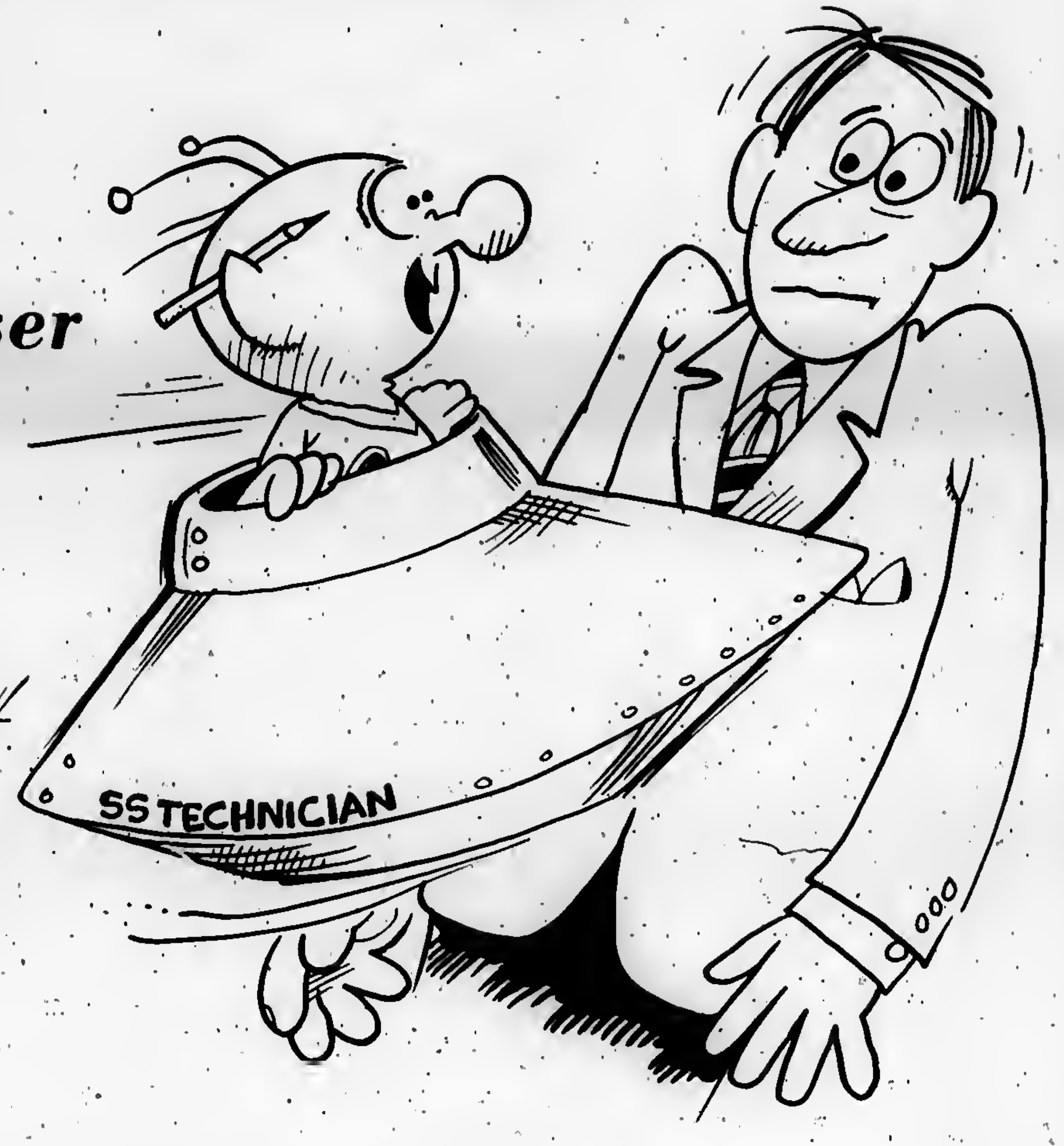
of the first kind:

Technician vs. User

By Rita Shoor



— Six Rules —
For Effective
User Interaction
And Communication

- *Ask Questions*
- *Never Talk DP Jargon To Users*
- *Analysts Define What, Designers Decide How*
- *Never Say 'Yes' When You Mean 'Maybe' or 'No'*
- *Admit It When You Goof*
- *Confirm Major Decisions In Writing*

Data processing education is unique. Let a new piece of software or a different organizational tool appear and — within weeks — there are courses to provide conceptual background, define the latest buzzwords and supply technical data needed for implementation.

The number of books, cassettes, seminars and lectures which owe their existence to the innocuous phrase "Structured programming" is the most recent proof of this phenomenon. The result, in some instances, is academic argument for its own sake.

Nevertheless, today's programmers, analysts, and designers are fortunate in the amount and quality of timely technical information that is available for their continuing education.

Unfortunately, one vital element is overlooked during the educational process. Few, if any, seminars are available to assist the technician in his interactions with nontechnicians.

The cassette doesn't exist that enables the professional DPer to communicate effectively with that mysterious entity known as a "user." The result of this breakdown can be a system that works effectively and efficiently while being totally useless.

If the user doesn't accept the system's output as valid, if he feels compelled to check every figure manually, if he throws the reports into the circular file as he receives them, the system is a failure.

In an attempt to avoid the expense, personal and professional frustration and the ruined reputations that result when years of work produce nothing but meaningless paper, I have developed "Six Rules for Effective User Interaction and Communication" (SREUIC). Note that the acronym is impossible to pronounce and doesn't mean a thing. This should in no way affect its becoming an accepted word in your DP vocabulary.

These rules will be of limited use to senior analysts, project leaders and anyone else who has been in the field long enough to have formed his user communication patterns. If you are successful in a senior-level position, you are no doubt following most of these suggestions. If not, you will ignore them.

Perhaps SREUIC can give some assistance to the senior programmer who has been promoted to a designer/analyst position with little warning and less formal training. It may help the lead programmer who has worked exclusively in the systems and programming department until his manager casually says, "Carl Controller in Finance wants another report from the general ledger sustem. Take care of it." It can make life easier for the very junior designer whose boss comes down with appendicitis right in the middle of the detail design phase of a new system.

And if SREUIC prevents the development of even one system that "just doesn't do what it's supposed to" — a chronic user complaint — it will have served its purpose.

RULE NO. 1
ASK QUESTIONS

How many of us apply this simple rule when we meet with a user? All too often, we tend to see ourselves as members of a somewhat privileged elite.

(Continued on Page 16)

IN DEPTH

IN DEPTH

IN DEPTH

IN DEPTH

IN DEPTH

(Continued from Page 15)

While this is partially true, we should remember that our technical expertise is applicable to a very narrow strip within the business spectrum.

Granted that you know how to design a system and write a program. Tape drives, disk packs, CRTs and CPUs are old friends. Before you can utilize any of this precious knowledge, however, you must know what the user requires. And he is the only one who can give you that information.

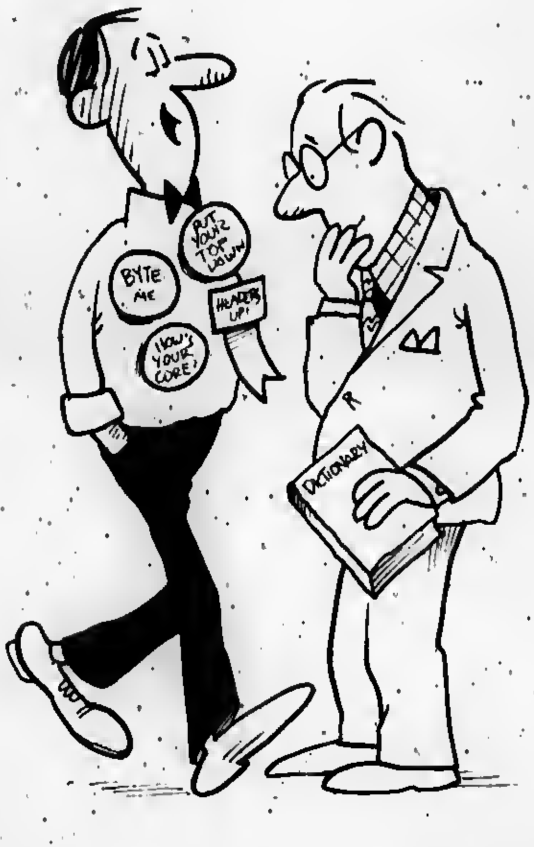
Ask questions. You may know how to update a master file, but how much do you know about the Employee Retirement Insurance Security Act (Erisa) requirements for all new retirement plans? You may be thoroughly familiar with data base concepts, but how familiar are you with the commission structure for insurance agents?

You can design a screen with minimal effort, and variable-length records are child's play. How about Securities and Exchange Commission regulations and the various ways of computing interest on certificates of deposit?

Keep in mind that your user is probably as much of a specialist in his field as you are in yours. If you ask questions, not only will he feel more comfortable about your interaction because everyone loves to show how much they know, but you will have a fighting chance to develop an end product that will be acceptable to both of you.

RULE NO. 2
NEVER TALK DP JARGON TO USERS

The minute you walk into a user's office, forget that you ever heard of bytes, core dumps, tracks, cylinders, random access, operating systems, headers, trailers, machine language, table searches, matrices, data bases, structured programming and top-down design. These words, which are a part of what I call "technolanguage," have a precise and specialized meaning for the DP professional, but no meaning at all for the nontechnician.



Mention a byte to a user and he may look at you in amazement because, all of a sudden, you seem to be discussing food. Speculate on how many tracks the new file will require and he may begin to wonder how the two of you managed to get from payroll checks to railroads in the space of a single sentence.

Worse yet, he may completely tune you out. There is nothing as boring as being forced to listen to a technical specialist rattle on when you haven't the slightest idea what he is talking about.

Perhaps more important, jargon produces one of two reactions on the part of the user: He is either intimidated or irritated. Neither of these conditions leads to a profitable information exchange, the goal of all user meetings.

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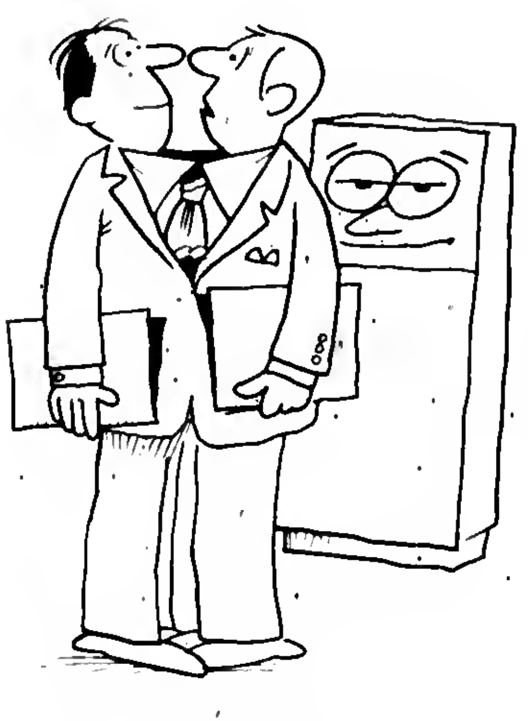


RULE NO. 3
ANALYSTS DEFINE WHAT, DESIGNERS DECIDE HOW

The difference between an analyst and a designer is that the former defines the task which is to be accomplished and the latter decides how the results can best be achieved.

In most cases, the user is concerned with the *what* of a system: What will the system do? What kind of reports will he receive? What kind of input must he provide? What will it cost?

He could not care less about *how* the system will work. He really has no interest in how many processing modules are required for the update segment of the system.

He will go to his grave quite happily without ever knowing about the arguments that raged in the systems and programming areas over whether it was necessary to have the edit program reedit input on the off chance that the key-to-disk editing program might blow up.

In many installations, the designer and the analyst who are assigned to a given project inhabit the same body. It is the analyst who should appear at those confrontations which are sometimes euphemistically referred to as "user meetings."

The designer gets his chance once the analyst has a clear definition of the user's requirements. He will shine as he determines the method by which results can be achieved with minimum expense and by an unrealistic due date. That will keep him busy for a while.

RULE NO. 4
NEVER SAY 'YES' WHEN YOU MEAN 'MAYBE' OR 'NO'

This rule should be considered unbreakable. There is no excuse for the DP professional agreeing to something he knows is wrong just because it's easier, or politically expedient — or maybe because he knows very well he isn't the person who is going to have to live with an impossible commitment.

Imagine this all-too-familiar scene.

You are sitting in the user's office. You don't know him very well. Departmental gossip classifies him as a difficult person with whom to work, but you haven't run into any trouble yet. He has a good idea of what he wants to accomplish, and you agree it is a feasible concept.

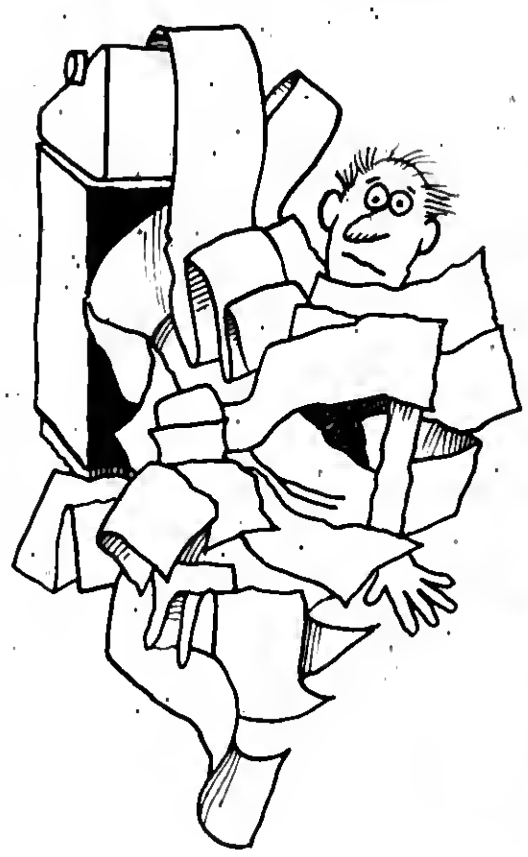
You are in the very first stages of general system design. A detailed estimate of design and programming man-hours and costs has yet to be considered.

At this point, the user sits back, folds his hands and inquires innocently, "So when do you think you can have the system ready for me?"

Or, much more dangerously, he may lean *forward*, peer at you intently and briskly state, "This has to be ready by December. I don't see any problems with that, do you?"

The temptation to agree with the user can be overwhelming; you want to make a good impression. You don't have any basis for realistic man-day estimates, but you think it could be done in time. After all, December is eight months away and it appears to be a fairly straightforward system.

The user is asking you a simple question, and nobody likes to be the bad guy. But there's an internal voice (often originating from that portion of the anatomy which will later erupt with ulcers if Rule No. 4 isn't strictly observed) that keeps whispering, "It's too early. Don't commit yourself. You'll be sorry."



What do you do? Look the user in the eye, smile bravely and tell him, "I don't know yet."

Explain that you must look into the system requirements in more detail before you can hope to come up with a realistic due date. You might consider letting him in on the fact that experienced designers are in short supply. Tell him that you must ascertain when the best designer for *his* system will be available.

This is one area where the user can relate to your problems. He knows what it's like to set up a schedule with inadequate personnel. Sales managers have quotas to meet; bankers cope with the sector of the independent audit; the accounting department has its yearly set-to with the Internal Revenue Service.

After the user has commiserated with you, let him know when you will be able to give him a satisfactory estimate. You are now setting your own individual due date. Stick to it.

After all, if you can't manage to meet this first due date, how can the user possibly believe the estimated project completion date will be met?

RULE NO. 5
ADMIT IT WHEN YOU GOOF

As a DP professional, you are probably relatively young, have above-

(Continued on Page 18)

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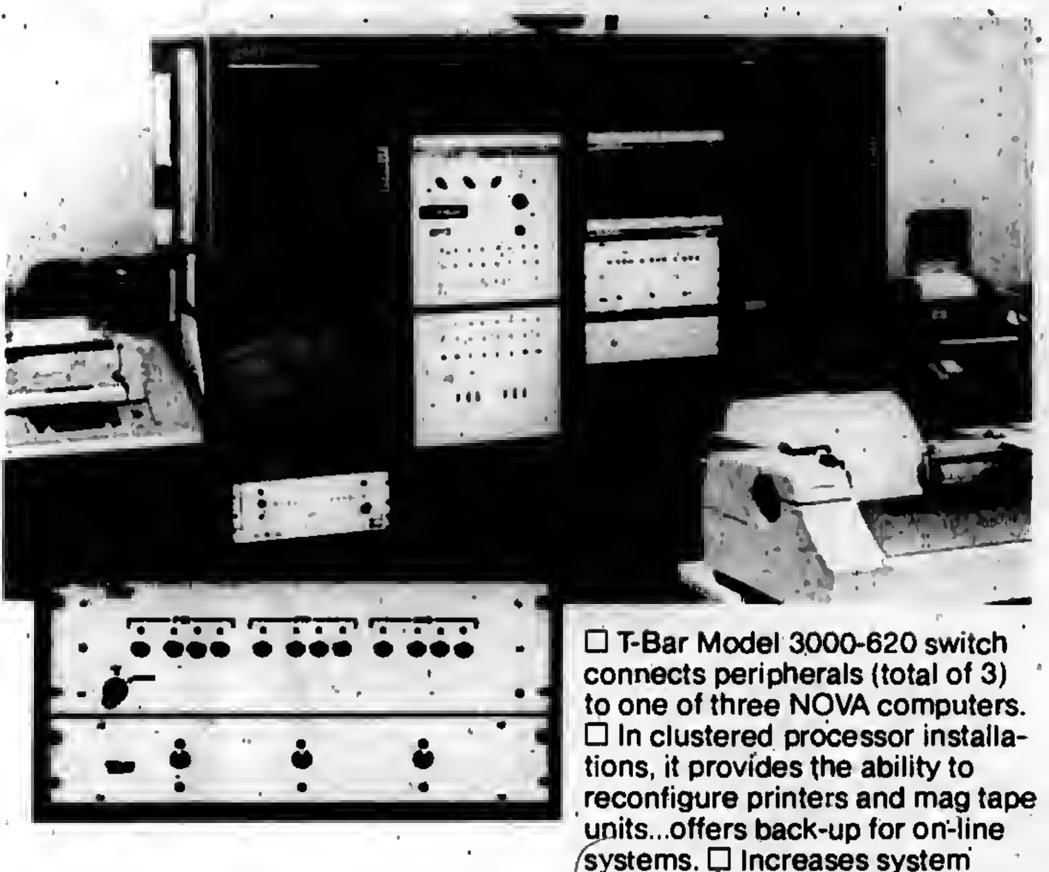

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IN DEPTH

(Continued from Page 17)

average intelligence and know everything there is to know about a field the user only hazily comprehends.

You may have detected a faint tinge of sarcasm in the previous statement. However, that is the image projected from the systems and programming department. Users often have a childlike faith that programmers and analysts have a mean IQ of 183 and can solve any problem if they are asked politely.

It is difficult to pry information from someone who is convinced you have already have all the answers. He is apt to shove several sheets of scrawled notes across the desk, look at you with bright expectancy and chirp, "Well, you can take care of it from here, right?"

An occasional admission of your own imperfection allows the user to lower his defenses. His fear of appearing foolish or intelligent is lessened. Your reward is a healthy relationship.

There is another important consideration. If the user has prior experience with the systems and programming group in developing a new system or maintaining an old one, you'll wind up in trouble if you attempt to bluff your way out of a bad situation.

I realize that, in certain companies, it is a cardinal sin to let anyone outside the department know DPers make mistakes. I don't advocate reporting every data exception in a unit test.

However, if a system test requiring seven tape drives, three hours of clock time and 48 CPU minutes must be rerun because someone forgot to override a data parameter, you may be justified in letting your user know exactly what happened and why. It won't be pleasant, but it will increase your credibility with him when later problems develop.

Don't attempt to bury mistakes with a vague statement on the order of, "There were some problems with the hardware." It sets a bad precedent. Besides, what do you tell the user when there is a real hardware breakdown?

Above all, don't try to shift the blame to another area, especially to the conveniently available computer operators. Nothing should be done to strain relations between the operations and systems and programming groups. Computer operators can save your neck or let you hang. The former is always preferable.

RULE NO. 6 CONFIRM MAJOR DECISIONS IN WRITING

I can see grizzled veterans shaking their heads as they murmur, "The old CYA principle again." That is not the reason for this rule.

Generating reams of paper to explain all of your actions from now unto eternity (or until a new boss takes over) is not reasonable or justifiable. However, a concise memo listing all of the major decisions about the system reached during each user meeting sets up a feedback loop that can have positive results.

You are forced to methodically list and review everything you have agreed

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to do. This process could prevent you from inadvertently forgetting a design modification originally scribbled on scratch paper. Those hasty shorthand notes are apt to disappear during one of the periodic desk cleanings in which you compulsively indulge when the computer printouts, test results, flowcharts, decision tables, worksheets and card decks threaten to inundate you.

A formal memo also provides the user with confirmation of exactly what happened during a meeting when his primary concern was selling you his own viewpoint. This unconscious dichotomy can create confusion, misinterpretation and costly future modifications.

Finally, a memo may enable you to avoid those painful discussions that flare up when the user states categorically he wanted the output sorted in ascending sequence, agent within branch within division within company, and you remember he told you it was to be sorted in desending sequence with no mention of a break or division.

A piece of paper is a neutral object to which both parties can refer with calm rationality. It lessens personal remarks of the "You said this," "But, I *meant* this" variety. Given the harsh realities of the business world, you will implement most requested changes even if you have tons of memos listing exactly the opposite specifications.

The fact remains that a hard copy of the system requirements, from first definition through all major design modifications, will be invaluable in determining how the system evolved from its original concept into a finished product. Needless to say, all written communications should be clear, definite and readable.

Don't use technical jargon to slip something by the user. It will come back to haunt you ... and you'll deserve it.

Practically speaking, some of these rules may be impossible to follow with various individuals. You may be blessed or cursed with a user who is a voluntary refugee from the systems and programming area. He might insist on technical discussions even though his last programming was done on a second-generation card-processing system. Just let him talk. Your common background can help you build rapport as the project develops.

Another widespread problem is the user who doesn't want you to "waste your time" writing confirmations when major decisions are reached. Write the memo anyway. The exercise will give you practice in nontechnical communications — something many technicians lose after several years in the business.

Keeping these exceptions in mind, and allowing for any others that apply to your own situation, SREUIC should give you some help in developing and maintaining a mutually acceptable, possible enjoyable working relationship for the life of your system.

Rita Shoor is a principal in Shoor and Associates, a data processing consulting firm in Wilmette, Ill.

Prior to setting up her own firm in June 1976, Shoor worked as a technical representative for Applied Information Development, a Midwestern DP consulting firm at which she was responsible for all phases of system design and analysis, programming and implementation.

Shoor began her career in 1970 as a programmer trainee with Kemper Insurance Co. in Long Grove, Ill., where she progressed to a senior programmer position. Later she worked as project leader at the Northern Trust Bank in Chicago.

Shoor holds a B.A. degree from DePaul University, where she studied English literature, American history and business management.

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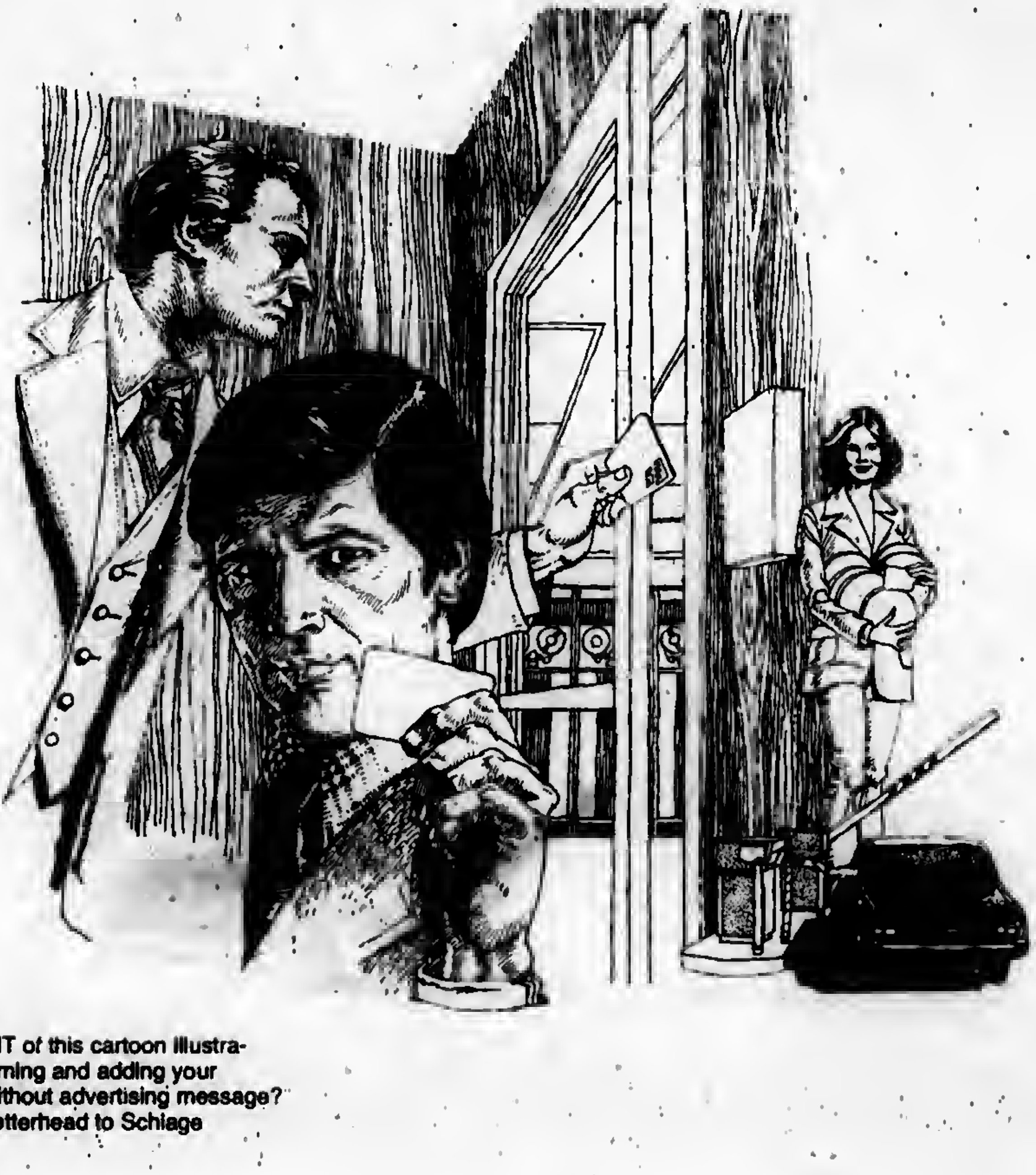

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Editorial

Human Intervention

DP users probably didn't need to be reminded, but evidence has again surfaced that a CPU is not the last word and that human intervention is still needed to rectify the failings of what really is little more than a machine that depends on human instructions.

A story on the need for a human appeal mechanism brought this issue to mind. As the result of a suit brought by victims of a billing error, the U.S. Supreme Court ruled that a Memphis utility had to provide "designated personnel empowered to rectify" errors in CPU-generated bills [CW, May 8].

The court emphasized the need for a human interface between the utility's computerized billing system and its customers.

The desire to triumph over machines and the errors for which they are blamed is also the theme of one of a series of radio ads for Western Union Mailgrams. Don Knotts explains that a Mailgram will generate the attention needed to solve a computer billing problem. Presumably a simple phone call will not do the trick.

The point of all this is well-documented. Regardless of the high level of sophistication ascribed to computers and their bill-disgorging capabilities, somebody has to be around to mind the store.

There are still outsiders who blame the computer. Those in the DP community know very well that people who tell the CPU what to do are the real culprits. The problem is that the public may never understand this distinction. Coming from DPers, such an explanation sounds too much like a cop-out to be believable.

The members of the DP community can only try to make their routines as foolproof as possible. Maybe the best approach is to let the mainframe take the blame. Then the programmer or other DPer who straightens out the problem will be even more of a hero to the members of the public who are "victimized" by these unscrupulous CPUs.

Exciting Prospect

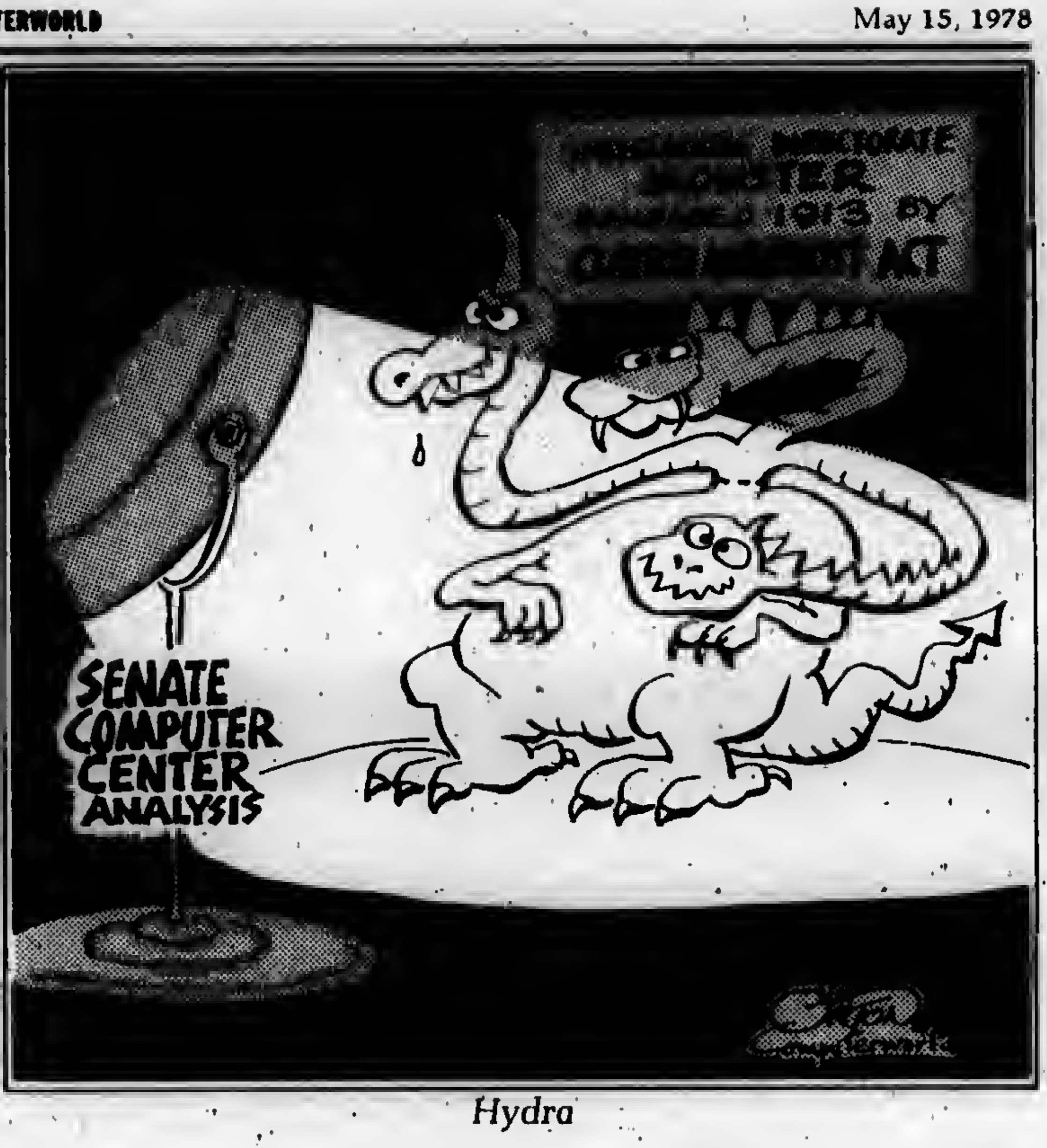
The recent introduction of a truly portable terminal that combines FM radio with conventional data communications has exciting implications.

The prospect of a terminal small enough to carry in one hand being used to update a CICS file one mile away in real time should attract the attention of even the most jaundiced technocrat.

The Motorola, Inc. terminal has no new technology. It uses the capabilities of the microprocessor to merge FM radio with binary synchronous communications. Nevertheless, this portable unit will undoubtedly be used for applications that the vendor cannot yet envision.

Futurists have predicted that one day everyone will wear a device on his wrist that will give him access to any data base or to any other person. Technology still has not reached that level of sophistication, but this new ability to use a tiny terminal to access information, residing in a remote number cruncher — all in real time — is exciting.

The other technological prognostications now look just a little more believable.



Hydra

Data Past

Five Years Ago
May 16, 1973

LOS ANGELES — IBM was accused of being partly responsible for the Equity Funding Corp. of America scandal in a Superior Court suit filed here. The class action filed by five Los Angeles residents charged that IBM contributed to the scandal by failing to build safeguards into its equipment. The $4 million suit also said IBM neglected to warn users of the possibility of fraud.

— — —

TULSA, Okla. — Using data from the census of companies in the computer industry compiled in the IBM vs. Control Data Corp. antitrust action, an IBM witness last week indicated that IBM's share of the computer market was actually declining and that competition was growing.

Eight Years Ago
May 20, 1970

GAITHERSBURG, Md. — Dr. H.R.J. Grosch was removed from his post as the director of the Center for Computer Sciences and Technology at the National Bureau of Standards. Grosch said he would accept a position as a senior research fellow within the bureau.

The transfer of assignments was without loss of pay, according to Grosch, who had discouraged federal acquisition of IBM's System 3 because the small computer did not have communications or Ascii code capabilities.

— — —

EL SEGUNDO, Calif. — Xerox Data Systems (XDS) unveiled the Sigma 6, a system specifically intended for commercial DP. The system offered users approximately the power of the IBM 360/50 for about the price of the 360/40.

Letters to the Editor

Temper Tantrum

Honeywell, Inc.'s most recent temper tantrum, the cancellation of its *Business Week* ads in response to an article entitled "Are Computers Heading for a Back Seat at Honeywell?" should be given the criticism it deserves.

Honeywell Information Systems, Inc. is now servicing customers of Xerox Data Systems who were caught unawares by the Xerox move that pushed the computer operation from the back seat of a fast-moving, high-technology company, executioner style. Someone should back what *Business Week* has written by saying (to parody a current computer-component-as-chess-piece ad), "Bad move, Honeywell."

Ira J. Friedman
Brooklyn, N.Y.

System Not Newsworthy

I generally find *Computerworld* a reliable source of what is new in the DP industry. However, I must express my surprise and disappointment at the front-page article "User Posts Electronic Mail Success" [CW, May 1]. The functions accomplished by Combustion Engineering, Inc. hardly merit mention in a newspaper, much less front-page headlines. The facilities it has implemented are a subset of those that have been available for several years at a number of other sites.

Of course, the Arpa network is the most notable example of the capability of terminal users to electronically distrihute correspondence to a broad variety of other users, but there are many other organizations that offer similar capabilities. These capabilities have been implemented in both research and production environments and on both mainframe and minicomputers.

In fact, the functions implemented by Combustion Engineering's Atom system sound very similar to those offered as a standard system utility on the Decsystem-20 introduced nearly three years ago. Even at that time, the facility was considered so mundane that it was not emphasized as a major advancement in DP functionality, but simply as an ancillary function to the primary purpose of offering on-line, interactive DP.

Lawrence Lee Adrian
Princeton, N.J.

'Dwarfs' Don't Need Relief

The May 1 editorial suggested "serious flaws in the antitrust laws" as the main reason the Department of Justice refused to request interim relief from IBM.

A more plausible explanation is that IBM's supposedly suffering competitors are enjoying excellent business and have shown no urgency of late in requesting relief. It may be that Justice and the dwarf mainframers are reluctant to attempt a solution for IBM's future.

New technology and a possible IBM System 80 may conceivably require a restructuring of IBM and the industry, but that company's management and world market conditions are the key factors.

Within the confines of its role as a U.S. corporate citizen, should IBM's management seize the opportunity to provide an imaginative response to the world's needs? Is it time for the world statesmanship and missionary zeal of Thomas J. Watson Sr. to be "born again"?

William Baynham
New York, N.Y.

Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Managers Should Review Basic Practices

By Jack Stone
Special to CW

The Human Connection

It has been two years and 90 columns since I began this series on the human connections in DP. My major goal has been to help expand the awareness of directors of DP or management information systems (MIS) to the many problems that have developed in data centers because of poor management practices.

Looking back, I feel there is a widespread and growing sensitivity to "people problems," but still relatively little activity to correct them. Nonetheless, there is hope in that user groups, for example, are focusing more on management matters than on technical subjects. Such movements suggest a new and welcome trend toward improving managerial effectiveness in the MIS environment.

In this column, I'd like to set a theme for several subsequent articles. In particular, I'd like to urge managers to review how — and how well — they are handling their fundamental responsiblity of getting the systems jobs done, through people. After that, they should determine where they may more effectively apply the principles of good management practice.

— — —

There are those who claim the DP center is impossible to manage properly, and they suggest several reasons for this rather pessimistic view. For one thing, they say the MIS department is composed of individuals who never have been and probably never will be woven into the fabric of the organization. As a result, the pessimists conclude, DPers lack the organizational knowledge and loyalty needed to produce quality systems.

In the second place, the so-called normal pressures to "get the work out the door" are in fact abnormal and chronic. Continuing and numerous pressures from within — operating system failures, application program bugs and data line drops — and from outside — user complaints, unrealistic top management deadlines and late vendor deliveries — dictate that daily operations have been and probably always will be chaotic, according to the pessimists.

'Crisis Mode' Management

Still another factor is that the level of difficulty of the daily problems or, perhaps better said, the impact of the daily problems upon the effectiveness of the organization, requires the constant attention of the MIS director, who cannot avoid responding to them. This situation forces deviations from any kind of reasonable operating plan and leads to management in "crisis mode."

Although the job of director-of-MIS is very tough, I submit we cannot afford to take such a "negative Nellie" approach to our problems. We can and must address them head-on, one at a time, in a positive way. And we should start by turning to classic management principles to guide us in our solutions to these problems.

For starters, let's look at the "crisis mode" issue. After permitting chaos to continue for years, many MIS directors are now coming under the multiple guns of user, management and employee groups.

Most users perceive the MIS department to be terribly disorganized, and that, they say, is the root cause of its nonresponsiveness to their needs. Top management generally sees the department as incapable of meeting developmental and production commitments with dollar and manpower budgets.

Within DP itself, both professional and technician-level employees are near exhaustion, having been directed to construct perfect application systems under extremely short timeframes with very limited resources.

What's even worse, the abysmal public relations capabilities of the MIS management has all too often prevented any except those directly concerned from hearing about real MIS successes — and there have been many of these that deserve public notice.

Approach to Solution

One basic principle of good management that applies to the solution of the "crisis mode" problem states that a manager should only accept jobs for his staff that can be accomplished on a time schedule and at a resource level such that the employees can be proud of their achievements.

When professionals have to respond to a swirl of critical projects, changing priorities and crash developments over sustained periods of time, their performance deteriorates, errors increase, product quality falters and costs escalate. How many DPers can you name who show sincere, continuing pride in their work?

The approach to solving the "crisis mode" of operation is not very complex. It does, however, require determination, courage and leadership by MIS management to implement. Here are some of the major initial steps in the approach, and I'll discuss others in later columns:

- Analyze the patterns of the operation and see if there are subsets

(Continued on Page 22)

Bank Statement Avoids Customer Confusion

The Taylor Report
By Alan Taylor CDP

Dear Mr. Taylor,

If you want to find a bank that uses the English system for overdraft accounts successfully, try Industrial National Bank of Providence, R.I.

I had an account there until the end of 1976 and found its statements very easy to follow. If my checking account was $125.37 in the hole, the balance was shown as $125.37-.

H.R. Sides
Surfside Beach
South Carolina

P.S.. The banks around here all use the pseudo loan approach. I hate it. Even my bank manager says he has trouble balancing his checkbook.

This letter arrived a few weeks ago when the confusion involving the notation of cash advances and overdraft protection on bank statements was being discussed [CW, Jan. 23], and when I was being told that legal requirements prevented the use of clear forms. Naturally, as soon as I could arrange it, I went to Providence to see this wonder form.

At Industrial, Joseph Kent explained the way the bank puts out its statement. Like every other bank, Industrial had the requirement of getting its form through the legal department. However, out of this came the best design I have seen. It is illustrated here in a sample form made up for a fictitious John Smith.

Confusions Avoided

The really important parts of the form are the provisions for avoiding confusion. The designer kept two things in mind:

- A particular piece of data should not be printed unless it is absolutely necessary.
- Although from some technical points of view a cash reserve advance is a deposit, a bank customer does not think of it as a deposit.

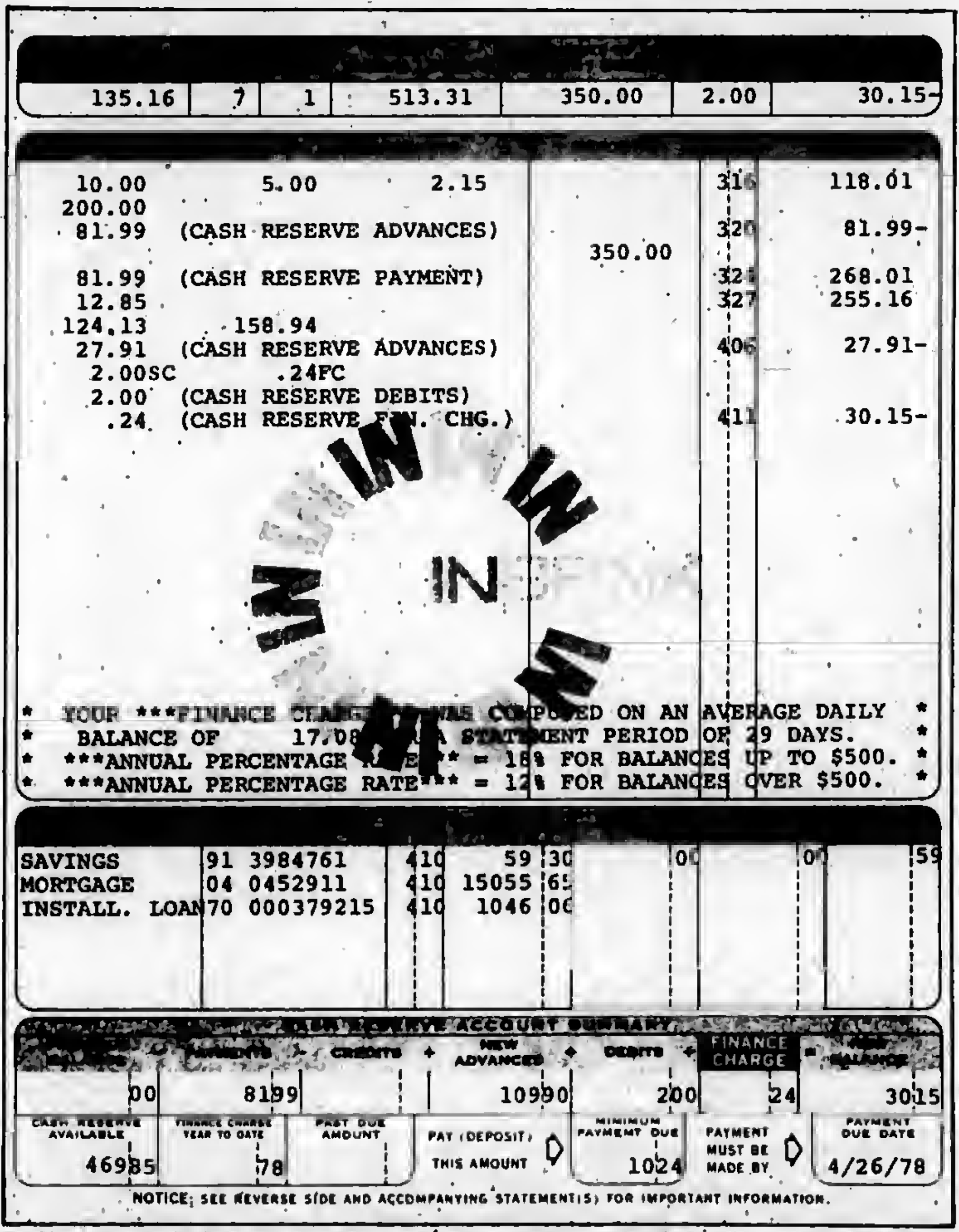
Notice that the statement has one column for deposits — just the deposits the customer will recognize as deposits — and another column for daily closing balances. There could be balances shown on every line, but instead the design provides only a closing balance for each day the balance changed.

I am not certain I like the placement of the date, however, because there is nothing to clearly connect it with the transactions. For instance, the $200 check shown on the second line was cashed on March 20, not on March 16. In fact, the balance is for the date directly opposite and that date is only printed on the last line of that day's transactions.

The balance notation, however, is the one the customer understands. It is his true balance, the total amount he owes the bank or the bank owes him. It is never the fictitious balance given for overdraft cases, which is always zero.

When service charges and finance

(Continued on Page 22)



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 135.16 | 7 | 1 | 513.31 | 350.00 | 2.00 | 30.15-

  10.00        5.00        2.15                 316    118.01
 200.00
  81.99  (CASH RESERVE ADVANCES)                320     81.99-
                                      350.00
  81.99  (CASH RESERVE PAYMENT)                 321    268.01
  12.85                                         327    255.16
 124.13       158.94
  27.91  (CASH RESERVE ADVANCES)                406     27.91-
   2.00SC       .24FC
   2.00  (CASH RESERVE DEBITS)
    .24  (CASH RESERVE FIN. CHG.)               411     30.15-

*  YOUR ***FINANCE CHARGE*** WAS COMPUTED ON AN AVERAGE DAILY  *
*   BALANCE OF     17.08 IN A STATEMENT PERIOD OF 29 DAYS.     *
*  ***ANNUAL PERCENTAGE RATE*** = 18% FOR BALANCES UP TO $500. *
*  ***ANNUAL PERCENTAGE RATE*** = 12% FOR BALANCES OVER $500.  *

SAVINGS       91 3984761    410     59 30    00    00    59
MORTGAGE      04 0452911    410  15055 65
INSTALL. LOAN 70 000379215  410   1046 00
```

CASH RESERVE ACCOUNT SUMMARY

BALANCE	PAYMENTS	CREDITS	NEW ADVANCES	DEBITS	FINANCE CHARGE	NEW BALANCE
00	81 99		109 90	2 00	24	30 15

CASH RESERVE AVAILABLE	FINANCE CHARGE YEAR TO DATE	PAST DUE AMOUNT	PAY (DEPOSIT) THIS AMOUNT	MINIMUM PAYMENT DUE	PAYMENT MUST BE MADE BY	PAYMENT DUE DATE
469 85	78			10 24		4/26/78

NOTICE; SEE REVERSE SIDE AND ACCOMPANYING STATEMENT(S) FOR IMPORTANT INFORMATION.

The Industrial National Bank statement illustrated here was praised by reader and systems analyst H.R. Sides.

Letters to the Editor

Reading Too Rough For Seventh Grade

In "GM Program Rates Level of Text Difficulty" [CW, May 1], a GM engineer was said to have noted that "Many classics of American literature, such as *Robinson Crusoe* and *Tom Sawyer*, are written at about the seventh grade level."

Robinson Crusoe was written by Daniel Defoe, an Englishman. It has, since its publication, often been rewritten as an adventure story. To quote Angus Ross in his introduction to the Penguin edition; "Such simplifications seize upon an element that is undoubtedly there, but at the expense of the protean force of Defoe's imagination."

How many seventh graders make it through the fifth paragraph of *Robinson Crusoe*, which is 400 syllables long, all in one sentence?

Man Friday
Systems Analyst
Philadelphia, Pa.

About Data Boss/2

I was disappointed that more care was not given to reviewing "Data Boss/2 Gains Report Writer" [CW, March 20] and "'DBMS' Label Stuck on Too Many Packages" [CW, April 17].

Had Stephen Robinson compared the March 20 article (authored by CW) with the Data Boss/2 literature (which he requested on March 29), he would have noticed that the latter did not contain the words "Codasyl specifications."

Phil Borod
Systems Consultant
Florida Computer, Inc.
N. Miami, Fla.

Bank Statement Cuts Out Confusion

(Continued from Page 21)

charges occur, they are also identified as such. The cash reserve transactions receive separate treatment. They take up a complete line so they don't get confused with finance charges. They also are clearly labeled.

The finance charge calculation is a four-line statement at the bottom, including the two lines stating the annual percentage rates, only one of which is actually used here. The charge can be checked by the user from the statement, with one small exception. What can be checked is whether there was an average daily balance of $17.08 if the statement period was indeed 29 days. What can't be checked, on the statement itself, is if the statement period was indeed 29 days.

The customer can see when the period ended, but he can't see when it began — without looking at the previous statement.

The rest of the statement has the standard grouping of opening balance data, cash reserve summary and account types for the savings, mortgages and installment loans. I'm not keen on having both deposits and loans in the same balance group without positive or negative signs, but that is a very minor point.

Altogether, Industrial's statement is the best that has come my way, and I know there are many banks that would do well to copy it. I don't know whether credit should go to the technical people like Joe Kent or to the legal department for being able to continue working with the designers until both were satisfied. (I hear it took quite a lot of work to satisfy both.) Indeed, this willingness to soldier on in the design work may well be the key to Industrial's success.

However, someone may have a better statement design. And someone may be able to explain why this is a better design than most — in a way others can compute the comparative virtues of alternative versions.

If you know of any bank that has a good form — or if you can give some clear ways of scoring the differences between good and bad forms — I'd be happy to spread the news.

Good work, Industrial.

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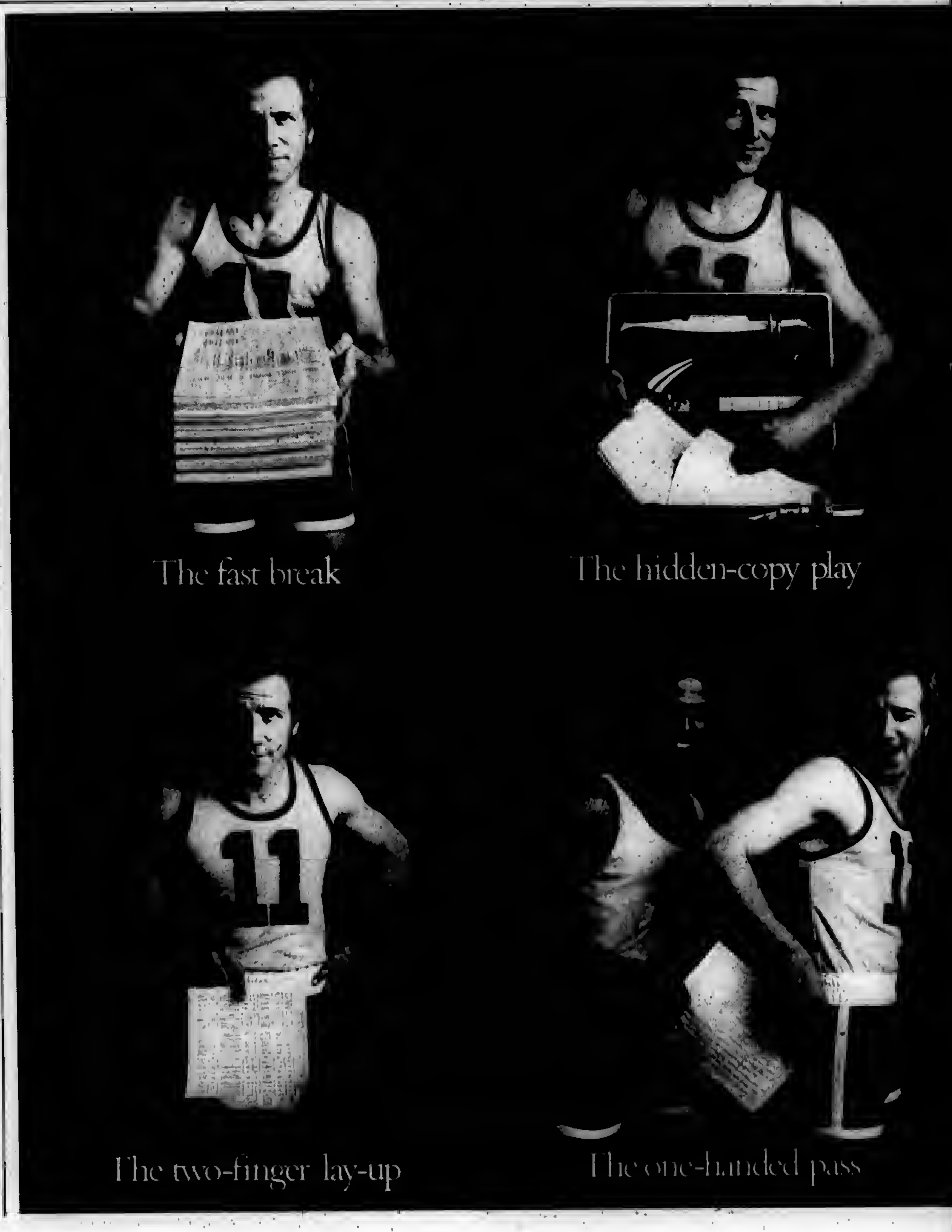
Managers Need Basic Review

(Continued from Page 21)

that can be delegated down the line so you can be freed for more constructive activities, specifically those relating to planning and evaluation.

- Call a moratorium on new development projects until so-called "production" programs can be debugged, once and (nearly) for all.
- Assemble statistical data of past performances on which to justify realistic schedules and manpower levels for future develpment projects. Top management won't like what it learns, but it will at least appreciate having a more scientific method for setting MIS development budgets.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.



Manager Becomes Passive

Referee Role Turns DP Tiger Into Pussycat

By George Feller
Special to CW

I take vehement exception to the views attributed to Jack Stone in an article entitled "Managers Held Responsible for Their Teams." [CW, May 1]. Specifically, the comments that "the primary duty of a manager within a DP environment is to act as the referee or intermediary between the people inside and outside the computer room" and that "the manager must not take on any new work until the present operations are in order" not only espouse a passive view of management, but also encourage an isolation from the "raison d'etre" of a DP department in the first place.

First, I believe the majority of top executives would be dismayed to discover the DP tiger they thought they hired to help gain a competitive edge via the computer is really a pussycat disguised as a messenger boy. I agree that human relations skills are a mandatory aspect of most management positions, but they are hardly sufficient in and of themselves to produce a truly effective manager. The truly effective manager is far more than a passive "intermediary."

Reader Commentary

In fact, it has been my observation, both as a consultant and manager, that adopting a passive approach is the surest way to find yourself in the unresponsive situation where you must, as Stone proposed, set up artificial controls so management will not "screw up the work schedule." You will continually be whipsawed because you are not in touch with the business and are not actively contributing to its management.

On the contrary, the truly effective manager is aggressive not only in learning the business he services, but also the specific changing business pressures that may affect his priorities. He must possess the interpersonal and communications skills to set up an effective dialogue with line manageemnt and the creativity to synthesize a systems direction that coordinates the disparate individual systems projects.

Within his department he is equally aggressive, communicating what he perceives and stimulating discussion and commitment. He actively works to break down isola-

(Continued on Page 28)

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Checklist Lets DP Job Hunters Test Recruiters

By Paul B. Davis
Special to CW

The April 24 Taylor Report concerning the DP recruiting industry contained some valid points. Unfortunately, there are some unprofessional and unqualified recruiting firms in the business; however, ours is a billion-dollar-a-year industry that fills a tremendous need for companies and DP professionals alike, and there is no need to throw the baby out with the bathwater.

I would like to point out that the employees of my firm all come from the DP industry and have an average of 15 years in both the DP and recruitment professions. I would like to think that many recruitment firms are much like ours.

A professional recruiting firm maintains tight controls over all the relationships between the client company and applicant. A full-service recruiting firm does more than fill the obvious need; it should provide professional guidance and direction to both the job applicant and the client company based upon its in-depth knowledge of that marketplace.

Below are some guidelines that can be used by applicants and client companies in evaluating recruiting firms prior to any involvement:

- Ask the recruiter how many situations he recruits in a month. The ideal number is about seven — any more than this and you are probably talking to a "mass mailer." These, incidentally, are the worst abusers of confidentiality.
- Ask the recruiter what his technical/professional experience is. Does he specialize in DP? It is important to know the recruiter understands your background and technical needs. This is vital for both client companies and applicants.
- Ask how long the agency has been in the business and whether it can provide recent references.
- Check with your professional colleagues to find out who they have dealt with in the past. This is easily done at the Association for

(Continued on Page 28)

Codasyl Standard Urged

Multiple DBMS Standards a Ludicrous Idea

By Larry E. Towner
Special to CW

There can be little doubt left that the future of business data processing lies in the direction of data base technologies and concept. To many operations and data processing managers, 'data base' has come to be the light at the end of a long, dark tunnel . . . some major philosophical and managerial changes must be made before we can be sure that that light at the end of the tunnel is not a train."

Daniel Appleton wrote those prophetic words in a January 1977 *Datamation* article entitled "What Data Base Isn't."

Most of us who work with data base have found that the light *is* a train — and it is moving. We have caught that data base train. Depending on our grip, the ride is exciting, scary or downright terrifying.

Reader Commentary

The train is gathering speed. Some riders without a sure grip have already fallen off, and others will drop away as the journey progresses. The ones who survive the fall will be reluctant to climb aboard the next data base train to come along.

The message of this story is to pick the right train — one that can provide you with a safe ride to the destination you want to reach.

Since my Feb. 6 article on Codasyl data base management system (DBMS) standards, I have heard many comments pro and con, some expressed here in *Computerworld*. The difference in responses aptly illustrates my premise: We know too little about this important new tool of data processing.

No Clear Answer

Our world is filled with claims and counterclaims about what is best for us. What is the answer? There doesn't appear to be a clear answer right now. The Codasyl standards approach will help us relate apples to apples.

In his response to my article [CW, March 20], Eugene I. Lowenthal of MRI Systems Corp. (maker of the System 2000 DBMS) advocated multiple standards for DBMS — that is, one standard for MRI, another for vendor B, etc.

This is very useful to the vendor. After all, it's relatively easy to meet your own standard. Multiple standards (the thought is a bit ludicrous, anyway) make an accurate comparison of DBMS packages difficult, somewhat like comparing apples to oranges.

Multiple standards for the same product serve only to keep a user tied to a single supplier. Until the non-Codasyl DBMS vendors bite the bullet and adapt, our selection of data base trains must be made very, very carefully.

Back in the early days of railroading, there weren't any standards either. Tracks were of different gauges. Trains from one railroad were unable to travel on the tracks of another. When a standard gauge was established, a lot of trains had to be junked.

Data base systems are similar to railroads: Standards or lack of standards can make the difference between a safe trip or one interrupted by a change along the way. Can you afford the change? Lowenthal agreed the cost of change is enormous.

Shaky Assurances

I have previously stated that vendors who change to Codasyl standards could be expected to abandon support of the nonstandard versions of their sytsems. Obviously, this upset some non-Codasyl vendors.

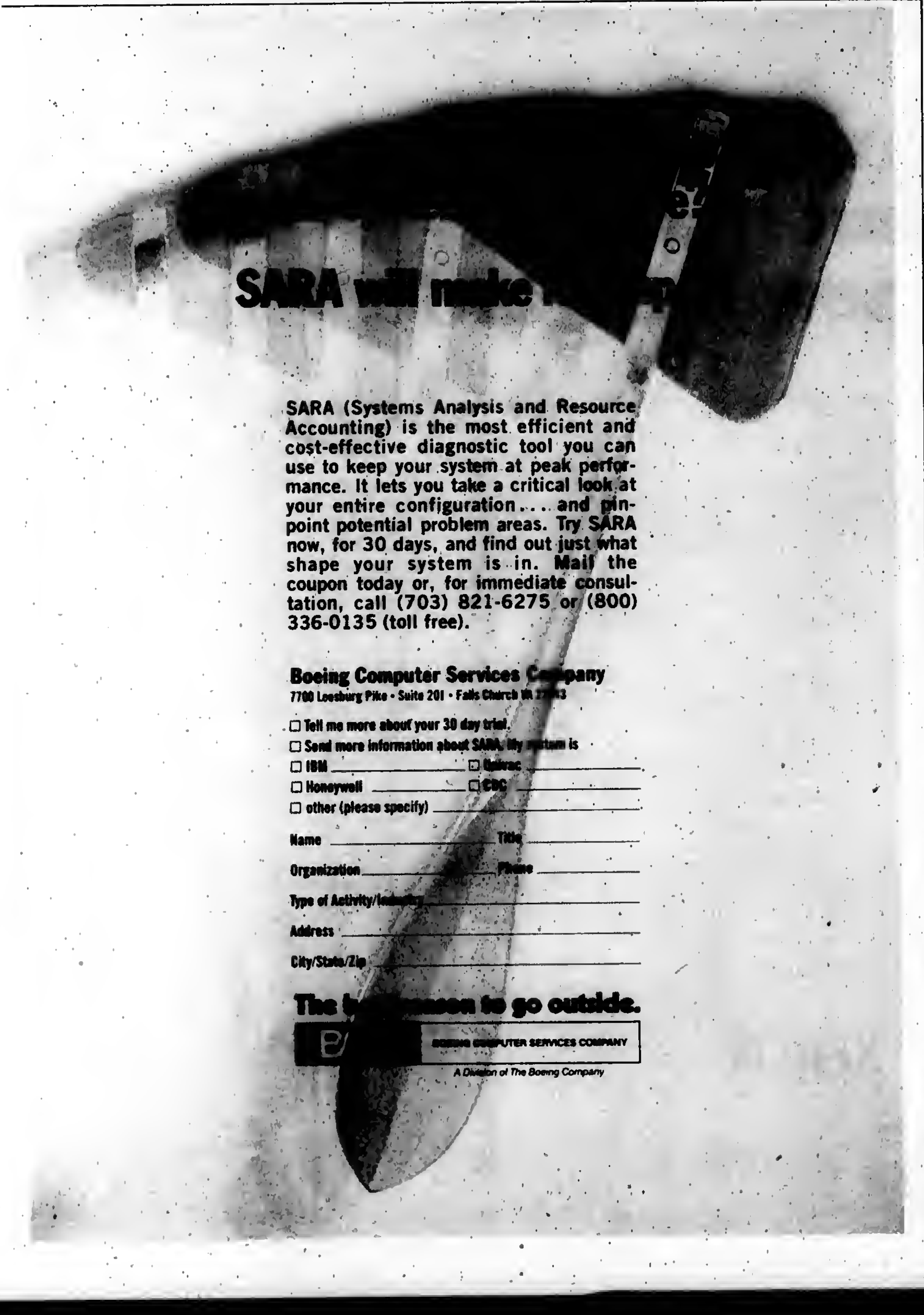
Lowenthal retorted that my statements were not based on experience and showed little understanding of vendor-user relationships — an understandable response from a vendor whose future can be threatened by a proposed standard.

It is convenient to forget that RCA and Xerox got out of the computer business because it was no longer profitable to keep supporting a computer which did not have enough of the market. It is also convenient to forget that IBM dropped support of DOS because it cost too much to keep up support. (I experienced that one.) IBM has dropped support of OS, too. Same reason?

Whatever the reason, the only solution available to us OS users is to buy a 370 or hire systems programmers (at a high price) to maintain the operating system.

I think this is experience enough to make my statements relevant. As

(Continued on Page 28)



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Multiple Standards Ludicrous

(Continued from Page 24)

for vendor-user relationships, we users have had lots of experiences recovering from the decisions of vendors over whom we had no control.

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If we are to catch the right train, it is up to us as users to insist that our train be capable of the full journey.

Passivity Turns Tiger Into Kitty

(Continued from Page 23)

tionist ("DP vs. management) walls by both two-way communications and direct exposure of the isolationists to line personnel.

Secondly, Stone's recommendation that "the manager must not take on any new work until the present operations are in order" is just another way of saying, "Stop the world, — I want to get off." The problem is — how do you get back on?

I have seen companies that have adopted Stone's recommendation and they did, in fact, achieve internal efficiencies. Unfortunately, the companies these DP departments were supposed to be servicing continued to grow and evolve, and when the DP department finally finished contemplating its alimentary canal, it discovered that line management considered its by now outmoded systems a competitive disadvantage.

You can't stop the world without damaging it. The challenge is not to improve DP in isolation, but to improve the profitability of your company via DP.

Feller is the vice-president of systems and DP at Pepsico Transportation, Inc. of Tulsa, Okla.

Checklist Aids DP Job Seekers

(Continued from Page 23)

Computing Machinery, Data Processing Management Association and similar organizations.

- Find out whether there are any other services the recruiting firm provides companies — for example, wage and salary programs, benefit studies, etc. This will give you a good idea of the professional competence and level of expertise of the firm with which you are dealing.
- Ask if the firm is a franchise. The quality control of franchise organizations varies drastically from city to city.
- Ascertain whether the recruiting firm belongs to a professional organization that specifically spells out in writing the relationship that will exist between the recruiting firm, the applicant and the client company.
- Make sure the recruiting firm agrees client companies will be contacted only after receiving the applicant's permission.

With this checklist in mind, a professional will be able to decide whether to use the recruiting company's services.

Davis is with E.G. Jones Associates, Ltd., personnel consultants, in Towson, Md.

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They Think Ahead: Kemnitz

Want Success? Let Users Run the Show

By Don Leavitt
CW Staff

MINNEAPOLIS — "Is there an explanation for our success in installing new systems?" Dee H. Kemnitz asked rhetorically. "Sure. The project manager is not a DP professional; he is a user and he runs the show."

The vice-president, personnel, at Carlson Companies, Inc., a privately owned, widely diversified corporation largely in service industries, was commenting particularly about the company's involvement with a combination payroll/personnel/pension package but added that the approach has been used for both packaged and "home-grown" applications.

Dee Kemnitz

Emphasizing the point, she noted that the payroll manager had been in charge of the effort eight or nine years ago when Carlson built its own payroll/personnel system. He had been assisted by the records manager, and they had been supported by the DP staff.

The same men were still with Carlson when it converted from the old system to Wang Laboratories, Inc.'s Super package in late 1976, so they were once again put in charge of the crew that did the work.

That means the people who have to use the system once it's in place are in a position to think very carefully about it "up front" before the wrong decisions are made. "That has guaranteed our success," Kemnitz asserted.

Even the old system was a success, she said, but it had become obsolete over the years as Carlson changed and acquired new operations — the Radisson Hotel chain for example — that just didn't fit easily into the system. Written originally for either a Honeywell Information Systems, Inc. 1200 or an IBM 360/40 — "I don't remember which, for sure" — it was running on an IBM 370/138 when the company decided to get a more modern system.

Package Search

The search for possible packages was a typical Carlson operation. The search committee was made up of the vice-president in charge of finance, the corporate director of DP and Kemnitz. That's an unusually high-level group, she said, but it meant they had the power to make the decision and the "clout" to show the system had management support.

The "evaluation" process involved scanning what was available, quickly recognizing that there were three serious candidate packages, listening to vendors' presentations, reviewing the documentation and checking (by phone) with a few current clients. The whole procedure took "probably three weeks from start to finish" and that is characteristic of the way Carlson makes decisions, whether to acquire new businesses or new software, she said.

Having said all that about how the user is so deeply involved, Kemnitz nonetheless had praise for Ed Frandle, the director of corporate DP, who managed the technical aspects of the changeover. That was so smooth, she said, that out of 2,500 checks produced in the first production run, only three were unmailable.

(Frandle isn't in the DP slot anymore, she noted. He's been promoted into line management within the corporation. "That's what happens to the super-good DP managers and it's a great loss to the DP field. But we in personnel and the other departments can't figure what else to do with them: they have to have a future.")

Although payroll processing under Super was limited at first to corporate staff and those units historically whose payrolls had been handled by corporate, it has now grown to support about 10,000 employees in most divisions. Almost all will be on the system by next January although a few will be brought in later next year.

Much of the input from outlying operations comes through the mails — "certainly not the best method" — but Carlson is beginning to consider distributed DP "of some sort" to simplify the mix of equipment and methods that mark its divisions now.

Carlson is implementing the personnel portion of Super along with the payroll processing. It also acquired the pension modules in March 1977 to handle what Kemnitz called "probably one of the most complicated profit-sharing plans in the country." Though Carlson was an early user of the software, it was up and running for the entire corporation by last October, she said.

'Datamanager' Gains Flexibility

LEXINGTON, Mass. — Release 2.0.2 of the Datamanager data resource management system from MSP, Inc. is said to increase both the integrity and the flexibility of the system for IBM 360/370 users.

A full automatic error-recovery feature has been built into the basic Datamanager module. This facility prevents the corruption of the data dictionary if the system fails for any reason during accessing or updating, whether in on-line or batch mode, a spokesman claimed.

Integrity is further strengthened, he said, by the inclusion of a lock against concurrent access during updating operations.

Status Facility

A Status facility enables past, present and future data definitions to be stored and interrogated on the same dictionary. Past and current definitions are "frozen" and cannot be changed unless "unfrozen," while future definitions are recognized as test statements and can be changed at will.

Capable of supporting 255 different statuses on the same physical dictionary, the system has "great potential" for a distributed processing environment requiring local dictionaries, the spokesman noted.

On-Line Updating

Outside of the basic system, on-line updating has been added to the CICS interface module, enabling users to change as well as retrieve data from the dictionary through a terminal.

Support for IMS data definitions has been implemented in the IMS (DL/1) interface module, he continued. This allows IMS data bases and segments to be defined, documented, interrogated and processed using standard Datamanager commands, the spokesman said.

An ACCESS/CALL facility has been implemented as part of the User Interface selectable unit. This enables the data dictionary to be used dynamically to drive user applications, since definitions and such data as edit criteria can be moved from the dictionary into programs during compilation or execution.

Datamanager carries a base cost of $9,900 with special feature-selectable modules costing $2,250 each. Typically an installed Datamanager will cost about $20,000 and use upward of 350K bytes on an IBM 370/135 or larger mainframe.

MSP is at 594 Marrett Road, Lexington, Mass. 02173, while MSP Ltd. is at 71 Gloucester Place, London W1H3PF, England, and affiliated offices are in Canada, Sweden, W. Germany and Finland.

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Standard Pascal Compiler Runs on PDP-11s

PORTLAND, Ore. — Designed for use on Digital Equipment Corp. PDP-11s functioning under various operating sytsems, a Pascal compiler from Oregon Minicomputer Software, Inc. (Omsi) produces programs that execute faster than Basic-Plus, Basic-Plus-2 or Fortran IV programs created from software provided by DEC, according to an Omsi spokesman.

Omsi Pascal-1 is a true compiler that generates assembly code from programs written in full standard Pascal. The code is then assembled and linked with DEC system utilities, he said.

The minimum RT-11 system required to support Omsi Pascal-1 is 16K words of memory on any LSI-11. The compiler can make use of up to 32K words (64K bytes) of user memory on the RSTS/E and RSX-11 systems and takes advantage of DEC's floating-point processor (FPP), floating instruction set and extended instruction set if available, he added.

This Pascal is typically five to 30 times faster in program execution than DEC's Basic-Plus, he claimed. A benchmark was conducted on a PDP-11/45 with FPP under RSTS/E Version 6B swapping on an RK05. According to the spokesman, 124K words of memory plus Fabri-Tek, Inc. cache memory were used.

Although good execution speed is important, the compiler also supports an "unusually powerful" high-level symbolic debugger (itself written in Pascal-1), in-line machine code, overlays, random-access files and a flexible library system, he said.

An optional feature of the RSTS/E version is a single command that turns most Pascal programs into RSTS/E run-time systems. With this facility, a single copy of a program can serve many simultaneous users without swapping, he added.

RSTS/E (V6B and V6C), RSX-11/M (V3.0 and V3.1) and RT-11 (V2C and V3) versions of Omsi Pascal-1 can be acquired for $1,500 per site license from Oregon Software, 2340 S.W. Canyon Road, Portland, Ore. 97201.

NBS Conference To Look at 1980s

WASHINGTON, D.C. — A one-day symposium on "Tools for Improved Computing in the '80s" will be held at the National Bureau of Standards (NBS) complex in nearby Gaithersburg, Md., on June 15, sponsored by NBS and the Washington Chapter of the Association for Computing Machinery (ACM).

Keynoting the conference will be Richard M. Harden, special assistant to President Carter for information management. He will speak on sharing information for decision making in the federal government.

Super Computers

Topics to be covered in concurrent sessions include "super computers," software engineering, programming languages, microprocessor software, hardware architectures, management issues, software tools and optimization tools, a spokeswoman said.

At noontime, a panel will discuss the President's federal DP reorganization project. Speakers will include Walter Haase of the Information Systems Policy Division of the Office of Management and Budget; U.S. Rep. Charles Rose (D-N.C.); Jack Biddle, president of the Computer and Communications Industry Association; and Herbert Maisel, regional representative of the ACM.

Registration fees, which include a copy of the proceedings and lunch, range from $20 to $35.

More information is available from registrar Charles Bridges, 151 Fleetwood Terr., Silver Spring, Md. 20910.

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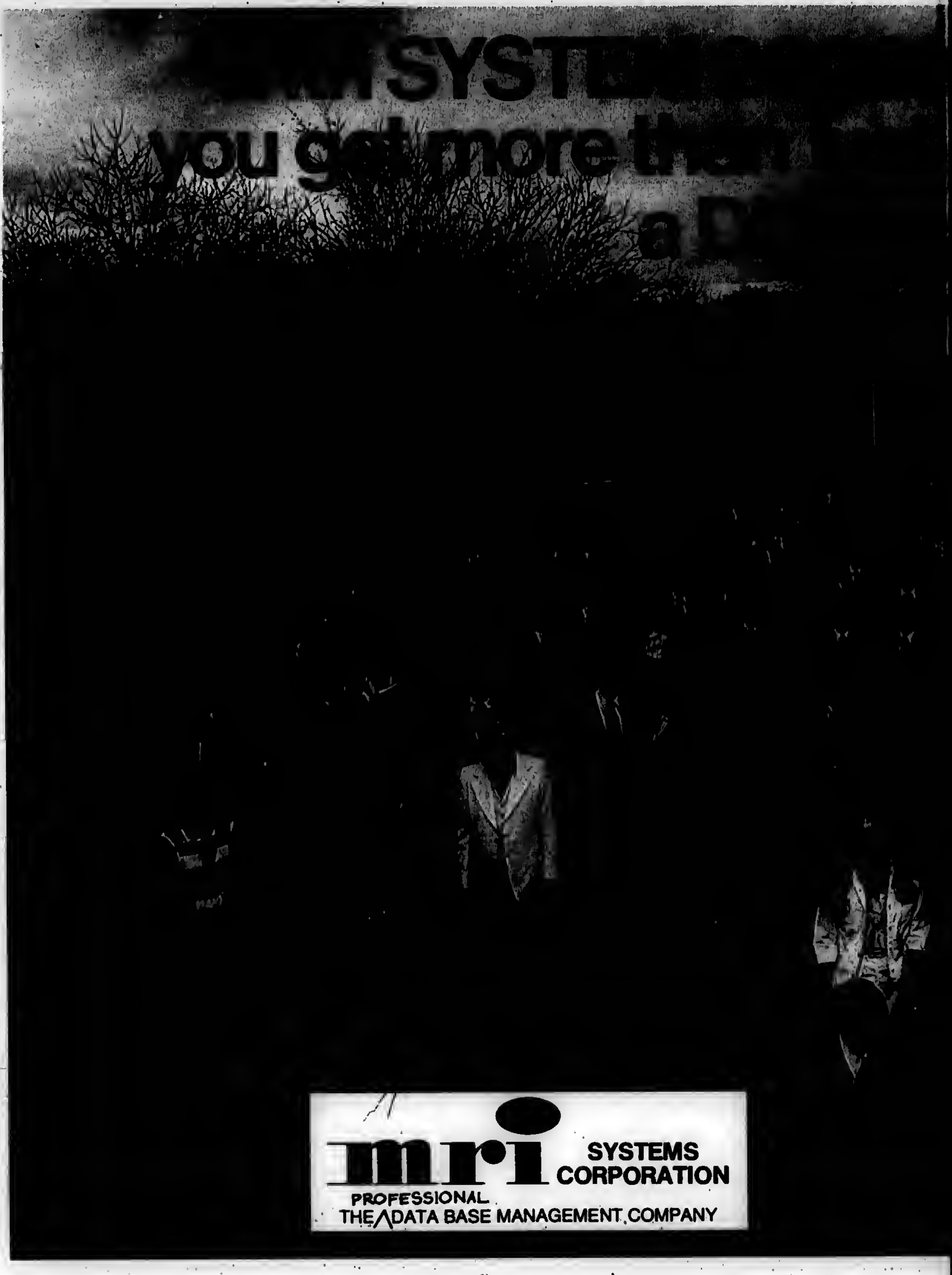

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Workshop to Plan Workloads

LOS ANGELES – A workshop on how to develop and use workload forecasts, with an emphasis on the methods of obtaining actual measurement from which forecasts are developed, will be sponsored by the Institute for Software Engineering at the Biltmore Hotel June 13-15.

Sessions at the three-day meeting will be technically oriented, designed for those with technical responsibility for workload forecasting. A major portion of the workshop will be devoted to the use of IBM's SMF data and both hardware and software monitors for forecasting, a spokesman said.

Despite the institute's interest in software physics, no prior knowledge of that subject is assumed; basic concepts will be covered early in the meeting and examples throughout the workshop will reinforce the attendee's ability to work with this approach to measurement, he explained.

The workshop leader is Robert A. Jones, co-author of the institute's report "Job Costs and Charges."

The registration fee is $240 for institute members and $400 for others. More information is available from the institute, P.O. Box 637, Palo Alto, Calif. 94302.

'Dynam/D' Manages Data Set Generations

NEW YORK – Release 2.0 of Dynam/D, the DOS-DOS/VS disk space and catalog management package from Computer Associates, Inc., includes a generation data sets facility comparable to the long-time OS feature and an enhanced backup/recovery facility, a spokesman said.

The generation data sets feature was implemented to allow the user to create and save multiple versions of a file and then be able to access any of these generations. Dynam/D catalog management is a prerequisite to using this feature, the spokesman noted.

The backup/recovery routine allows any disk file to be transferred to tape and then restored to disk as needed. The enhancements enable multiple files to be dumped on a single tape, but restored selectively. An entire disk dump/restore is now supported, the spokesman added.

Sequential disk files can be restored dynamically to any disk volume. Device independence and truncation at CLOSE are in effect when restoring these files, he said.

Dynam/D Release 2.0 is available for a minimum of $5,000 depending on options selected. Various monthly payment plans can be arranged, the spokesman added from 655 Madison Ave., New York, N.Y. 10021.

UNH Seeks Ideas For July Meet

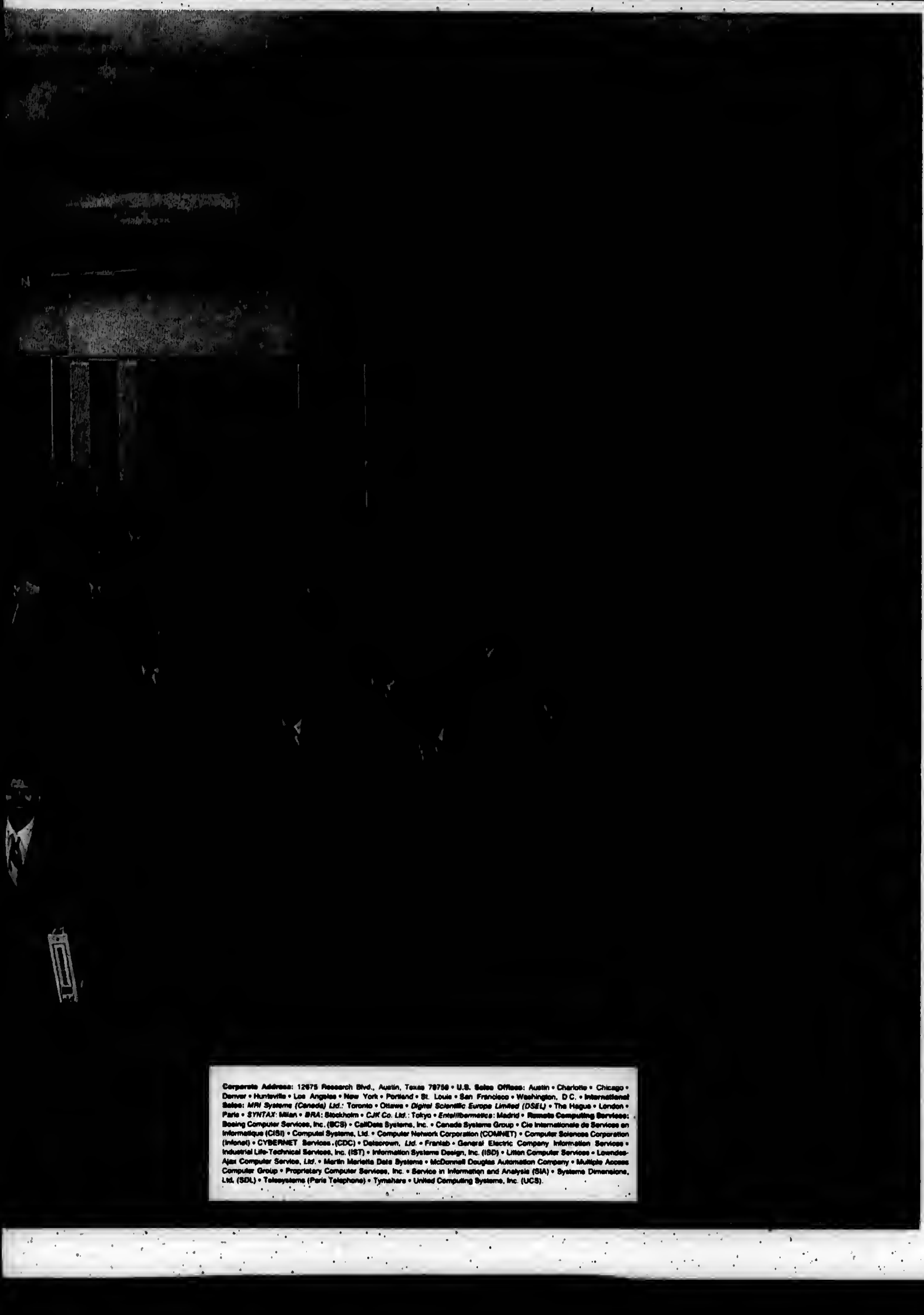
DURHAM, N.H. – The Office of Academic Computing at the University of New Hampshire (UNH) is planning a workshop in late July on the use of computers to teach statistics, and coordinator Dr. Jerry Warren has said he welcomes proposals for presentations to be added to the program.

The workshop will be held July 25-26 at the campus here, and the deadline for submitting proposals is June 1.

Each proposal should include both an abstract, telling what is to be covered, but limited to 20 typewritten lines, and a longer explanation with enough detail so the screening committee will be able to choose between similar proposals, he said.

Although only a few proposals will be accepted for presentation, Warren noted all abstracts will be included in the workshop proceedings so they will be brought to the attention of the attendees.

Warren can be reached at 304 McConnell Hall, UNH, Durham, N.H. 03824.



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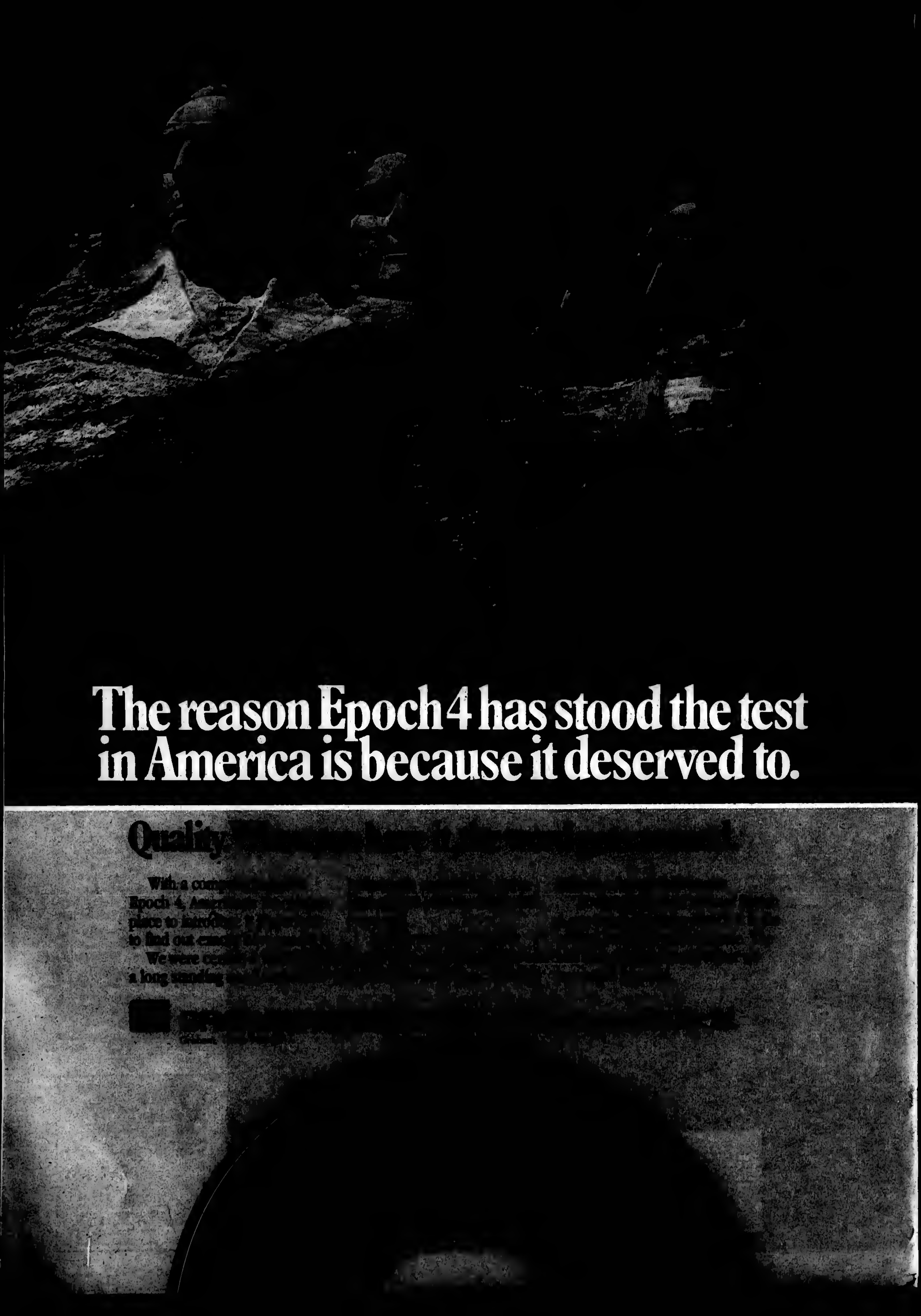

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Reasoning for Annual Training Plan Outlined

By Don Leavitt
CW Staff

Many authors have tried to communicate the need for serious planning to get or keep DP technicians current in their knowledge of the field and skillful in their application of the knowledge.

Although I encourage the formality of a document to structure the planning, I'd rather have managers and employees get together one-on-one to consider what training the employee needs and what commitment management can make to meet those needs than have them delay the process until a proper form can be designed and approved.

In any case, few commentators have stated the logic behind the planning better than the anonymous author of the following column, which appeared in the March 1978 issue of the Army Automation Review.

The Human Connection

The preparation of an individual development plan (IDP) is required as part of the revised career appraisal procedures for each employee who is registered in the Civilian DP Career Program. Although a similar plan is not required for military personnel who are assigned to automation activities, the value of the IDP is such that supervisors should consider preparing this plan for their military personnel.

Basically, an IDP is a review of the training and developmental activities required to fill in a gap in the background of an individual, to maintain the individual's technical skills at a level equal to the current state of the technology or to prepare the individual for future assignments. The developmental activities might include temporary duty assignments and details, task-force or work/study group assignments or assignments to specialized technical or management projects. For civilian personnel, the assignments proposed by the supervisor may be long- or short-term. For military personnel, the developmental activities should be confined to those that can be completed within the terms of their current assignments.

For either civilian or military personnel, the preparation of the IDP should start with an analysis of the individual's background to identify the technical or managerial areas in which his background is weak. The analysis can be started either by the individual or by the supervisor, but it should become a collaborative effort before it is completed.

After the areas in which there is a need have been identified, the supervisor should develop a proposed plan to fill that need. This plan may call for training, experience or formal education. The plan should be realistic. It should represent a commitment by the manager that he will adjust workload schedules to provide time for the training or work experience included in the plan and that sufficient funds are available for temporary duty assignments or training costs, which may be included in the plan.

The plan should not be a wish list. It should represent a commitment on the part of the supervisor to provide the means for the employee to develop. Similarly, the plan is a commitment on the part of the employee to put his best effort into developing his background and abilities.

An IDP should be developed to cover the period of 12 to 15 months from the time it is prepared. If during the period covered by the plan the supervisor's or the individual's ability to fulfill the plan changes, the effect of the change should be discussed by the two of them and the plan revised accordingly.

Tandem Units Emulate 3780s

CUPERTINO, Calif. — A Tandem Computers, Inc. Nonstop 16 system linked to an IBM 360/370 reportedly can emulate the functions of an IBM 2780 or 3780 remote-batch workstation through software now available from Tandem.

The Exchange remote job entry (RJE) subsystem package is said to handle batch I/O from and to all devices including terminals, tape transports, disk drives and line printers. Exchange commands can be entered conversationally from a stored command file or programmatically from an application routine, a spokesman said.

The system is capable of transmitting and receiving Ascii or Ebcdic, horizontal tab and vertical forms control codes, Ebcdic transparent code and blocked data link messages. In addition, it performs short record truncation and blank field compression, he said.

Exchange supports file transfer between workstations. The software also generates warning codes when a system is temporarily unable to transmit or receive because, for example, it is already handling an uninterruptible process run.

The Exchange software costs $2,000 from Tandem at 19333 Vallco Parkway, Cupertino, Calif. 95014.

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Service Aids Loan Manager

NEW YORK — The Loan Pricing Model (LPM) software now available through Automatic Data Processing, Inc.'s (ADP) Network Services enables a bank officer to consider a wide range of factors very rapidly when trying to establish the appropriate price for a major loan, an ADP spokesman said.

Developed by Rhode Island Hospital Trust National Bank and the American Management Co., LPM is said to help a bank analyze the sources of return on individual loan transactions by evaluating the impact of different assumptions about the future rate environment.

Since the models created by LPM can incorporate a bank's situation and profit goals, they also provide a means of studying how different strategies coincide or conflict with the bank's lending policy, the spokesman continued.

The ease with which LPM can be used, especially compared with manual or table-driven methods, should also lead to the uniform background work so important in the area of loan negotiation, he claimed.

LPM was designed to be used by line banking executives, with emphasis on human-engineered input, operation and output, he asserted.

More information about LPM is available from the network's Financial Information Services offices at 424 Park Ave., New York, N.Y. 10022.

Access Methods and Sort In Package for Series/1

METAIRIE, La. — Users working with the IBM special-order Event Driven Executive (EDX) for the Series/1 minicomputer can now acquire a pair of access methods and a sort/merge facility for EDX files, all in a package from Applied Realtime Systems, Inc. (ARS).

The first of the two access methods was described as a combination of direct and sequential read/write by logical record number.

A rather conventional indexed sequential access method is also provided, allowing access directly by key or sequentially in ascending key order. The method utilizes a multilevel tree structure; keyed and sequential access modes may be intermixed.

Completing the package, EDXSort accepts files formatted by the access method software and sorts them by a set of user-specified fields. Depending on how the user sets up the operation, the output will be formatted as sequential files of records, tags or pointers to the records in the sequence specified, the spokesman said.

To initiate the sort operation, the user identifies key fields (as many as nine) in sequence, high order to low order. These fields must be within the bounds of the input record; they can overlap and be of any length as long as the total key field length does not exceed 256 bytes.

The ARS software can run in 16K bytes but functions better in 32K bytes, especially if multiple concurrent users are working with it, the spokesman said. The package is available for $495 per CPU, the company noted from 5107 W. Napoleon Ave., Matairie, La. 70001.

'Bookkeeper' On T/S Net

MT. KISCO, N.Y. — The Bookkeeper accounting system developed by Westchester Associates and now available on the Rapidata, Inc. remote computing network includes modules supporting accounts payables; accounts receivables, trial balance and general ledger activities.

Intended primarily to provide small and mid-sized accounting firms with facilities enabling them to automate their clients' accounting, Bookkeeper is written in Rapidata's X2C langauge and runs on Digital Equipment Corp. Decsystem-10s and 20s.

Converting clients from manual systems is said to be extremely easy, especially since Westchester Associates provides on-site support for each changeover.

Bookkeeper is available for a one-time charge of $5,000 plus $50/mo per client which is billed by Westchester plus the cost of network resources, which is billed by Rapidata.

Westchester Associates is at 115 Kisco Ave., Mt. Kisco, N.Y. 10549.

IBM 7070 Simulated On Current Systems

MILWAUKEE — Installations can move application libraries to IBM 30 series, Itel Corp. or Amdahl Corp. mainframes — even if the libraries contain programs written for IBM 7070/-74 equipment — with support provided by the 7070/74 simulator package from A.O. Smith Corp.'s Data Systems Division.

Regardless of the reasons for retaining the old programs, the simulator allows installations to run in an IBM OS/MVS or compatible environment, the company noted.

Already operational on IBM 360 and 370 systems, the software supports both tape and disk files, a spokesman said. The utility costs $24,500 or $1,000/mo from A.O. Smith at 8651 N. Port Washington Road, Milwaukee, Wis. 53217.

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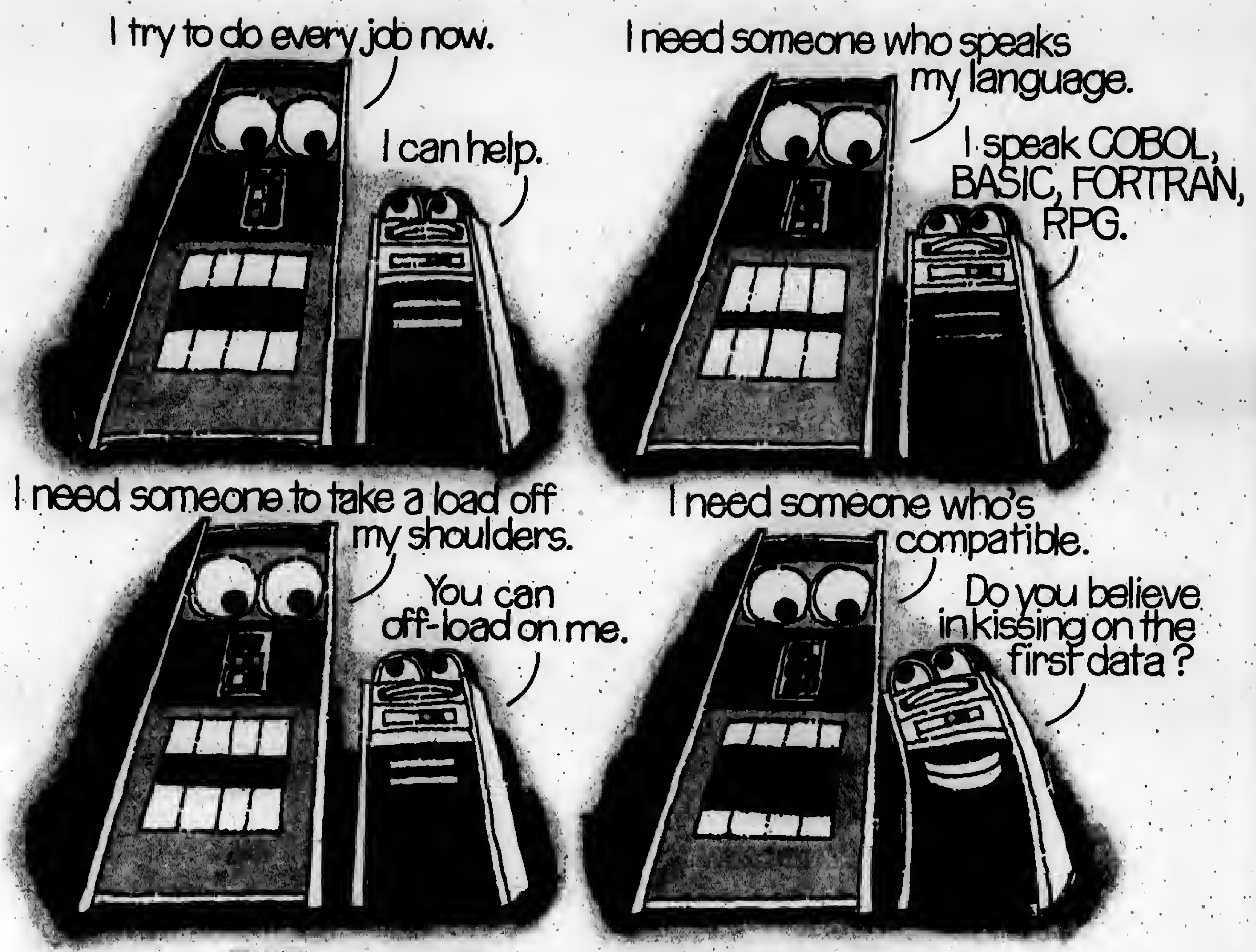
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Technologies Linked — Part II

Users Like Data's Currency, BLS Likes Control

By J. Harvey Trimble Jr.
Special to CW

The Bureau of Labor Statistics (BLS) combined the capabilities of problem-oriented languages and a data base management system to create a system that supports economists in their work at the bureau. The components of the Labstat system were outlined in Part I of this article last week; the programming needed to pull the components together and the users' reaction to the system are described here by the man who directed the effort to build the system.

User reaction to the Labstat system has been very positive. The common storage of all Bureau of Labor Statistics (BLS) time series data in one place and in a uniform format coupled with the power of the problem-oriented languages make display and analysis of data from multiple BLS surveys routine rather than difficult.

BLS regional offices are also major beneficiaries of this new system since they can have direct access to the most current data and no longer have to wait for the printed release to discover what the current statistics are. The regional offices use the same terminal equipment to interact with Labstat as the national office, since all users have dial up telecommunications equipment.

A further advantage resulting from the use of problem-oriented languages and the data base approach is the time and cost savings associated with Labstat design, development and maintenance. Labstat development required the conversion and storage of 800,000 yearly time series records from 16 different BLS surveys into an integrated data base. Of these records, 60,000 require monthly maintenance to store the most current figures.

Cincom Systems, Inc.'s Total data base manager facilitates such monthly maintenance by permitting retrieval and update of only the most current year's data without having to access any of the historical data. Thus, the monthly maintenance cost is independent of the length of time the series has been computed, which for some series goes back to 1913.

Storage and maintenance of BLS time series is only half the problem faced by the developer of an analysis and retrieval system. However, since the retrieval and analysis capabilities in Labstat are all provided by problem-oriented languages, the only development effort required to exploit the power of these languages was a connection between the data base and the languages. This connection was provided by another BLS-developed facility called Trim, for all batch-oriented systems.

Since Trim is in itself a problem-oriented language, this connection can easily be provided to any future batch systems the BLS acquires or develops.

The two interactive languages, MDL and TSP, required the development of one subroutine that provides the data observations for a single time series to the calling program. This subroutine provides a simple connection of the time series data base to the calling program, be it a problem-oriented language request or a conventional application program.

Providing all batch systems with data from one tool, Trim, and all interactive systems with data supplied by one subroutine has significance in terms of protecting data from unauthorized access. Because all data is retrieved from Labstat through one of two paths, software to protect confidential data need only be incorporated into two places.

This is important to BLS users, because in addition to more than 100,000 public time series that will be stored in Labstat, there are another 150,000 time series the BLS produces but does not publish. The installation of a security module this month will allow the storage and protection of all 250,000 series.

One begins to appreciate the virtues of combining these two technologies, with the realization that to the user the size of the Labstat data base has no impact on the response time or performance of the tools. Thus, the ease of use of these problem-oriented languages can be fully applied to any of the BLS time series data with cost being a function only of data usage and not of total data storage.

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'The Florist Said This Would Be the Perfect Plant ... It Has Square Roots.'

IBM Brings Out Series/1 Packet Interface

By Ronald A. Frank
CW Staff

ATLANTA — IBM has introduced an X.25 interface for the Series/1 that utilizes High-Level Data Link Control (HDLC). Offered only on a request-for-price-quotation (RPQ) basis, the Series/1 packet network interface is designed for use on the Datapac net in Canada and the Transpac net in France.

The interface includes a set of functional software modules that control the data flow to and from the packet network and provide the frame level data link control support to handle the framing and address characters. The modules also control the Modulo 8 or Modulo 128 packet formats and determine whether the data qualifier bit will do call establishment and clearing functions and similar functions.

Some modules that control the flow of data would be used most of the time, while other modules, such as one that provides reverse charging, would be optional for the user, a spokesman said..

With the interface, the user has the option to specify whether link access protocol A or B is required. These protocols include a specific set of commands depending on the type of interface used, he explained, as called out under Level 2 of the X.25 specification.

The second part of the Series/1 interface is a hardware adapter that provides a two-way synchronous communications full-duplex connection for point-to-point or nonswitched configurations, he added. The hardware adapter has a V.24 physical interface.

The Series/1 packet interface differs from a similar product introduced earlier by IBM overseas for the 3270 CRT. The latter interface is limited to IBM systems operating under Systems Network Architecture (SNA) with Synchronous Data Link Control (SDLC). But the Series/1 interface utilizes HDLC, which is a general protocol that provides a universal interface to either Datapac or Transpac.

With the 3270 interface, application was limited to data exchanged between SNA systems, but the Series/1 capability will allow interaction with other types of network users, the IBM spokesman said.

The Series/1 interface allows a "native" connection to the packet network while the other IBM interface for 3270s and 370 CPUs translates SDLC to HDLC for transmission on the network. The Series/1 data is handled completely in HDLC protocol, the spokesman said. This means that the Series/1 can communicate with any other device (IBM or non-IBM) that is also interfaced to the network via HDLC and under the link-level protocol of X.25.

The hardware adapter is available under an RPQ, while the software modules are available under a Programmed RPQ, with each being provided separately. At present, the X.25 interface is available only in Canada and France for Datapac and Transpac, but the IBM spokesman acknowledged that multinational firms operating in other countries might also get the interface.

Speed-Select Package Helps 3705 Users

By Ronald A. Frank
CW Staff

MANHATTAN BEACH, Calif. — Comm-Pro Associates has introduced a teleprocessing software package for the IBM 3705 Network Control Program (NCP) that provides users with an automatic speed-select capability.

The NCP package provides Vtam/NCP installations with the ability to support terminals operating at 10-, 15-, 30- and 120 char./sec. Without the Comm-Pro software, the IBM NCP can support only limited devices on the same line interface. This means that dedicated line interfaces are required, the company said.

The IBM NCP software contains a feature called Multi-Terminal Access (MTA) that allows NCP to set the terminal speed and code after a phone connection is established. But the MTA routines can only support 135 bit/sec start/stop IBM terminals and 110 bit/sec Ascii devices, a Comm-Pro spokesman said.

By adding the non-IBM package, users can support 300 bit/sec BCD and Ascii terminals plus 1,200 bit/sec Ascii terminals without having individual line interfaces dedicated to specific speeds and transmission codes. The MTA routines will not support the 300 bit/sec IBM 3767 or teletypewriter and other Ascii devices, Comm-Pro said.

With the addition of the independent software, users can run Ascii, start/stop and BCD codes at speeds from 110- to 1,200 bit/sec. Among the terminals compatible with this support are the Tektronix, Inc. 4013, Hewlett-Packard Co. 2641A, Anderson-Jacobson, Inc. 630 and General Electric Co. Terminet 1200.

The Comm-Pro NCP speed-select software requires 300 bytes of 3705 storage and can be leased for $100/mo. The package is available for a no-cost trial from Comm-Pro Associates, Suite 700, 638 14th St., Manhattan Beach, Calif. 90266.

HP Adds Smart Graphics CRT

PALO ALTO, Calif. — A graphics CRT terminal from Hewlett-Packard Co. is programmable in a high-level language and reportedly offers flexibility in graphics applications.

The HP 2647A graphics terminal has interactive alphanumeric capability and multiple display workspaces; shares output peripherals; displays data as graphs, pie or bar charts; and provides dot-by-dot hard copy of its screen display with optional companion plotter/printers, the firm said.

The terminal accepts Basic programs that are downloaded from the host CPU and then executes them under local control. With Basic, the terminal's graphics and alphanumeric functions and facilities can be modified, output from a computer can be changed into formats defined by the user and the keyboard can be reconfigured by assigning each key a different code. With such flexibility, no software changes may be required to adopt "canned" programs to users' applications, HP said.

Multiple workspaces enable the terminal's display memory to be partitioned into four separate sections. These can be varied in size using dynamic memory allocation and used for such tasks as conducting an interactive

(Continued on Page 38)

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With Mixable Modules

Burroughs Unveils Transaction Control System

DETROIT — Burroughs Corp. has introduced a family of on-line, modular transaction control systems including two on-line data communications control processors, modular keyboards, displays, printers and special-purpose devices that can be intermixed.

The modular components include TD 500 input and display terminal systems, AP 100 and AP 300 printer terminals and DC 128/129 communications processors.

The TD 500 is a CRT terminal featuring 5-in. or 9-in. screen. Modular options include a numeric keyboard, an alphanumeric keyboard, a personal identification number (PIN) keyboard and magnetic card reader. These components can form one compact unit or be separated for placement on workstations or financial teller counters where space is limited. The PIN keyboard and magnetic card reader provide privacy for bank customers, Burroughs said.

Each component is priced separately. Purchase price for a TD 500 system with a 5-in. display screen plus a numeric keyboard is $1,975. The same two modules are available for $84/mo on a one-year lease. A TD 500 with a 9-in. screen, an alphanumeric keyboard, PIN keyboard and magnetic card reader may be purchased for $2,985 or leased for $128/mo. TD 500 systems will be available in the first quarter of 1979.

The AP 100 series of auxiliary printers, for use in financial institutions, offers all the forms-handling features of Burroughs earlier TU 1800 on-line terminals, including automatic passbook reading. One AP 100 printer can serve two or more tellers, the firm said.

Purchase prices for the AP 100 start at $5,150. Lease price is $196/mo for the basic AP 100. Deliveries are scheduled for the second quarter of 1978.

The AP 300 is a printer station that can function as an unattended, desktop message printer or as a printing, validating and receipting station. Controlled by a microprocessor, the AP 300 can produce multiple sizes and styles of characters, allowing reports, customer statements and other records to be customized for better readability or for drawing attention to particular areas, the firm said.

The basic AP 300 printer can be purchased for $1,700 or leased for $67/mo and will be available in the fourth quarter of 1978.

Burroughs' DC 128/129 communications processors function as local control centers for the new transaction control modules and certain other teller terminals, transaction terminals and displays in a local network.

DC 128/129 systems reportedly occupy less floor space than a small file cabinet and, because they operate unattended and without special air-conditioning, they can be placed almost anywhere in the branch office.

The basic DC 128 with magnetic tape cassette auxiliary storage may be purchased for $5,150 or leased for $185/mo. Deliveries are scheduled for the first quarter of 1979. A DC 129 with full user memory, minidisk, auxiliary storage and data communications capability is priced at $6,700 for purchase or $240/mo on lease. Deliveries will begin in the second quarter of 1979.

Burroughs spokesmen were unavailable to provide any additional information on the announced products.

HP Introduces Graphics CRTs

(Continued from Page 37)

session with the computer, displaying an output of an applications program, showing a local Basic program and acting as a scratch pad for computation, HP explained.

The HP 2647A is compatible with programs developed for the HP 2648A — HP's earlier graphics terminal.

The terminal has 64K bytes of random-access memory (RAM) for Basic, 32K bytes of RAM for graphics and 56K bytes of read-only memory for terminal control functions.

Vector-drawn hard copy for the terminal can be provided by both the HP 9872A multicolor graphics plotter and the HP 7245A plotter/printer. Price of the HP 9872A is $4,200, while the HP 7245A is priced at $4,600. The option adds $250 to the plotter/printer's base price.

The HP 2647A intelligent graphics terminal is priced at $8,300, the firm said from 1507 Page Mill Road, Palo Alto, Calif. 94304.

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Papers' Terminals Keeping Subscribers Happy

ST. PETERSBURG, Fla. — The Times Publishing Co. here has responded to increases in newspaper circulation and the need for more efficient means of handling subscriber inquiries by implementing a terminal-based distributed DP system.

As a result, the company, which publishes the *St. Petersburg Times* and *Evening Independent*, can now respond to all subscriber inquiries almost instantly. Before the installation of the Raytheon Data Systems Co. PTS/1200 terminals, some 80% of subscriber service actions were processed manually, a method that could not keep pace with a continuing circulation increase for the two papers of more than 300% since the early 1960s.

In order to implement the faster response system, Raytheon provided systems software, in which PTS/1200 macro routines could be used to convert batch-oriented IBM 2780 protocol supported by the newspaper's Honeywell Information Systems, Inc. CPU to an on-line interactive inquiry system similar to IBM 3270-type device operations.

"In effect, the Times took a batch protocol and made it interactive. Each subscriber inquiry is sent from a terminal to the host CPU as if it were an individual transaction, but with the batch message boundaries of IBM 2780 protocols," DP manager Curt Von Kaenel explained.

The automated subscription system now in use at the Times includes an RDS PTS/1200 terminal-oriented, multiprogramming system that supports 12 PTS-100 down-time interactive CRT terminals. All subscriber services processing is handled by the local PTS/1200 processor. At the end of each business day, data related to internal billing and other business functions is batched and transmitted to the company's mainframe.

The PTS-100 terminals replaced 10 terminals connected to the firm's HIS 2050 CPU. The previous system was used to handle only pay-by-mail subscriptions, which constituted 20% of the subscription business. Most subscribers pay carriers on a monthly basis.

According to Von Kaenel, "The two major improvements in subscriber service that were immediately apparent to the Times when the Raytheon system went on-line were the ability to maintain comprehensive, accurate and up-to-date subscriber records for pay-by-mail subscribers and the ability to service subscribers served by carriers."

Feasibility Study Undertaken

The Times began a feasibility study two years ago to locate a system that could be programmed to handle all subscriber inquiries. The idea of upgrading the HIS system with additional hardware and software was eliminated because studies showed they would experience poor response time.

Raytheon Data Systems was chosen, according to Von Kaenel, because it was one of the only vendors that would commit themselves to interface with the company's HIS mainframe.

Today the Times Publishing Co. is able to handle each subscriber inquiry in a matter of seconds while the customer waits on the telephone to verify that the correct change was made.

Files Stored

Files containing basic pay-by-mail subscriber index information for each customer are stored on the local PTS/1200 processing site and can be accessed to any of the 12 PTS-100 terminals the publisher is using.

"Now," Von Kaenel said, "each time a customer wants service, such as a renewal or putting the paper on hold for a while, the change is immediately recorded for timely action by the circulation manager and carrier."

An additional reason for using the PTS/1200 system was its easy expandability, Von Kaenel said. With the current population boom Florida's Gulf Coast is experiencing, he expects circulation to continue increasing, and he required a system that could meet those future needs.

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Builder Becomes First Infoswitch/SMDR User

SAN ANTONIO, Texas — Morrison-Knudsen Co., an international construction and engineering firm, has become the first customer to install and use Datapoint Corp.'s Infoswitch/SMDR station message detail recorder.

"I expect a 10% decline in the number of outgoing calls with this system," according to Bill Hooten, Morrison-Knudsen's communications manager. That is more than the $17,000/mo savings he is already getting from his Infoswitch/Long Distance Control System (LDCS), he added.

Morrison-Knudsen installed its Infoswitch/LDCS system in April 1977 to manage all long distance facilities. The Infoswitch/LDCS provides long distance call holding, queuing, least-cost routing, speed dialing, remote access and line performance monitoring for all outgoing long distance calls from Morrison-Knudsen's headquarters in Boise, Idaho.

No Caller ID

One feature of the Infoswitch/LDCS that Morrison-Knudsen does not use, however, is the caller identification. "We did not want our employees to have to punch in their caller identification before dialing the long distance number," Hooten said. "This left us without accounting information, but still saved a significant amount of money."

But with the Infoswitch/SMDR, Morrison-Knudsen gets a different type of automatic accounting by individual telephone sets. Each telephone set has its own restrictions and priorities built into the system. The company president's phone can be used to call anywhere in North America, while some clerks can only make local calls on their phones. "And I can change these restrictions any time I want, even while the system is in normal operation," Hooton noted.

Complete Cost Control

The Infoswitch/SMDR system provides complete cost control over all outbound local and long distance calls. It consists of an intelligent switching subsystem for long distance call conrol, an intelligent metering subsystem for automatic station identification and the collection of message details on all local calls and an advanced host CPU.

The centrally located host is shared by both the subsystems and supports up to 20M bytes of cartridge disk data and program storage. The host incorporates a typewriter-style keyboard, CRT display and internal memory capacity. The CPU can be equipped with local printers for the production of hard-copy management reports.

A magnetic tape drive can be added for transferring accounting records to the user's DP center, or data can be transferred directly to other DP systems using communications emulation programs.

The intelligent metering subsystem, which connects to each PBX or Centrex extension line, collects calling detail on local, directory assistance and tie line calls. This detail is then transmitted to the Infoswitch host, where it is merged with the long distance call details which were collected by the intelligent switching subsystem to produce a record of all or selected outgoing calls processed by the system.

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Prices Reduced For Plato Unit

MINNEAPOLIS — Control Data Corp. has reduced the purchase price of its Plato terminal and expanded its services to Plato customers.

The price of the terminal is now $5,300, which is said to be one-half the initial price and the third price reduction since the Plato education service was introduced in April 1976.

The monthly maintenance charge for the terminal has also been decreased by $6 to $36, a spokesman said.

Services to Plato subscription customers — those who use the service for a flat monthly rate — have been expanded to include communications line costs from more than 130 entry points across the country to the Plato DP system in suburban Minneapolis.

Although the monthly subscription rate will increase slightly — for example, from $1,050 to $1,130 for a single full subscription — the total monthly cost to most subscription customers will be substantially reduced as a result of the increase in locations, the spokesman claimed.

MFE Corp. Offering Cassette Terminal

SALEM, N.H. — MFE Corp. is offering a buffered data cassette terminal. The Model 2500 incorporates MFE's Model 450B tape drive, which allows recording on both sides of the tape for 350K-char. capacity, according to a spokesman.

Ansi-compatible, the MFE 2500 is available with Texas Instruments, Inc. or NCR Corp. compatibility, selectable rates of up to 2,400 bit/sec and a binary mode. Also standard are teletypewriter and RS-232C interfaces.

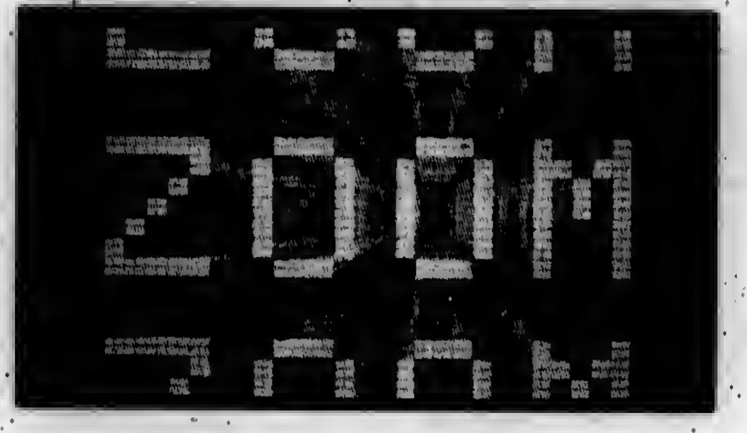
A microprocessor-based system, the Model 2500 price is $1,190 from Keewaydin Drive, Salem, N.H. 03079.

Most graphics terminals are too dumb for words.

Even expensive models get tongue-tied when it comes to alphanumerics. But now there's a bright new graphics terminal that has a lot to say for itself.

Alpha-graphics: the perfect combination.

It's the Hewlett-Packard 2648A alpha-graphics terminal. For just $5500* it will dazzle you with a virtuoso display. You'll see zoom and pan, area shading, pattern definition, rubber band line, scientific plotting and graphics text composition. Having independent memories for graphics and alphanumerics, you can do auto-plots with or without words and figures on the screen.



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The HP 2648A can also edit with the best of them. Communicate with a computer at rates up to 9600 baud. And accept a plug-in forms drawing mode to generate just about any form your company uses.

Strong as well as intelligent.

Like all our terminals, the HP 2648A has a clean, tough, modular design. Open it up like a suitcase, and you'll see the neat row of plug-in PC boards.

That makes it easy to add options or take care of maintenance. Not that downtime is a problem. Our terminals have such a good track record that we've lowered our maintenance price three times in the past two years. When you do need service, more than 1000 Systems and Customer Engineers worldwide are ready to take care of you.

So why settle for any dumb graphics terminal when ours can figure in your picture? See for yourself by calling the Hewlett-Packard office listed in the White Pages. Or send us the coupon and give our 2648A alpha-graphics terminal a screen test.

Yes, give me the good words (and pictures) on the HP 2648A terminal.

☐ I'd like a demonstration. ☐ Send me information.

Name **Title**

Company

Address

City/State/Zip

Phone

Mail to: Ed Hayes, Marketing Manager,
Hewlett-Packard Data Terminals Division,
19400 Homestead Road, Dept. 314, Cupertino, CA 95014.

**U.S. domestic price*

HEWLETT hp PACKARD

42801HPT5

Xerox Users Get CRT

LOS ANGELES — An intelligent terminal system has been introduced by Xerox Computer Services to provide on-site DP capabilities to users of its national data communications network.

The Xerox 1350 intelligent terminal system consists of a CRT with a 12-in. screen, 96-char. Ascii set and 24 80-char. lines. A matrix printer is included that prints at speeds up to 120 char./sec while communicating with the national network, a spokesman said.

The system is microprocessor-controlled and includes four floppy disks, each with 512K-char. capacity, he said.

The system leases for $745/mo or can be purchased for $15,000. Xerox Computer Services is located at 701 S. Aviation Blvd., El Segundo, Calif. 90245.

Leasametric Cuts Rental Terms

BURLINGAME, Calif. — Claiming to be one of the first to rent I/O terminals and data test instruments for periods as short as a day, week or month, Leasametric has introduced a short-term rental program for data communications users.

Leasametric's rental programs cover teleprinters, CRTs, calculator systems, protocol monitors and line disturbance monitors as well as general-purpose test instruments, the firm said.

Major manufacturers represented include Teletype Corp., Texas Instruments, Inc., Lear Siegler, Inc., Digital Equipment Corp., Hewlett-Packard Co., Tektronix, Inc., Hazeltine Corp. and Spectron Corp.

All equipment is inventoried, serviced and ready for immediate delivery from Leasametric's 20 regional inventory centers across the U.S. and Canada, according to a spokesman.

Representative rental prices for one month are $90 for a Teletype Model 43 portable teleprinter, $90 for a Lear Siegler Model ADM-3A CRT, $950 for a Spectron Model 501 protocol monitor and $2,000 for an HP Model 9845S desktop system, the firm noted.

Leasametric is located at 822 Airport Blvd., Burlingame, Calif. 94010.

Leases Cover Three States

BOULDER, Colo. — Microprocessor Computer Systems Corp. (MCSC) has introduced an equipment leasing program serving New Mexico, Colorado and Wyoming.

The leasing program enables businesses to lease selected terminals or total systems ranging in price from $500 to $50,000, according to a spokesman.

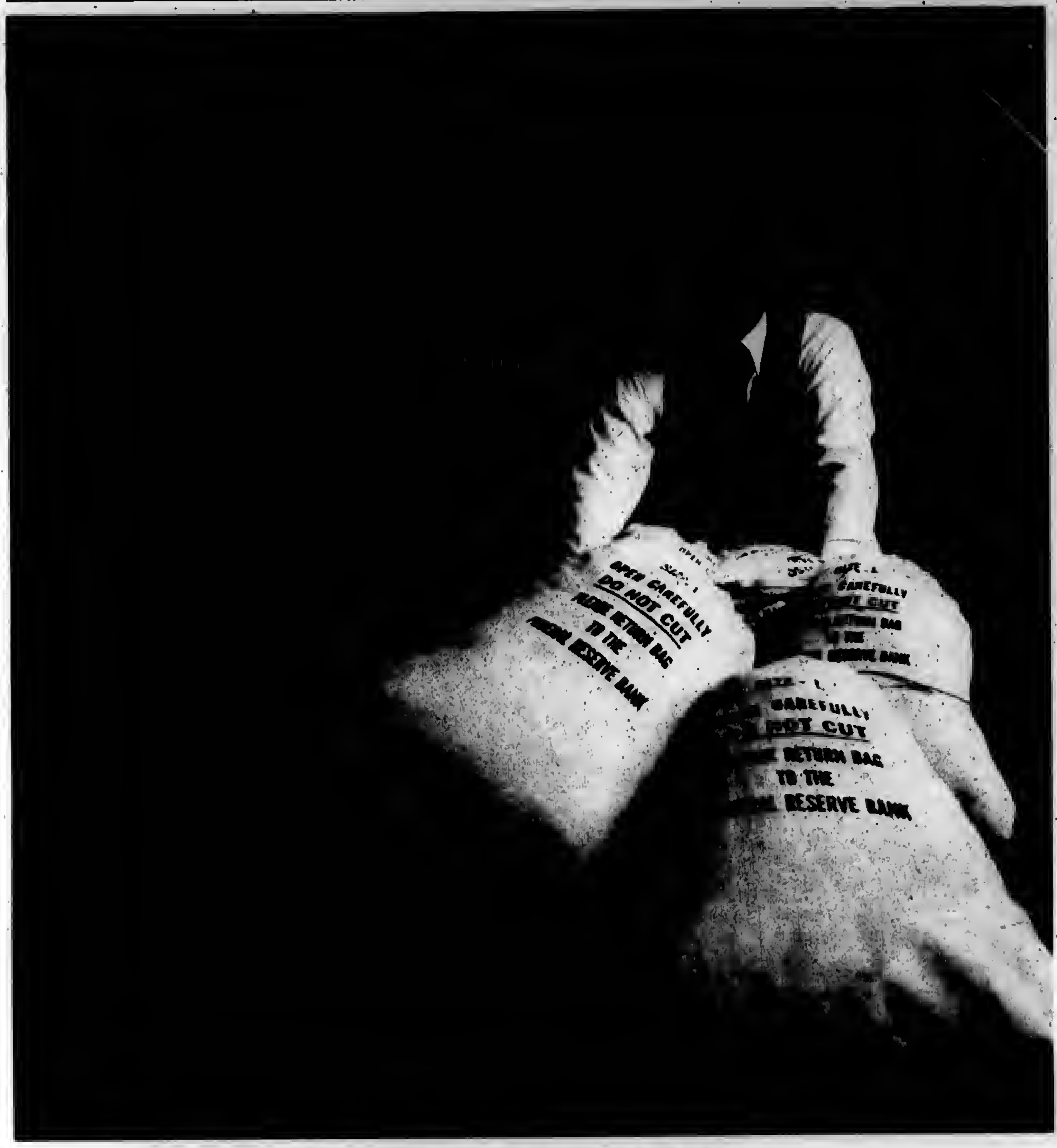
The program is available to MCSC customers through a three-, four- or five-year third-party leasing arrangement with Avatar Financial Group, Inc. of Lakewood, Colo. Standard lease-purchase options are also being offered.

Equipment involved in the program includes the Malibu Design Labs Model 160 line printer; Texas Instruments, Inc. Model 810 line printer; North Star Computer Products, Inc. Horizon II microprocessor; Applied Digital Data Systems, Inc. Region 100 CRT; the Soroc Technology, Inc. IQ 120 CRT; and Ven-Tel, Inc. modems, the spokesman stated.

Typical lease prices are $91.54/mo for the Soroc IQ 120 on a one-year lease, $93.80/mo for the TI 810 on a two-year lease and $83.38/mo for the North Star Horizon II on a three-year lease. The minimum lease period is one year.

MCSC is at Suite 2, 1280 28th St., Boulder, Colo. 80303.

OURS NOT TO REASON WHY. OURS BUT TO DIGITIZE



The interactive database system that keeps a constant check on over 14,000 banks.

The Federal Deposit Insurance Corporation needed a way to manage details about the financial condition of each of its member banks. And handle over 32,000 inquiries a day.

They chose CCA's Model 204 — the only DBMS designed from the start to be interactive.

Model 204 has the power to manipulate a vast amount of data, yet it's simple enough to make that data accessible to anyone — even people who've never used a computer before.

If you need a DBMS for your IBM 370/138 or larger computer, find out why thousands of users nationwide are satisfied with Model 204. Clip your business card to this ad and send to: Computer Corporation of America, 575 Technology Square, Cambridge, MA 02139.

Model 204

Computer Corporation of America

DECwriter II & III
FOR SALE
• LA36 • LS120
800 323 2288

Front panel accessibility – All the normally used operator controls are organized into functional groups and logically arranged for maximum operator convenience.

Baud rate switch – Switch from 110, 150, or 300 baud to 600 or 1200 baud transmission easily. Just flip the convenient switch and the terminal easily adapts to your communication speeds.

TwinTellect™ option – Want to use a special printwheel? Just switch on TwinTellect when you install the printwheel. Sprint 5 electronics provide the coordination between code and print characters. Available only from Qume.

Dynamic positioning – Create graphs or justify your text easily. With switch selectable 10 or 12 characters per inch spacing. Plus controlled spacing of 1/120" horizontal and 1/48" vertical.

Introducing the smart daisywheel terminal designed especially for the computer industry.

Smart microprocessor logic – You get flexible character spacing, precise plotting resolution, and smart multi-direction carriage slewing. Not to mention high quality printing. Fast.

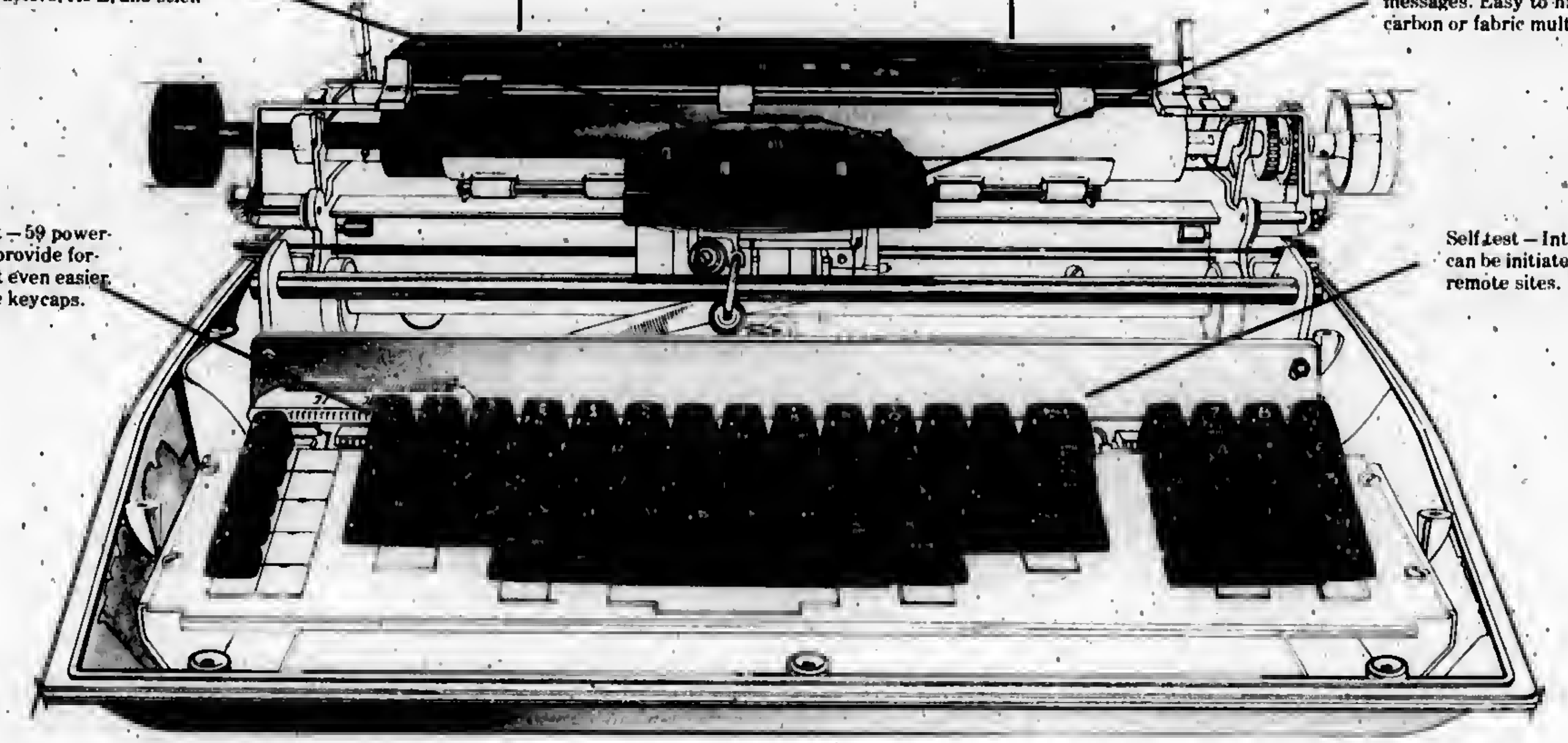
Serial or parallel interface – Sprint 5's can provide a standard serial RS232C interface to your system. In addition, the keyboard version is available with DC current loop interface, and the printer version is available with DC current loop or parallel interface.

Interchangeable character sets – We have over 50 different character sets and typestyles. They're easy to change and include international characters, APL, and scientific symbols.

Multicolor ribbons – over 15 different ribbons (10 color choices) to color your messages. Easy to handle cartridges with carbon or fabric multicolor ribbons.

Comprehensive command set – 59 powerful user oriented commands provide format flexibility. And to make it even easier, commands are printed on the keycaps.

Self test – Internal self-diagnostic routines can be initiated from the keyboard or from remote sites.



It's called the Sprint 5. And it's from Qume.

That's right. Qume.

We've established quite a reputation in the word processing business. A reputation for letter quality print. And because of that, we didn't want to simply attach a keyboard to a printer and present it to the computer industry as a full blown terminal.

So we designed our Sprint 5 daisywheel terminal from the ground up to meet the needs of the computer industry. Complete with our famous print quality. And 55 cps.

Qume's smart microprocessor gives the Sprint 5 many capabilities not found in conventional terminals. Such as a powerful command set, self-diagnostics, memory storage of tab settings, and forms control programs.

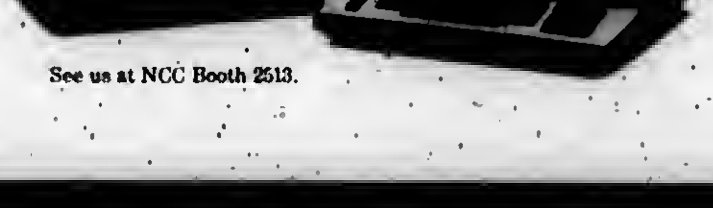
Surprisingly enough, however, the Sprint 5 costs no more than competitive terminals.

Obviously, a product that does much more but costs no more is a better buy.

And when all is said and done, that may be Sprint 5's most outstanding advantage.

For further information on how the Sprint 5 can give your computer letter quality output, contact: Qume Corporation, 2323 Industrial Parkway West, Hayward, CA 94545 or phone Lee Cannon, (415) 783-6100, Extension 338.

Qume®
the printed word



See us at NCC Booth 2513.

THE $99.00 MODEM*

You're suspicious aren't you? OK, we confess. Our M-1 asynchronous short haul modem won't do what a lot of other modems will do.

However, the M-1 will solve many of your local or in-house communication problems up to 10 miles or 9600 bps. And because you aren't paying for a lot of options and capabilities that you don't need in those situations, you'll be saving a bundle of money.

Interested? Write or call us now for a data sheet and complete price information.

bo-sherrel co.
36443 SHELLEY COURT
NEWARK, CA 94560
(415) 792-0354

*100 Quantity

"Towns you've probably never heard of" are now key locations in major data communication networks. And they're big in using terminals in many local applications.

That's why Trendata expanded its nation wide service facilities to cover places such as Victoria, Texas. Any data communications terminal manufacturer could have shipped a system there. We backed up a recent Victoria installation with a full training and service program.

We like towns like Dublin, Georgia because we offer everything from a system for wide flexibility and high production to a single reliable machine for limited applications. We handle the purchase, lease or rental program to keep it simple. And we provide peripherals and supplies to avoid further complications.

Trendata communication terminals are designed to be as reliable and trouble-free as possible, but when you do need service, our factory trained serviceman will be there in a matter of hours...because we realize that downtime on a system in Las Vegas, New Mexico can be just as costly as one in New York City.

Applied Magnetics
Trendata

610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Our service reaches towns you've probably never heard of

Turnkey Unit Unveiled For Mortgage Bank Use

HORSHAM, Pa. — Complete Computer Systems, Inc. has announced a turnkey terminal-based system for mortgage banking which, according to the firm, speeds the application process, reduces errors and provides status, profitability, cash flow, marketing, trend and management data to user banks.

The system, based on Data General Corp. Nova 312 or Eclipse minicomputers, includes CRT terminals and forms-handling printers which may be lcoated in branch offices connected by ordinary telephone lines to the central processing site, according to a spokesman.

Main memory size of the minicomputers ranges from 64K bytes to 256K bytes, with mass storage from 10M-bytes to 192M-bytes, according to the firm.

The terminals are Hazeltine Corp. Model 1 CRTs with detachable keyboards. The system includes either a Centronics Data Computer Corp. line printer with speeds of 80- to 180 char./sec or a Perkin-Elmer Data Systems daisywheel-type printer that prints up to 55 char./sec, according to a spokesman.

For every mortgage application, the system schedules each step in the process and prepares all the documents including the application, request for verification of employment, appraisal request forms and letters as well as cover and follow-up letters, the firm claimed.

Users can draw on data stored in the system to prepare selected promotional mailings to both bank customers and real estate brokers. The system analyzes the data, prepares the mailing lists and prints the letters and mailing labels, the spokesman said.

The mortgage banking system computes the yield on each loan and reports on a monthly, quarterly and annual basis. Management can determine the status of any loan at any time, the company said.

The system includes Create, a data base management system that lets users with no programming skills create their own special reports, the firm stated. Create guides the user through each step in "designing" a new report, the spokesman said.

In the mortgage application process, the buyer's name, address, telephone number, Social Security number and the loan, property, seller and any other transaction information is keyed in only once, according to the firm. Using one of the CRTs, the clerk, guided by a cursor, only has to fill in the blanks on the screen, since the characteristics of every form used in the process are stored in the central CPU.

Prices for the system start at $70,000. Complete Computer Systems is located at 159 Gibraltar Road, Horsham, Pa. 19044.

Communications Seminars Scheduled for Five Cities

LOS ANGELES — Six three-day computer/communications "Seminars of Excellence" will be presented this summer by Technololgy Transfer, Inc. in five different cities.

Scheduled for July 10-12 in Washington, D.C., is a seminar on "Queuing Systems" to be given by Dr. Leonard Kleinrock. "Satellite Data Communications" will be discussed by Dr. Norman Abramson in Washington, July 17-19.

Slated for Atlanta on July 24-26 is a seminar on "Experts on Networks." Giving this seminar will be Kleinrock, Dr. Howard Frank and Dr. Lawrence G. Roberts.

"Data Communications Services and Protocols" will be the focus of a seminar in Los Angeles Aug. 2-4 presented by Dr. Robert Lucky and Dr. Paul E. Green, Jr.

Boston will be the scene of Dr. Peter Denning's seminar on "Performance Evaluation," to be held Aug. 14-16. Finally, Kleinrock will again make an appearance at a Chicago seminar on "Computer Networks" to be held Aug. 21-23.

The fee for each seminar is $575, with discounts available for each additional seminar taken by a single person.

For more information, contact Technology Transfer, P.O. Box 49765, Los Angeles, Calif. 90049.

Balance Tasks Mark ECR

MAYNARD, Mass. — Data Terminal Systems, Inc. has announced its Model 327 electronic cash register (ECR) that offers a previous-balance/balance-forward service capability.

Useful in a variety of guest check and charge posting environments such as restaurants, bars and lounges, the Model 327 is fully programmable for up to 12 department totals or as many as six employee/transaction totals, supplying substantial merchandise control and cash accountability, according to the firm.

The 327's optional alphanumeric slip printer details all entries with any four characters desired, and an endorser module is available for single keystroke check tendering.

The stand-alone microprocessor and micromemory electronics of the 327 are programmable for all standard ECR software, plus expanded day-end management reports that include the number of each register uses or number of customers in each department, a company spokesman said.

A variety of controls for voids, tendering, department entries, cash drawer operation and two-cashier activity can also be implemented to suit the individual installation, the firm said.

Price for the unit is $1,695. Data Terminal Systems is located at 124 Acton Street, Maynard, Mass. 01754.

System 45:
A desk-top computer

All shook up:
An HP 1000
takes a jarring ride on the shaker table

You won't stand in line for these two...

CIS/3000: On-line means no line

With HP's new College Information System, students can register for classes and be on their way in a matter of minutes. CIS/3000 handles all student records, registration, and grade reports. Written in Cobol, it uses the IMAGE data base management system, and operates in batch or interactive mode with formatted screens to aid user input. CIS/3000 can serve the student information needs of diverse educational customers. For example:

Seattle University is a four-year undergraduate and graduate school founded by the Jesuits in 1891. The neatly landscaped campus, just blocks from downtown, draws 3,600 students—from 50 states and 40 foreign countries.

Mira Costa Community College overlooks the spectacular California coastline. A variety of day, evening, and even weekend courses serve a mobile community of some 7,500 students ranging in age from eleven to more than ninety.

Mary Alice Lee has been registrar of S. U. through the transition from pen and ink posting of grades, to keypunching, and now to a totally interactive HP 3000. Mary Alice comments on...

Bob Crabtree is Mira Costa's one-man data processing department. The HP 3000 is their one computer system. Bob talks about...

CIS and the 3000...

"If you told me this time last year that we'd be getting on-line student information at the drop of a hat, with literally no DP support, I'd probably have laughed out loud."

"The 3000 is almost an operatorless system. Nobody sits at our console 8 hours a day. Instead, my secretary handles more and more of the operational tasks. Before the 3000 came, she'd never seen a computer... except on TV."

the conversion...

"People typically underestimate the complexity of conversions — I know, I've been through four! Our HP systems analyst came in on August 18 to begin reformatting our data. The 3000 was plugged in on September 8; terminals arrived on the 13th. On the 20th and 21st, we were registering students on-line."

"I've been in DP since 1967 and have had experience with five conversions. This one has been, by far, the easiest. We fired up our 3000 Series II on July 25 and started registering students ten days later. Now, I focus my attention on the users and their needs and not on the software problems."

the interactive environment...

"The greatest advantage we see with our interactive system is the potential for accuracy. Before, our batch system had around a 5% error rate at the end of a ten week quarter. This absolutely plagued our staff and students. Now corrections are immediate."

"Basically, we get the same information, but now we get it when we need it. Before, we could have two week delays in census reports. They were outdated when we got them. With CIS/3000, the information is current."

the data base...

"A university is a dynamic place; there's always a new report needed. What we saw in CIS/3000 was a data base of enormous scope — 200 data items* that cover any student info item that we might ever have."

"The IMAGE data base provides 200 predefined items of information — more than we'll ever need!"

CIS/3000's initial cost is $5000. More information? Indicate A.**

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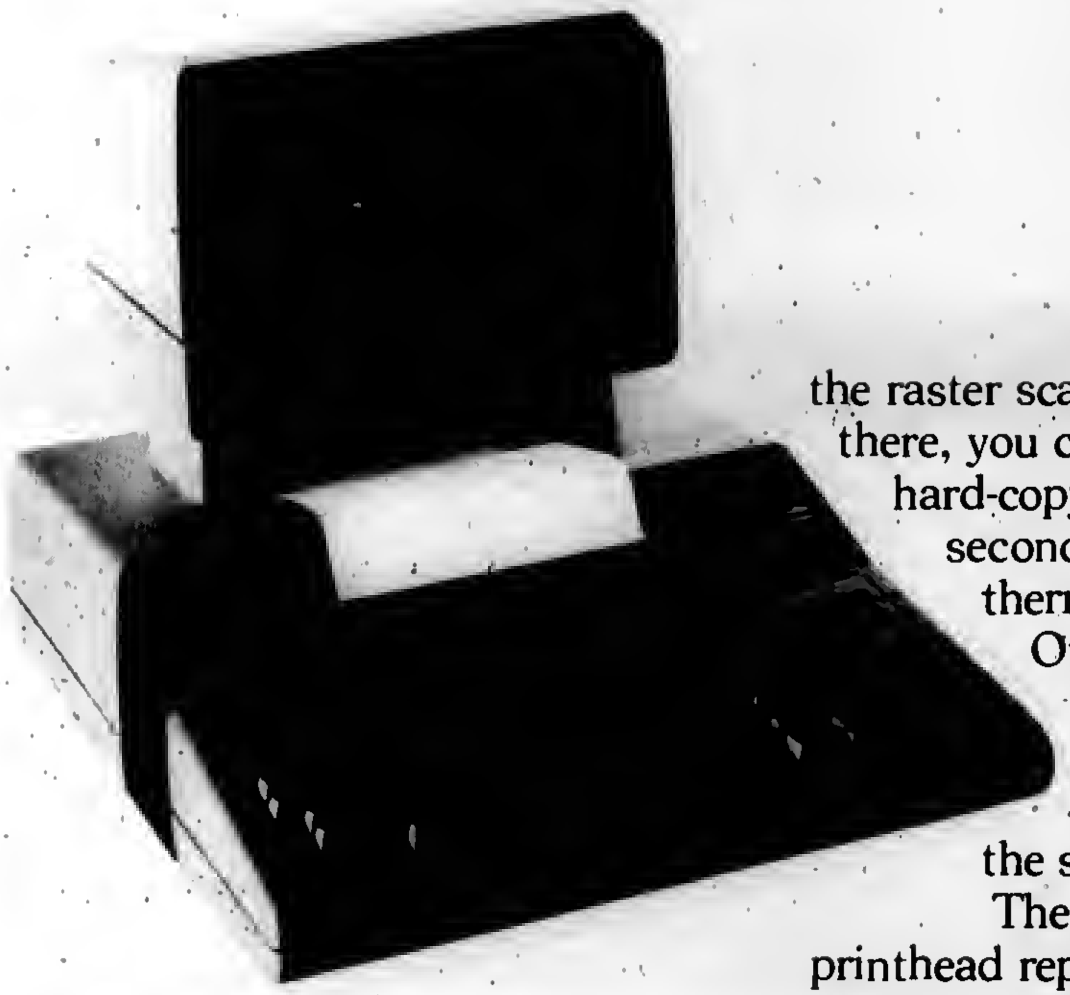
*Most items are suggested by NCHEMS – the National Center for Higher Education Management Systems.



System 45: You're always first

The System 45 is a 16-bit computer system that is so compact it fits right on top of your desk. All the peripherals are neatly integrated for easy accessibility — keyboard, CRT display, printer/plotter, and two tape cartridges. High performance results from state-of-the-art technology — six LSI microcomputers, plus two CPUs which occupy only 5.36 cubic inches each.

Dual processor architecture

One secret to the System 45's responsiveness is its two processors — one for I/O, the other for program execution. By operating concurrently on the user's program and I/O (in an overlapped approach) these processors can, in some cases, double system throughput. The System 45 is the first desktop computer to use dual processors.

The System 45 closely couples powerful computational capability with graphics options. A high-level interactive graphics language simplifies developing an image on the raster scan screen. From there, you can get a dot-for-dot, hard-copy replica in just 15 seconds on the high-speed thermal line printer.

Other HP plotting devices can be connected and then controlled by the same commands.

The printer/plotter's printhead represents an interesting break-through in thin-film technology. Multiple layers of conductive and resistive surfaces are deposited on three sides of the printhead.*

Because of this difficult-to-do conductor wraparound, the 560 print elements (resistors) can be evenly spaced across the printhead for continuous plotting and alphanumeric output. But why power up for all 560 dots when analysis revealed that 90% of typical printouts have rows with fewer than 56 dots? To avoid this inefficiency, we implemented a microprocessor-controlled, "variable pass" method. In those cases where more than 56 dots per row are needed, the printhead takes another 5 millisecond pass. The result: a typical speed of 480 lines per minute, and power consumption in most cases of no more than 30 watts.

Cool as a breeze

Integrating peripherals into one unit presents a real challenge in cooling. The solution was an innovative parallel/pull air circulation system. The air flows up through the entire system, first passing those components most sensitive to heat and then those less sensitive.

BASIC, an obvious language choice, is a superset of the new proposed ANSI standard (X3J2/77-26). It has some features not usually found in desktop computers — for example, the use of variable names up to 15 characters, and FORTRAN or ALGOL-like subroutines.

Standard with each System 45 is a library of generally useful utility software packages (statistical and numerical analysis, etc.). Ten other packs are available now. Of particular interest, is a waveform analysis library which uses graphics and fast Fourier Transforms, and a project management library for network analysis.

If you would like more information on the System 45, which starts at $11,500, indicate B on the reply card.**

*The System 45 desk-top computer's innovative, thin-film printhead.**

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*Patent pending
**U. S. prices only

Shake and bake, drop and shock

Assuring product quality is more than a saying at Hewlett-Packard — it's a way of life. Since the company's beginning as an instrumentation firm, quality assurance has been an integral part of a product's lifecycle.

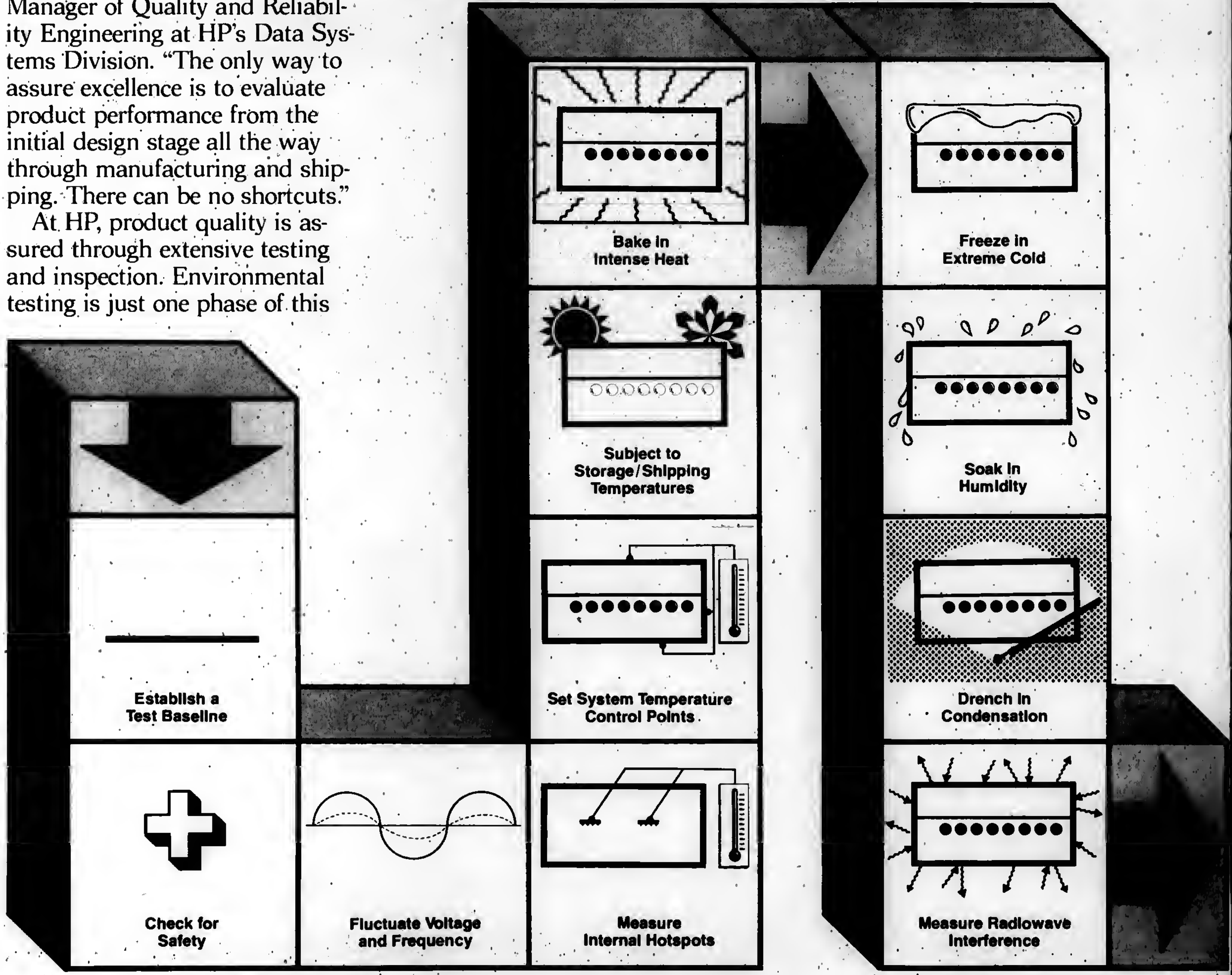
"Quality must be designed into a product", states Jim Gillette, Manager of Quality and Reliability Engineering at HP's Data Systems Division. "The only way to assure excellence is to evaluate product performance from the initial design stage all the way through manufacturing and shipping. There can be no shortcuts."

At HP, product quality is assured through extensive testing and inspection. Environmental testing is just one phase of this process and is performed at several points in the product's developmental cycle. Sixteen grueling, environmental tests are conducted, ranging from severe temperature extremes to massive extended vibrations.

"HP has one of the most dynamic and dramatic environmental testing programs in the industry," says Jim Ehrhardt, Reliability Engineer at Disc Memory Division. "It's been good design practice here for years."

A product's rigorous life

In the design phase, the product is defined, and its desired


Establish a Test Baseline
Check for Safety
Fluctuate Voltage and Frequency
Measure Internal Hotspots
Set System Temperature Control Points
Subject to Storage/Shipping Temperatures
Bake in Intense Heat
Freeze in Extreme Cold
Soak in Humidity
Drench in Condensation
Measure Radiowave Interference

working parameters outlined. A breadboard or preliminary prototype is made, and environmental testing occurs for the first time to evaluate product design.

Based upon the knowledge gained from the breadboard testing, a final or production prototype is constructed. The most rigorous testing in a product's developmental lifecycle occurs during this critical period.

At this point, changes and adjustments are made to the design to assure reliable performance. Should a failure occur here, or at any other point in time, it may be necessary to revise the product design and restart the testing.

Next, there is a pilot production run. Once again the exhaustive environmental tests are performed. If the product passes them, it is ready for production and shipment to the customer.

"Because some products may never be used in certain environments, some tests may be waived," says Stan McCarthy, Product Assurance Manager at Data Systems Division. "Card readers, for example, may never be used in a high condensation environment."

Besides this standard series of tests, periodic random checks are made on products ready for shipment to make sure they live up to designed survival parameters. Even the product assurance and environmental testing procedures themselves are periodically evaluated.

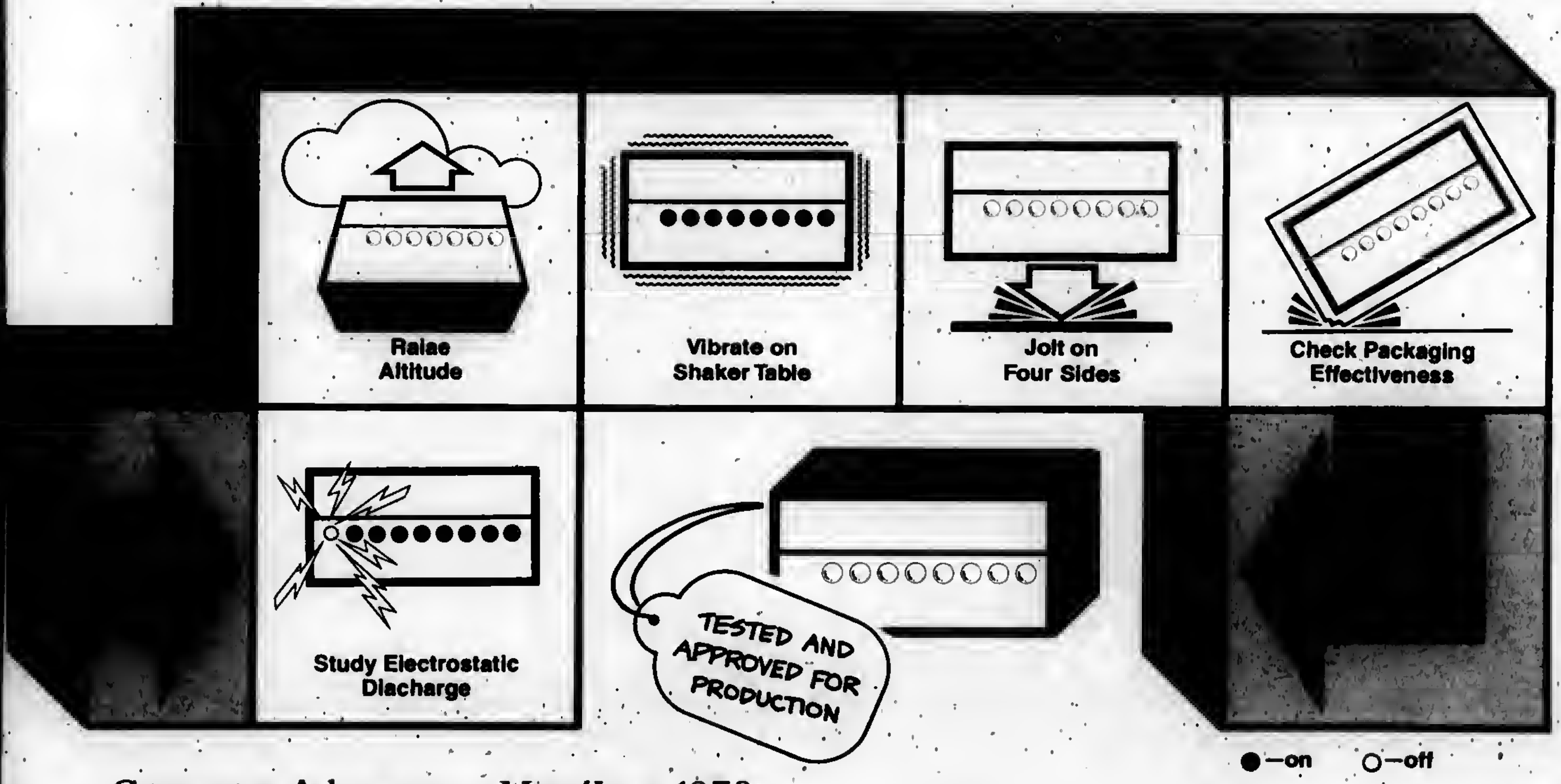
Evolving Tests

Test parameters change and new tests evolve as we move into markets where different customer environments exist. For example, noise detection is one environmental test now being developed, refined, and conducted at General Systems Division. Jim Bobroff, Hardware Reliability Manager, explains that GSD's new products will be used primarily in the commercial business market. "Our customers and computers will be in an office environment with low ceilings. We must make our products quieter."

Gillette adds, "We give the customer a product which can stand up under varied and extreme environments even beyond those found on the customer's manufacturing floor."

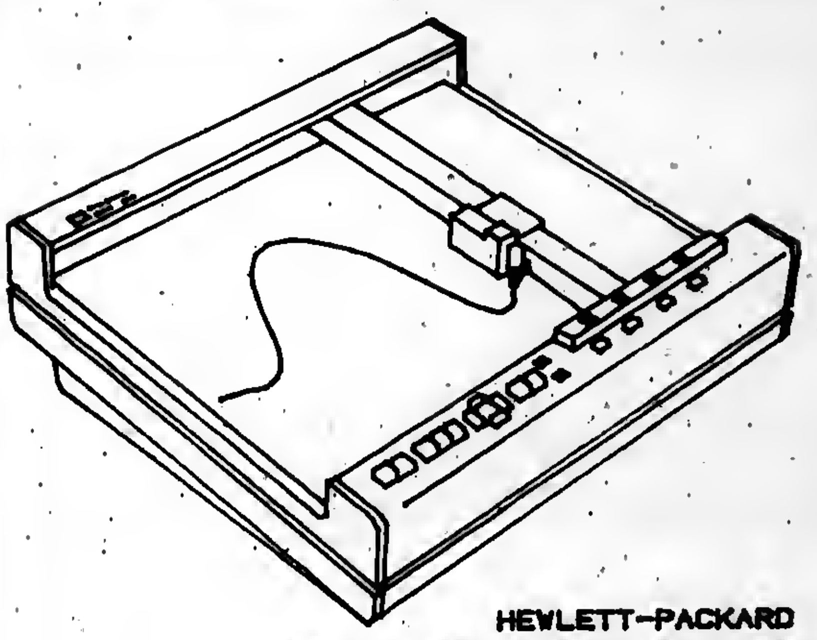
Customers describe our environmental tests as "rugged", "rigid", "exhaustive", and even "sadistic". "They are," claims McCarthy. "But, thorough testing helps us to ensure that we have a quality product."

More information? Indicate C.


Raise Altitude
Vibrate on Shaker Table
Jolt on Four Sides
Check Packaging Effectiveness
Study Electrostatic Discharge
TESTED AND APPROVED FOR PRODUCTION
●—on ○—off

New & Noteworthy

The four-color plot



HEWLETT-PACKARD
MULTICOLOR GRAPHIC PLOTTER

The crisp, clean lines shown here are an untouched sample of publication-quality drawings produced by HP's new graphic plotters. These microprocessor-controlled, programmable plotters produce low-cost, multi-color graphs, charts, and drawings — all with alphanumeric labeling from remote processing facilities.

Traditionally, the pens of plotters move in visible steps. HP's advanced microstep control system moves the pen in much smaller increments — 1024 per inch, to eliminate the visible stair-step effect. A 16-bit microprocessor does the necessary high speed calculations.

Further smoothness is gained by an electronic compensation which linearizes the motor's performance even more. Motor perturbations are reduced to a negligible level by proper adjustment of the waveform of the motor phase currents — we add a third harmonic component to the normal sinusoidal motor phase currents.*

The plotters provide multiple colors in a dramatic new way. Rather than carrying the weight of four pens on the plotter arm, these pens are neatly capped and stored along the lower right edge in a "stable". Pen changing, either under manual or programmatic control, occurs during the natural motions of the X & Y axes. No additional motors or solenoids are used.

There are two versions of the new graphic plotter. The HP 9872 ($4200**) is HP-IB compatible. The HP 7221 ($4600**) is RS232/CCITT compatible. The microprocessor used in the HP 7221 has been optimized for data communication efficiency. Dashed-lines, arcs, and circles are quickly drawn by a single command.

More information? Indicate D and E on the reply card.

Faster, faster

Fast disc drives don't keep you or your CPU waiting. Several features make the new HP 7906 one of the highest performance 20 megabyte disc drives in the industry:

- start-up time=60 seconds
- track-to-track seek=5 ms
- data transfer rate=937 KB/S
- average data access=33.3 ms

Outstanding start-up time is achieved through sophisticated temperature compensation circuitry. The head positioner automatically compensates for thermal expansion. At power-on, thermal sensors measure the temperature difference between platters and, within 60 seconds, the circuitry compensates for the difference by offsetting the heads.

Besides environmental tests (see page 4), extensive manufacturing tests are performed on each disc to increase reliability. IC and PCA burn-ins at 75°C for 48 hours are examples of the rigorous tests conducted.

In addition, a new pre-filter assembly is included with every HP 7906 for reducing particulate contamination, providing more efficient cooling, extending life of the absolute filter, and reducing noise.

The HP 7906, compatible with HP 1000 and 21MX-based computer systems, starts at $9500.**

For additional details, check F on your reply card.

Computer Advances is written to inform professionals of the latest technical contributions from Hewlett-Packard. You are invited to receive issues at your place of residence or business. Write Carol Scheifele, Editor, Computer Advances, Hewlett-Packard, 11000 Wolfe Rd., Cupertino, CA 95014.

HEWLETT hp PACKARD

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*Patent pending
**U. S. prices only

Hewlett-Packard Computer Advances May/June 1978

Hewlett-Packard Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

Send more information	Please contact	
☐	☐	A. CIS/3000 College Information System
☐	☐	B. System 45 Desktop Computer
☐	☐	C. Environmental Testing
☐	☐	D. HP 9872 Four Color Plotter
☐	☐	E. HP 7221 Four Color Plotter
☐	☐	F. HP 7906 Disc Drive

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Title Company

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City State or Province

Zip or Postal Code Country Telephone

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☐	☐	B. System 45 Desktop Computer
☐	☐	C. Environmental Testing
☐	☐	D. HP 9872 Four Color Plotter
☐	☐	E. HP 7221 Four Color Plotter
☐	☐	F. HP 7906 Disc Drive

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California

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11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

Built by Siemens for Itel

Itel, IBM Users Get Laser Printer Option

SAN FRANCISCO — Itel Corp. has introduced a nonimpact laser printer, designed and manufactured by Siemens Corp., that is plug-to-plug compatible with its AS/4, AS/5 and AS/6 mainframes as well as IBM's 370 models 145, 145-3, 148, 155, 165-II and 168 and 3031, 3032 and 3033 CPUs.

The Itel 7800 system incorporates a laser beam character generator that transfers characters electrophotographically onto standard single-part forms, the firm stated. Data is handled line by line and printed page by page at a rate of 21,000 line/min or 8,800 form/hour.

The system prints characters via a rotating drum with an electrostatically charged photoconductor surface. Print information is placed on the drum in the form of charge patterns by means of exposure with a laser beam, a spokesman explained.

Toner Process

In the developing station, the toner particles adhere to the exposed positions in accordance with the charge patterns and are then transferred from the photoconductor to the paper as the paper is fed past the drum, he continued. The toner particles are fused into the paper via heat and pressure in the subsequent fuser station.

Data transfer, page buffer loading and the printing system functions are controlled by an integrated, microprocessor-based controller. When sufficient information has been transferred to form a complete page of output, the actual print operation takes place independent of the host CPU, Itel said.

Features of the system are said to include a format overlay optical image system, 20 programmable character sets and a graphics character modification function, three different column and line spacings, a writable vertical format buffer, a writable matrix memory and a copy modification system.

The 7800 is being offered in three versions: the Model 1, an on-line subsystem that is field-upgradable; the Model 2, an off-line printing subsystem that is also field-upgradable; and the Model 3, a system that can operate either on-line or off-line.

The Model 1 sells for $270,000, Itel said from One Embarcadero Center, San Francisco, Calif. 94111.

In Itel Corp.'s 7800 printer, characters are generated by a laser beam character generator and transferred electrophotographically onto ordinary computer paper.

First AS/5 User Up 98.9% of First Year

By Howard A. Karten
CW Staff

NEWPORT BEACH, Calif. — The first commercial user of Itel Corp.'s AS/5 mainframe has compiled an uptime record of 98.9% since it replaced an IBM 370/155 a little more than a year ago.

The AS/5 has been "an outstanding piece of hardware from the day it came in," according to Kenneth T. Garrison, vice-president and information systems executive for Pacific Mutual Life Insurance Co. here.

Since the user transferred all of its work to the Itel system in mid-April of 1977 [CW, April 11, 1977], the AS/5 has been up "98.9% of the item, as of the first of the year, and it's been better since then," Garrison said, adding that this track record is better than the IBM system's.

In addition, the AS/5 has outperformed the 370/155 on throughput. Even though the 370/155 had an accelerator attached, the AS/5 processes the same workload in 25% fewer CPU hours than its predecessor.

The system is "absolutely compatible," Garrison commented, noting Pacific Mutual "had no problems with any of the hardware or software. We are very pleased with the performance of the system and with Itel's performance."

The Itel unit, which was recently upgraded from 3M bytes to an AS/5-3 with 5M bytes, is now Pacific Mutual's mainstay.

It handles all the insurer's production work on 400,000 individual policies, plus the normal administration, personnel, debugging and other work found in an insurance environment.

Options Considered

Two years ago, the IBM 370/155 was "overloaded," Garrison recalled, and Pacific Mutual considered several options to relieve this load. Among them were the addition of a second 370/155, the replacement of the 370/155 with a 370/158 or a 370/165 or the replacement of the 370/155 with several minicomputers.

Another option the company considered was asking Amdahl Corp. to produce a smaller version of the Amdahl 470/V 6.

As part of its decision to bring in the Itel mainframe, Pacific Mutual specified a rigorous series of tests, including one in which power was dropped 30 consecutive times and the unit was placed into production after every five power drops. The AS/5 passed this and other similarly difficult tests, according to Garrison.

'UN' of Equipment

Pacific Mutual is a veritable "United Nations of DP equipment," Garrison said. The company has California Computer Products, Inc. disk drives, Storage Technology Corp. tape drives, IBM 3270-type communications terminals from Computer Optics, Inc., a Memorex Corp. communications controller and printers made by IBM and Documation, Inc.

Garrison estimated the company will save $4 million in the 1969-1979 period by installing plug-compatible equipment.

The company was five days away from signing a lease for an IBM 370/165 when Itel came in to discuss its AS/5. After investigating the unit and seeing it in action, the user concluded the AS/5 was as powerful as a 370/158, even though less expensive, and would be easy to integrate with Pacific Mutual's operating system.

Acceptance Quick

To make doubly sure, however, the insurance company established rigorous acceptance criteria for the Itel unit. The unit did so well on the tests that the mainframe was turned over to the company within hours after delivery, Garrison noted.

Commenting on the replacement, Garrison said, "IBM put up a professional and tough fight when we decided to buy an Itel system, but it accepted our decision graciously. We may go back to it eventually. It all depends on what IBM comes up with in the future and what Itel's plans are."

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CW5158

Add-On Extends 370/165 Memory to 8M Bytes

BEDFORD, Mass.— The introduction of a "super extended" version of its 370 Stor/165 add-on memory, said to be the first add-on to extend the main memory capacity of the IBM 370/165 to a maximum of 8M bytes, has been announced by Cambridge Memories, Inc. (CMI) here.

Expansion of the maximum capacity of the 370/165's Model 3165 processor to 8M bytes is reportedly made possible by an "address capture" feature developed by CMI. The feature enables the add-on address memory locations which are actually in the memory-addressing scheme of 3165 processors, but which IBM memory is unable to use because of lesser density of its core storage, according to a CMI spokesman.

To provide more core, CMI adopted a packaging technique that allows a maximum of 8M bytes to be packaged in the same physical space that IBM uses for a single megabyte, the vendor said. Combined with a CMI-developed cooling and air flow system, the packaging increases the core size with no degradation of memory speed, cycle time or data throughput, the spokesman claimed.

Additional features of the add-on memory are fail-safe reliability functions, the spokesman said. These include active storage replacement, an off-line switch for built-in memory exercising and an operator maintenance panel, he explained.

A typical 2M-byte Stor/165 is priced at $250,000 and a 4M-byte system costs $475,000. The memory systems are also available on lease, CMI said from 12 Crosby Drive, Bedford, Mass. 01730.

Free Booklets Offered

The following brochures are available at no cost to users:

- "Evaluating Your Computer's Power Structure," a four-page brochure that provides a checklist to assist the DP manager in evaluating the typical installation, is being offered by Computer Power Systems Corp. 3398 E. 70th St., Long Beach, Calif. 90805.
- A publication discussing the pros and cons of designing with switchable power supplies and the typical applications can be obtained from Boschert Associates, 384 Santa Trinita Ave., Sunnyvale, Calif. 94086.
- A four-page pamphlet that details three basic leasing plans available for any Computer Power Systems Corp. power system configuration is offered from the firm at 3398 E. 70th St., Long Beach, Calif. 90805.
- A three-page report from Electronic Memories & Magnetics Corp. (EMM) discusses the IBM 30 series processors and the effect they might have on current IBM 360 and 370 users. The newsletter can be obtained from EMM at 2311 W. El Segundo Blvd., Hawthorne, Calif. 90250.

Data Entry Costs Focus of Seminar

SANTA ANA, Calif. — "How to Profitably Manage and Control the Data Entry Operations" will be the subject of a one-day seminar for DP executives that will be held concurrently with the National Computer Conference in Anaheim, Calif. on June 5.

The seminar will be under the direction of Ed Feist, author of the "Feist Report" that appears in *Data Entry Digest.* Feist will discuss cost control, reporting techniques, quality control and operator selection.

The program, which will be held at the Jolly Roger Inn, costs $100. Additional information is available from *Data Entry Digest,* 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

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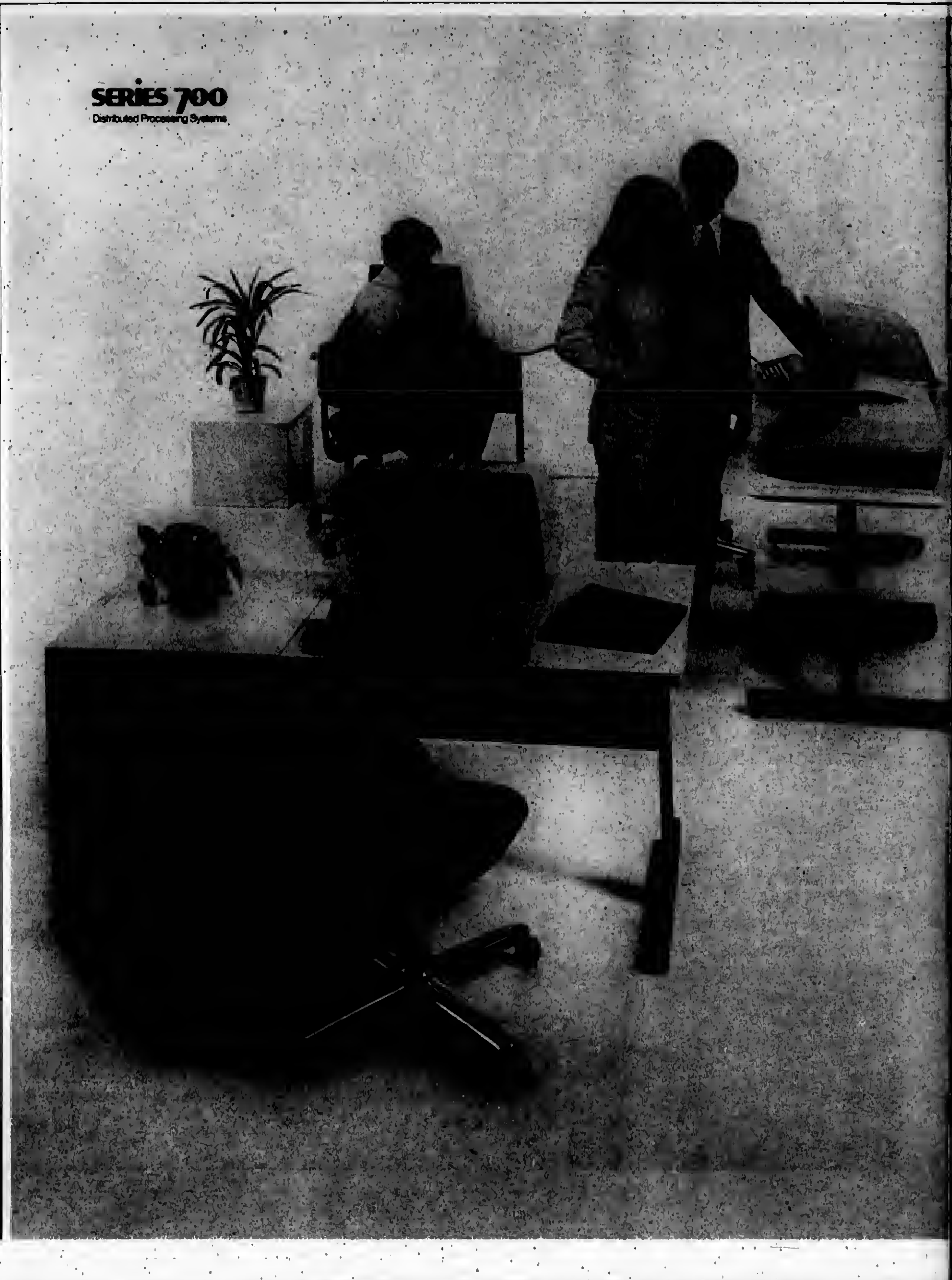

For Preprocessing, 72X Reduction

Bell & Howell Has COM System, Two Options

NEWPORT BEACH, Calif. — Bell & Howell's Computer Output Microfilm (COM) Products Division has added a system and two optional enhancements.

The 3705 COM system features a printing speed of 26,000 line/min, a line length of up to 160 char. and a page depth of 86 line/page. Additional features include a 90-char. (upper and lower), standard Ascii set, a 7 by 9 dot matrix and stroke generation, according to a spokesman. A 72X reduction capability places 690 (11 in. by 14 in.) pages on a piece of standard 105mm fiche.

The standard 3705 system includes a 3705 COM recorder, a Comflo 90 or Comflo 100 microfilm processor and a Comflo 418 high-speed fiche duplicator. The system uses 9-track, 1,600 bit/in., phase-encoded tape. Several performance options and plug-compatible upgrades are available that enable users to expand to a minicomputer-controlled 3800 COM system without replacing the original 3705 COM recorder, the spokesman said.

The system also features an upgraded software package called BHCOM. The previously introduced package, written in ANS/Cobol, has been upgraded and significantly expanded, the spokesman said, and includes features for titling, indexing, control breaks, vertical tabbing and data page formatting.

The company said the package runs on most mainframes, including IBM 370s and Burroughs Corp., Honeywell Information Systems, Inc., Control Data Corp. and NCR systems. Price for the 3705 is $74,000.

Preprocessor Configuration

The company is also offering an optional configuration for its standard mini-driven 3800 COM system. Called the 3802/6250 COM preprocessor, the configuration uses a 6,250 bit/in., read/write tape drive to process that density tape directly, with no intervening conversion to a lower density.

The 75 in./sec drive is self-threading, according to the company, and can also operate at 1,600 bit/in. Use of the drive in conjunction with the standard 3800 system tape drive permits overlapping tape mounting and reel switching between the two drives for multireel jobs. The drive is field-installable on existing 3800 systems for $31,500.

A 72X reduction ratio option for the firm's line of COM systems is also available. Storage space requirements and retrieval time are significantly improved by using the option, the company claimed, since less handling time is required.

The reduction option costs $6,800 from the company at 1451 Quail St., Newport Beach, Calif. 92260.

'Do You Swear to Give the Data, the Whole Data, and Nothing But the Data?'

TI's new 774 Intelligent Terminal System gets to the source of your processing needs.

One of the facts of business growth is that the wider the reach of your operations, the greater your need for capable distributed processing.

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With the 774, your video terminals can share a common data base and provide an efficient workstation for your branch office employees. The typewriter-style [illegible] operator ease and [illegible]. And, floppy-disk [illegible] easily [illegible] of data and [illegible] addition [illegible] Model [illegible] the same language — TPL 700, so the 774 is easy to program and operate with minimal operator training.

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Latest Harris S100 Designed for DDP Users

FORT LAUDERDALE, Fla. — The latest addition to the Harris Corp. S100 series is a 144K-byte system for distributed data processing (DDP) users.

The system, called the S123, is said to be the company's lowest priced system in the product line for multiuse applications.

Hardware on the system includes virtual memory CPU with 144K bytes of MOS memory and 768K bytes of virtual address space, an operator console, a 40M-byte storage module disk drive, a 9-track, 800 bit/in. tape drive, a 300 line/min. printer and a direct memory access (DMA) communications processor.

The communications processor has a channel capable of supporting up to eight ports for asynchronous devices or one synchronous plus four synchronous devices, Harris said.

The CPU can accommodate up to 384K bytes of MOS main memory plus a complementary I/O capability, the company added, making it possible to satisfy the needs of eight interactive users concurrently.

The S123 can be field-upgraded to either of the large systems in the Series 100, the S125 or the S135, with no changes to existing applications software and files, a spokesman claimed.

Hardware specifications for the system include an instruction set of approximately 120 instructions, which are capable of performing over 650 separate operations. An optional floating-point instruction set is also available, the company stated.

The S123 features a full memory cycle time of 450 nsec, mini cache buffer with an access time of 30 nsec and a bus-oriented architecture capable of transferring six bytes every 300 nsec, according to the spokesman. The channels for the system consist of an integral block channel for a card reader, a universal block channel consisting of two logical subchannels to support high-speed peripherals such as storage modules or high-speed tapes and a programmed I/O channel used to interface local CRTs as well as printers.

Altogether, the system can support 19 channels, each of which can support 16 device controllers, the spokesman said. Aggregate channel transfer rate is said to be 6.8M byte/sec.

Software available with the system includes the Harris Vulcan operating system and seven languages: Fortran IV, Basic, Ansi Cobol, Macro Assembler, Snobol 4, Forgo and Fortran. In addition, the company said, the system can host other remote job entry terminals via an IBM 2780 protocol.

The price for a system with 144K bytes of MOS memory, a console, a 40M-byte disk, a tape drive, a 300 line/min printer and a DMA communications processor is $120,000, the company said from 1200 Gateway Drive, Fort Lauderdale, Fla. 33309.

Meters Offer 2 GHz Range

IRVINE, Calif. — Two modulation meters from Racal-Dana Instruments, Inc. offer a frequency range coverage of up to 2 GHz as well as automatic tuning and amplitude leveling.

The Model 9008 and Model 9009 both permit measurements on equipment operating at frequencies in the medium, VHF and UHF bands, a spokesman said. Additionally, both instruments provide a measurement of AM and FM signals within an operating speed of 1 sec, he claimed.

The Model 9008 is remotely programmable and offers frequency coverage from 1.5 MHz to 2 GHz while the model 9009 provides coverage from 10 MHz to 1.5 GHz, the firm stated.

Each of the meters furnishes eight FM ranges with a 100 KHz peak deviation and six AM ranges to a 100% modulation depth.

Both units operate on either ac power or an optional rechargeable battery pack, the firm noted.

The price of the 9008 is $1,495 while the 9009 costs $1,295, the firm said from 18912 Von Karman Ave., Irvine, Calif. 92715.

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Printer Controller Allows Range of Character Sizes

MOBILE, Ala. — A microprocessor controller for use in Printronix Model 300 line printers reportedly allows a host CPU or terminal to create varying sizes of block letters ranging from .1 in. to 13 in.

The Magnum 300 controller from Quality Micro Systems, Inc. uses Motorola Semiconductor Products, Inc.'s 68B00L microprocessor, version of Motorola's 6800 series microprocessors. The circuit board slips into a spare circuit card slot in the printer, the company said, and requires no modification of the Printronix unit.

Use of the board in the host printer is transparent. The board is addressed by issuing a special character from the host, but does not interfere with normal operations, the firm explained.

The Magnum 300 controller allows intermixing of different size characters on the same line in a single pass of the print mechanism and offers horizontal and vertical tabbing and reverse images, according to a company spokesman.

The unit has a .56 in./sec print rate and meets several interface protocols including parallel, RS-232 serial or serial current loop. Various serial line protocols are available, the spokesman said.

Additional features of the unit are a self-test feature that permits a ripple test pattern while the printer is either on- or off-line and overprint abilities

(Continued on Page 62)

Digitron Has OCR Reader For Credit Card Processing

NEW YORK — Digitron, Inc. has introduced its Credit Card Processor, an OCR document reading station designed to interface with all common credit card processing systems.

The basic unit consists of a reader, an automatic feed, two viewing stations, a keyboard and a standard interface. The unit can interface to all common processing systems with no hardware or software modifications to the host, a spokesman said. Because of this, businesses that process credit card transactions need not go through a conversion effort to attach the unit to their existing non-RS-232 systems, he added.

The unit can read several type fonts, according to the company, including OCR-A and OCR-B, Farrington 7B, 1428 and others, as well as hand-printed numerics.

Digitron Credit Card Processor

The unit is reportedly capable of reading 900 document/hour with rejection rates of less than one per 10,000 characters.

The unit offers buffering, front-feeding of documents from a batch to maintain sequence for comparison with an audit trail and the ability to manually enter characters the machine is unable to read.

Prices begin at $35,000 with 30-day delivery from the company at 500 Fifth Ave., New York, N.Y. 10036.

Service Prints Check Digits

DAYTON, Ohio — A service from the Standard Register Co. provides users with business forms preprinted with sequential numbering including check digits.

Users can save computer time by using the service to have forms consecutively numbered and printed using modulus 10 or 11 systems, as well as any check digit system based on the use of a prime number, Standard Register said.

Sizes of the printed numbers can vary up to 2 in. depending on the printing method used, and check digits can be imprinted as a numeric character or an alpha equivalent.

The check digit can be placed as a prefix, suffix or buried in the consecutive number being printed, the firm stated.

Standard Register can be reached through P.O. Box 1167, Dayton, Ohio 45401.

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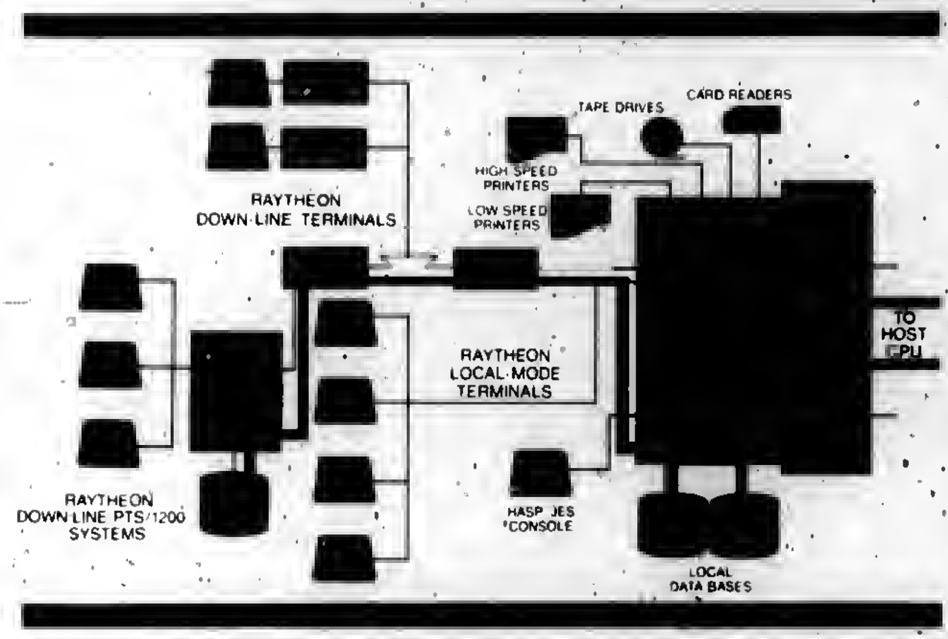
The Raytheon Checklist. A distributed processing user's best friend.

The term distributed processing is new enough that many people, both users and manufacturers, mean many different things when they talk about it.



Shown above is a typical schematic of a PTS/1200 distributed processing system with a hierarchy of local data bases, multiple terminals in multiple applications, all linked by one or more protocols to a central mainframe

Rather than try to add another definition to the many now existing, Raytheon Data Systems has prepared this comparative checklist of the major functions that might normally be considered attributes of any distributed processing system. Regardless of the distributed processing system you eventually select, there are a number of capabilities you will want that system to possess. Obviously, the more features the system has, the greater its capacity to do all the work you have planned now—or might need tomorrow.

Our checklist itemizes many of the most important features you should consider. They are not the only features, but we think they are the most important.

And—to make the point that Raytheon's PTS/1200 MARK·I and MARK·II systems are extraordinarily powerful distributed processing systems—we've taken the liberty of itemizing their capabilities in each of the columns shown. Do that with other vendors' equipment, and we think you'll choose Raytheon.

Then check prices. The MARK·I is lowest.

After you've looked at the variety of products on the market, you'll also want to see what each costs.

We can tell you about Raytheon's pricing. The PTS/1200 MARK·I is the lowest. By low, we mean up to 30 per cent below the most popular alternative models. The PTS/1200 MARK·II costs a little more, but is more than twice as powerful as the MARK·I. You won't be able to compare its cost directly with other equipment, because no other equipment can come close to matching its performance.

Solving the installation and productivity problems that these users encounter takes patience, skill and the commitment of an experienced vendor. It takes going beyond a standard product, and finding customized solutions, and often products, to meet a user's requirement.

Most of all, it takes doing it. Over and over and over again. Raytheon has done it over and over and over again.

Fast, easy installation and growth is vital.

Not shown in the checklist is another vital aspect of distributed processing systems—immediacy of installation and ease of expansion. The Raytheon PTS/1200 MARK·I can be installed in less than a day, with no change to host hardware, or systems or applications software. You become productive right away. And when you want to grow, you simply add capacity—within a single system, or by adding additional systems or devices. Every PTS/1200 is compatible with every other—and with your host mainframe system and protocols in almost every case.

Look hard at experience too.

Beyond the hardware, the price and the easy compatibility, there is the experience factor. The vendor with experience can save the user without it a lot of grief.

Raytheon is the world's largest non-mainframe supplier of intelligent terminals and distributed processing systems. Some of our customers use more than 2,000 Raytheon terminals in data networks located at more than 300 locations either domestically or around the world. Many others have one or several PTS/1200 distributed processing systems at work in remote locations, linked on-line to a central mainframe.

A typical four-station MARK·I system with a 64K-byte controller, 10 MB disk, and one 165cps printer leases for $850 per month, including all software and maintenance.

The 54-Point Checklist

Feature	Typical Configuration	Importance of Feature	Product Capabilities			
			PTS/1200	Brand X	Brand Y	Brand Z
INTELLIGENCE	✓ Dependent totally on host processor ✓ Stand-alone (non-shareable) intelligence in each station ✓ Small-cluster (shared by 1-8 stations) ✓ Large-cluster (shared by 1-24, or more stations)	Intelligence is based upon the amount of available programmable memory a system possesses. Its purpose is to facilitate local application development and execution. The larger the available memory, the better the applications freedom.	N/A All resources shareable by all stations 64K to 128K bytes 64K to 128K bytes			
CONTROLLER	✓ Word size ✓ Number of operator stations per controller ✓ Number of peripheral attachments per controller ✓ Availability of high level languages ✓ Ability to perform multi-tasking	The controller is the central processor of a distributed system. Its power in terms of word size, attachment capacities, programmability and ability to perform multiple tasks concurrently is the key limiting factor in its ultimate performance	16-bit 1-8 stations, or 1-24 stations 1-4 peripherals, or 1-20 peripherals Yes MACROL, COBOL in the future Yes Up to 32 tasks concurrently on one controller			
TERMINALS	✓ Variety of screen sizes ✓ Variety of keyboard options ✓ Availability of user definable function keys ✓ Ability to provide operator prompting ✓ Ability to attach remote terminals on phone line	The terminal is the point of operator interface and should be capable of being comfortable to use, easy to use, and easily matched to one or many different applications through customizing	960 or 1920 3270 typewriter, data entry 16 program function keys, plus any key programmable Yes, by screen, audio and light indicators Yes			
PERIPHERAL ATTACHMENTS	✓ Number of attachments per controller ✓ Low speed printer devices ✓ High-speed printer devices ✓ Card reading devices ✓ Magnetic tape transports ✓ Printers word processing quality	The ability to attach a variety of peripheral equipment of various speeds and capacities is a measure of the range of work a system can do	1-4, or 1-20, any combination 45-165 CPS 3 models 300 LPM and 600 LPM 300 CPM 800 and 1600 BPI Yes			
COMMUNICATIONS PROTOCOLS	✓ Asynchronous ✓ Synchronous ✓ Binary Synchronous —Batch —Interactive ✓ Synchronous Data Link Control (SDLC)	The ability to support more than one protocol—at the same time on the same system—adds immeasurably to the number of tasks and number of networks a system can work in without additional user development effort	Yes, TTY RS-232 Yes Yes Yes Yes [illegible]			
INTELLIGENT 3270 OPERATIONS	✓ Local format storage ✓ Local printing ✓ Ability to access and update local data bases ✓ [illegible] ✓ Field verification at each terminal location ✓ [illegible]	This feature assures that the system can work immediately and easily with the most popular terminal devices in use today, and extend the performance of those devices in a variety of ways	Yes Yes Yes Yes Yes			
EMULATION CAPABILITIES	✓ 3270 interactive (dumb) ✓ 3270 interactive (intelligent) ✓ 2780 batch ✓ 3780 batch ✓ SDLC batch/interactive ✓ HASP [illegible] entry ✓ Non-IBM protocols ✓ Specialized protocols	Emulators are software tools that permit a system to operate as a look-alike under other vendors protocols and procedures. Their advantage is to permit direct and immediate attachment to networks using a specific device protocol	Yes Yes Yes Yes Yes, in 1979 Yes Yes Yes			
DATA BASE STORAGE	✓ Multiple disk storage capacities ✓ Memory management software ✓ Ability to expand to very large local storage	Local data base storage under sound memory management techniques assures powerful local filing, easy offloading of large central files and elimination of unnecessary communications to and from host	Yes, from 10 to 320MB Yes Yes, to 320 MB per system			
SOFTWARE LANGUAGE	✓ Assembly language ✓ Strong macro command repertoire ✓ High level compiler languages ✓ Easy-to-learn and use ✓ Numerous screen manipulation and interactive programming aids ✓ Parameter-driven aids where required.	Language is the facility that makes it possible to tap the power of the basic system by allowing applications to be written easily. Simple but rich high-level language that can be learned easily by programmers or used by non-programmers extend a system's reach that much further	Yes, not needed by user personnel Yes, 150 instructions MACROL now COBOL in 1979 Yes Yes Yes, for format creation and source data entry			
NETWORK ENHANCEMENTS	✓ Concurrent communications operation ✓ Downline control of multipoint networks ✓ Remote program development support for mainframe in any language ✓ Teleprinter network on terminal lines ✓ Downline program debugging ✓ Downline terminal loading ✓ High-speed data transmission rates		Yes, batch and interactive at same time Yes, up to 10 drops per controller Yes Yes, on same lines at same time Yes Yes To 9600 BPS			

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Report Explores Prospects Of Nonimpact Page Printers

FITCHBURG, Mass. — A 102-page report exploring the benefits, prospects and pitfalls of the IBM 3800 nonimpact page printer and similar systems is available from Datek of New England.

The report, based in part on interviews with current users, focuses on the cost savings realized and the reliability problems faced by implementing such a system, a spokesman said. The study also deals with user satisfaction, vendor support and the comparative economics in relation to the data processed by the majority of the users.

The text also discusses the most frequently mentioned kinds of user problems, the actual replacement ratio in the field and the extent to which IBM is learning about the potentials of and failures associated with the 3800, the spokesman said.

The volume also delves into where the 3800 and similar systems are headed in relation to industry developments. The evolution of laser-electrophotographic technology, competing units and the effects of distributed DP on market trends are detailed as well as the relative costs and problems, the spokesman said.

The report, including a 21-page supplement on 3800-type forms, costs $200 from the publisher at 150 Main St., Fitchburg, Mass. 01420.

Matrix Controller Oversees T-Bar Peripheral Switches

NEW YORK — T-Bar, Inc. has introduced a microprocessor-based matrix controller for use with its 3915/3916 peripheral switches.

The device, called the 3917 Intelligent Matrix Control, is designed for use by companies that have four or more T-Bar peripheral matrix switches. Peripheral matrix switches are used to reconfigure the interconnections among computer channels and peripheral devices or device strings.

The reconfiguration is accomplished by pressing a button to designate which of several channels is to be connected to which one of several peripheral devices. The device eliminates the need to recable and permits rapid interchanging of devices, the firm said.

The 3917, which consists of a microprocessor, a dual diskette and provision for attachment of customer-owned video terminal and 55 line/min printer, is said to provide the ability to oversee several of the matrix switches. Features include an audit trail, showing the time of each configuration and the need for a security code before making any change. In addition, different configurations can be predefined, which means that multiple reconfigurations can be performed with one command, T-Bar said.

Another feature of the system, the company, said, is the ability to display configurations in a number of different ways. An operator can display interconnections arranged by CPU or CPU channel or by device classification, e.g., controller, disk, front-end processor or tape drive.

The average execution time required by the system to complete the transfer of as many as 40 peripherals is estimated by the company to be less than 3.5 seconds.

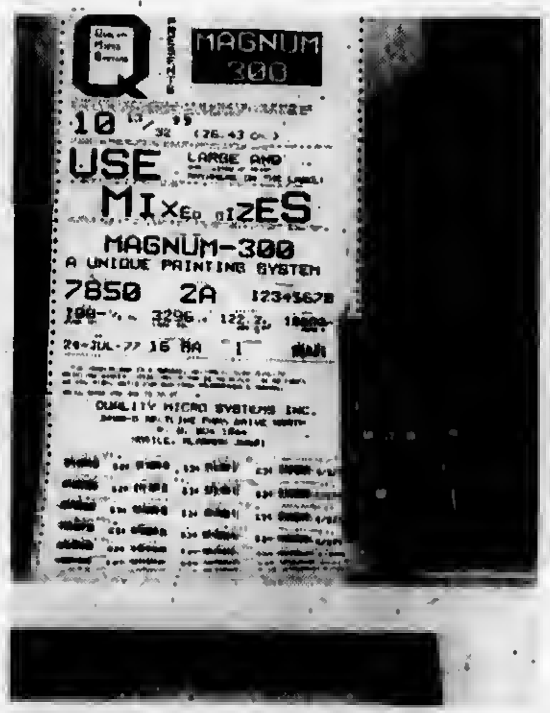
The device can handle up to 16 matrix switches, T-Bar said. Prices start at $40,000 from the company at 141 Danbury Road, Wilton, Conn. 06897.

Device Varies Character Sizes

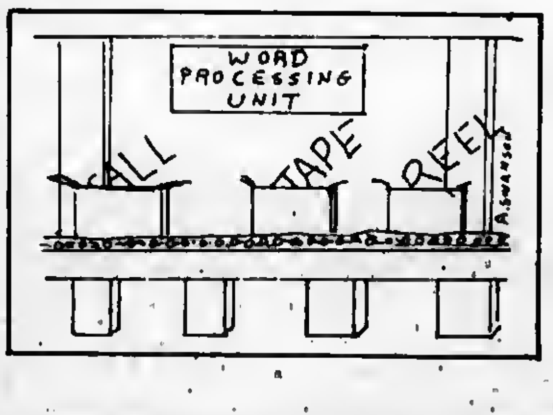
(Continued from Page 59)

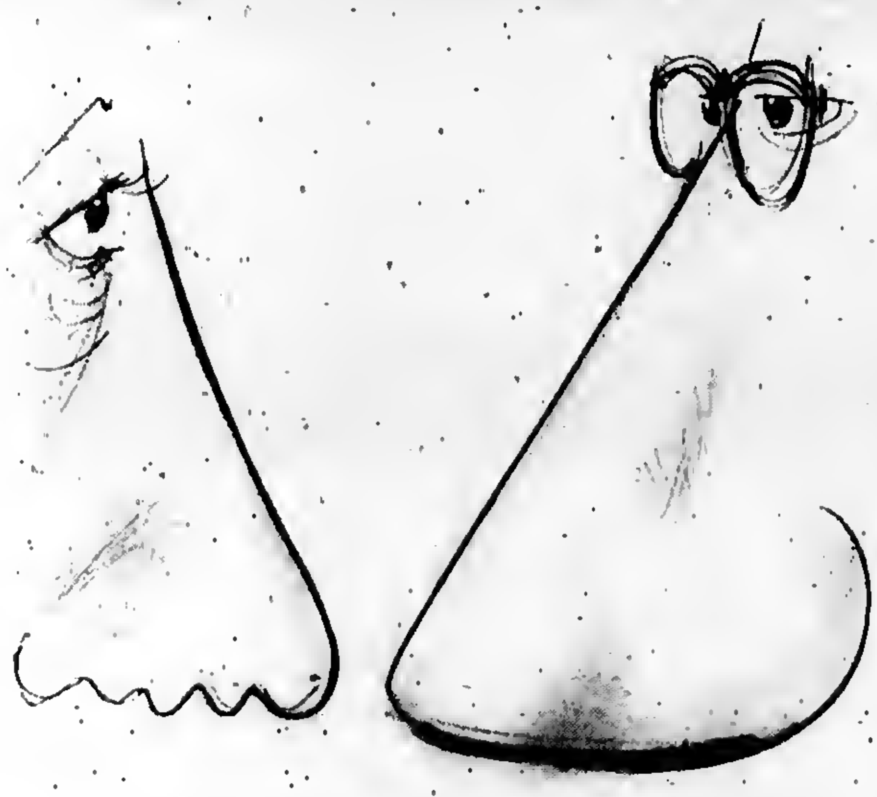
allowing mixing of large and small letters on the same line. Optional print fonts are OCR-A, bar code and expanded character sets.

The unit costs $2,500 in end-user single quantities, with OEM and quantity discounts available from the company at P.O. Box 1644, Mobile, Ala. 36601.



Magnum 300 controller from Quality Micro Systems, Inc. uses microprocessor to allow Printronix line printers to produce varying sizes of block letters.





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Graphics Unit Charts Horoscopes, Biorhythms

By Ann Dooley
CW Staff

HOUSTON — Step right up, folks, to the only computer around that prints your picture, analyzes your face, charts your horoscope — and if that's not enough, tells you how you spend your days and nights.

The Computer Odyssey system does in fact do all those tasks and more, according to Computer Portraits, Inc., manufacturer of the system, which is an outgrowth of its computer portrait business. Introduced early this year, the system is already attracting large crowds at Astroworld Amusement Park, the first site to use the equipment, according to Chuck Hendrix, Astroworld concession manager.

A customer can buy one or more of the features offered by the system, but the biorhythm and the computer portrait are the most popular, according to Hendrix.

The computer portrait system uses a microprocessor to process the customer's image from a closed circuit television camera. The system digitizes the image, which can be frozen to permit examination and comparison of light and dark areas. If necessary, operators can then alter the image's density before printing out a series of alphanumeric characters, which make up the picture.

The system also offers a computer sketch, similar to the portrait but more realistic, according to the firm. Instead of alphanumerics, the print is processed with square blocks ranging from black to white to form a dot matrix of varying density.

An additional feature of the portrait and sketch is the capacity to title the top or bottom or to reverse the print for transfer to a T-shirt.

Switch From Mini-Based System

The system used to be mini-based, but a year and a half ago, Computer Portraits switched to a microcomputer-based system.

Price was one reason for the switch, according to president Michael Kuhlman, who noted that the latest Computer Odyssey system could be sold for the same price as the old computer portrait system.

Another advantage of changing hardware was that the company could design the system itself and have more flexibility than would be possible with a mini, ac-

(Continued on Page 70)

Business Systems Users Warned:

Watch Out for Hidden Software Costs

By Jeffry Beeler
CW Staff

PHILADELPHIA — Take care not to underestimate applications software costs if you're considering installing your first small business system or replacing your existing configuration, Donald R. Shaw, president of Business Counselors, Inc., warned users at a recent conference here.

Maintenance and unanticipated modifications can push applications package costs as high as twice their projected levels and take a terrible financial toll on users who overlook these two critical — but often hidden — software expense items, Shaw said during a seminar on minicomputer selection and evaluation criteria.

Speaking on the subject of software costs in installing minicomputer systems, Shaw estimated a basic small business applications package consisting of 5,000 to 10,000 program statements costs $25,000 to $70,000, or $5 to $7 per statement.

'One of Many Expenses'

He reminded small business managers, however, that this basic purchase price represents just one of many expenses that contribute to the total cost of an applications package. When all the remaining expenses are included, most users find to their dismay that the original $25,000 to $70,000 outlay marked just the beginning of their applications software expenditures, the head of the Parsippany, N.J., consulting firm asserted.

For example, after users acquire their original application package, they usually must modify it to suit their individual application needs. Many software suppliers will perform this service — but only for a substantial additional fee.

Users who omit the price of modifications from their original software cost estimates often find themselves faced with thousands of dollars of unexpected charges, Shaw warned.

A similar fate often befalls small businesses that fail to appreciate the need for ongoing software maintenance and its financial implications, Shaw pointed out.

When small businesses acquire applications software, they should not expect it to last indefinitely, he said, estimating that a program code undergoes a 100% turnover during the four- to six-year lifespan of a typical package.

Therefore, users who spend $25,000 to $70,000 for software will probably have to pay the same amount again roughly five years later to prevent the original package from becoming obsolete, Shaw noted. To

(Continued on Page 66)

Line Controller Hooks to PDP-8

HOUSTON — Computer Extension Systems, Inc. has introduced a serial line controller that is hardware- and software-compatible with models A, E, F and M of Digital Equipment Corp.'s PDP-8 series, according to company officials.

Plugging into the PDP-8 Omnibus, the SLC8 offers 13 switch-selectable transmission rates ranging from 50 bit/sec to 9,600 bit/sec, the spokesman said. It also reportedly provides switch-selectable data bits of five, six, seven and eight plus switch-selectable data bits of one, 1.5 and two.

In addition, device codes for transmitting and receiving are independently switch-selectable as are parity selections, which include even, odd and none, company officials noted.

Model SLC8 is said to come with RS-232 and 20 mA data loops and with a reader control for Teletype Corp. ASR33.

The unit costs $495 with OEM discounts available. Computer Extensions is located at 17311 El Camino Real, Houston, Texas 77058.

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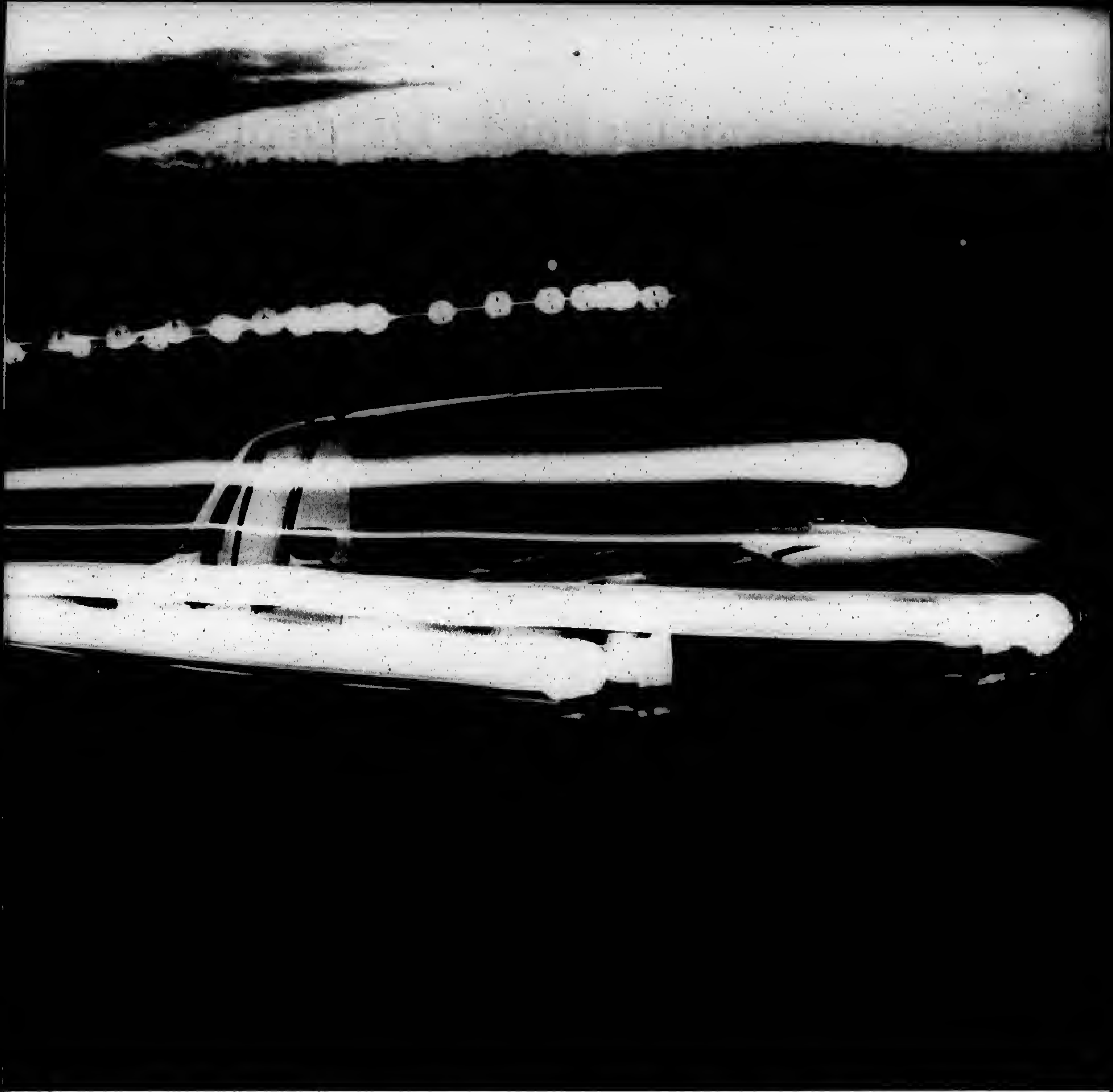

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Brochure Describes Sola Regulators

ELK GROVE VILLAGE, Ill. — A two-page illustrated brochure offered by Sola Electric Co. contains dimensional drawings and basic specifications for the company's line of portable, plug-in micro/-minicomputer regulators.

The literature features models with 140- and 250 Vac load ratings from use with low-power units like CRT terminals.

Copies of the brochures are available from the firm at 1717 Busse Road, Elk Gove Village, Ill. 60007.

Controller Fits 11 Different CPUs

PHILADELPHIA — Eleven CPU models plus the Ampex Corp. DM-900/DM-9000 family of disk drive units can reportedly interface with a peripheral controller that Ampex introduced here recently.

A standard version of the Model DC-1000, the company's first minicomputer peripheral controller accommodates as many as five high-density disk units, simultaneously and an equal number of processors, Ampex said. With an optional expander module quad, users can add up to 16 drives, in increments of four, to the unit.

Able to transfer data at rates from 806k byte/sec to 1.2M byte/sec, the controller is also said to come with the additional option of a 512-byte buffer that allows users to vary data transfer rates to suit CPU bandwidths and applications.

Besides a host-resident diagnostic, the DC-1000 provides a set of resident microdiagnostics as part of its firmware, Ampex said. Moreover, an error correction code, which is also standard with the controller, uses a 32-bit polynomial to find and correcl burst errors as long as 11 bits, a spokesman noted.

Using 16-bit wide microinstruction, the DC-1000 reportedly executes overlapping instructions in 200 nsec. A set of more than 100 microinstructions allows users to control an IBM 3330-class disk drive unit with a 1K-word program, the spokesman explained.

CPU models accepted by the controller include the Hewlett-Packard Co. 21M and 3000 series, the Microdata Corp. 1600 and Reality series, the Data General Corp. Nova and Eclipse lines and the Digital Equipment Corp. PDP-11/34, 11/35, 11/40, 11/45 and 11/70, Ampex said.

Prices for the DC-1000 range from $18,000 for an 80M-byte subsystem to $25,000 for a 300M-byte subsystem. Ampex is at 401 Broadway, Redwood City, Calif. 94063.

Users Warned to Beware Of Hidden Software Costs

(Continued from Page 63)

make matters worse, when documentation, teaching materials and other expense items are included in this recurring maintenance bill, application packages can end up costing as much as $150,000 — far more than the small systems hardware they are intended to support, the company president noted.

Precaulions lo Take

One precaution that can help prevent users from overlooking subtle but important software expense items is to perform an exhaustive study before trying to specify a new system, Shaw advised. Such an option will probably prove expensive, however, and it almost certainly will not provide complete protection against unforeseen expenditures.

"At the very least, one should view the development budget with a certain degree of resigned detachment, mentally preparing for a possible overrun of major proportions," he said. On the other hand, "doing little or no preanalysis and taking vendor pronouncements purely on faith may end in a very messy exchange of insults, threats and possibly even lawsuits."

Forgetting long-range costs for a moment and focusing on initial purchase prices, Shaw said expenditures for application packages usually vary with the amount of outside help needed to implement the software. If buyers are willing to provide their own software modifications and maintenance, they can obtain an application package for as little as $5,000, Shaw said.

If they hire an outside organization to perform these functions, initial purchase prices could start at $10,000 whereas service firms that "take complete responsibility for delivering a finished result" typically charge $15,000 to $25,000.

For custom-written packages developed from scratch, users should expect to pay at least $25,000 in initial service fees, Shaw said.

Of all these development alternatives, probably the most cost-effective is to completely delegate the burden of software modification and maintenance to a hardware vendor or outside software house. But, Shaw said, this approach works only if the modified software meets these criteria:

- The basic software is high in quality.
- It comes close to fitting the prospective user's true business needs.
- The necessary modifications do little violence to the original package's basic integrity.

If users decide instead to do the necessary modifications and maintenance themselves, they face the possible risk of failing to produce an adequate product, running out of resources and neglecting to anticipate future requirements, Shaw warned.

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DG Adds 10M-Byte Disk For Its Micronova Family

WESTBORO, Mass. — Disk-based as well as diskette-based configurations are now reportedly available to users of Data General Corp.'s microcomputer family following the company's recent introduction of a 10M-byte cartridge disk subsystem for the Micronova system.

Model 6095 cartridge DG/disk combines 5M bytes of fixed and 5M bytes of removable storage for integral system backup and attaches to Micronova processors through a 16-line I/O bus, DG officials said.

Eclipse, Nova Compatibility

DG's disk operating system (DOS) is said to provide software support for systems incorporating the 10M-byte disk drive unit. DOS offers buffered and unbuffered I/O and device-independent file transparency, disk file management and high-level language support, company spokesmen noted.

Disk formatting with Model 6095 provides compatibility with members of the Eclipse and Nova lines, a spokesman added.

Applications for the cartridge disk subsystem reportedly include medical, insurance, point-of-sale and manufacturing tasks as well as remote or local data collection and control systems functions.

Model 6095 transfers data at 312,000 byte/sec and provides 408 tracks per recording surface with 12 sector/track and 512 byte/sector, DG officials explained. Head positioning takes an average of 38 msec with a maximum of 8 msec track-to-track, the sources added.

DG credits the subsystem, which occupies 10.5 in. of rack space, with having 95% parts commonality with the company's other disk cartridge drives.

With a self-contained controller, 10-ft I/O cable and one removable disk cartridge, the subsystem costs $8,900 from DG at Route 9, Westboro, Mass. 01581.

Printers Run With Series/1

PHILADELPHIA — Data 100 Corp. introduced a family of IBM Series/1-compatible printer subsystems at the recent Mini/Micro '78 exposition here.

The line includes four subsystems consisting of a printer and a self-contained control board that plugs into the Series/1 processor backplane without socket adapter or channel repower card, Data 100 officials explained. Operating speed of the four models reportedly are 62.5 line/min, 125 line/min, 250 line/min and 300 line/min.

Six-Part Forms

Software-compatible with the Series/1 Model 4973 line printer, the OEM subsystems generate forms with up to six parts on pinfeed, fan-fold paper as wide as 17.5 in., the company officials said.

All models in the subsystem series link to the Series/1 Model 3 4973 processor, the Series/1 Model 5 4955 processor and the Series/1 4959 I/O expansion unit, the spokesman added.

The subsystems also provide a character belt mechanism with individually removable characters; adaptive logic to adjust lines and universal power suppliers, the firm said.

Available Options

Options are said to include various cabinet configurations, 96-character Ascii or 48-character Ebcdic sets, user-defined character font sets and switch-selectable line density of 6- or 8 line/in.

The 62.5, 125, 250 and 300 line/min subsystems cost $7,050, $7,450, $8,000 and $8,500, respectively, in OEM quantities. Data 100 is located at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

DG Minis Get Printer Link

STAMFORD, Conn.— Data General Corp. Nova and Eclipse CPUs can now be interfaced to direct memory access line printers with a controller introduced here recently by Digital Associates Corp., according to a spokesman for the printer supplier.

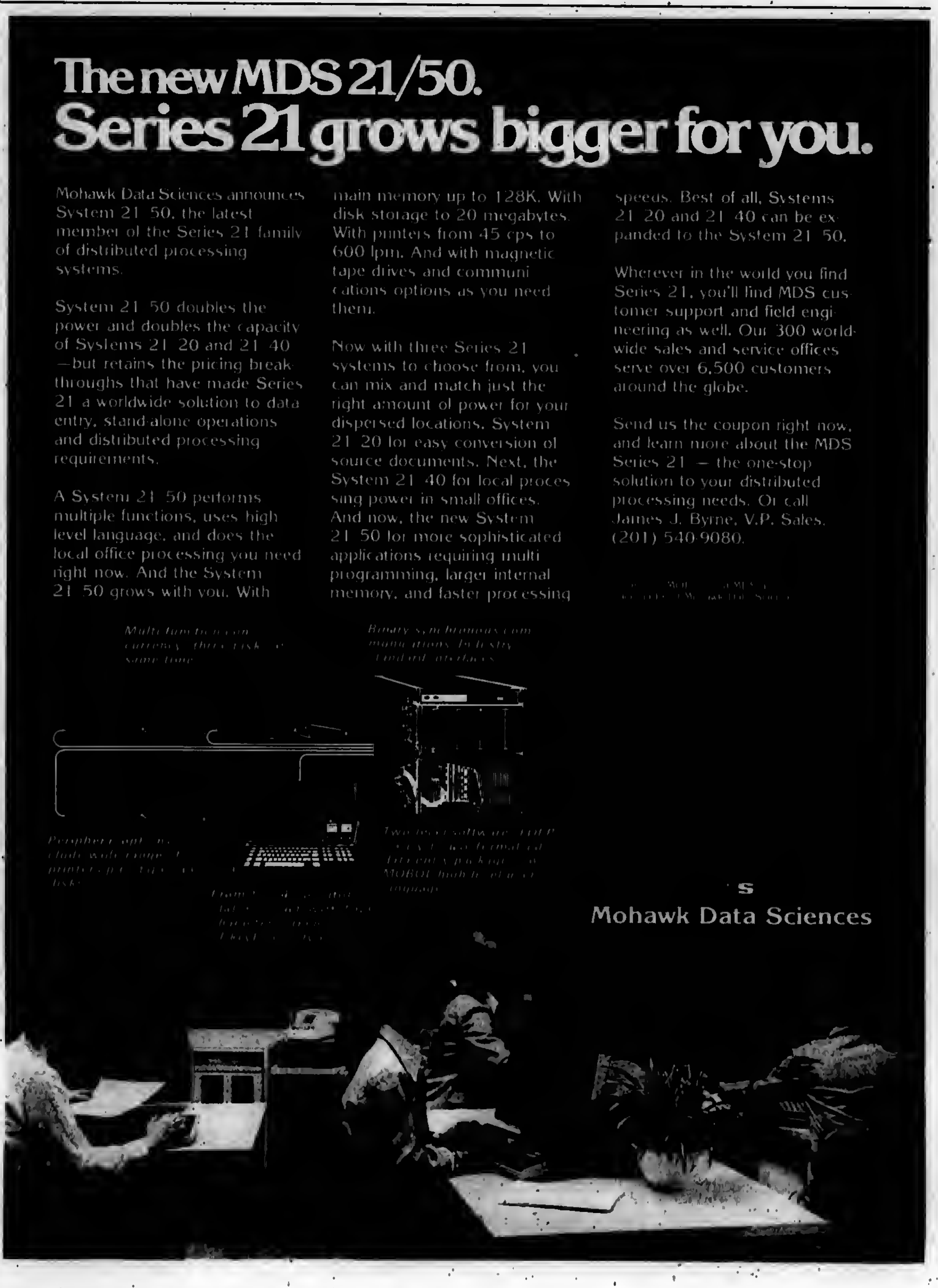
The 1200 series controller links the DG minicomputers to both the Dataproducts Corp. 2200 series printers and to the Data Printer Corp. Chaintrain series printers, the officials said.

Software-compatible with the DG systems, the controller consists of one 15-in. by 15-in. printed circuit board and occupies one I/O slot, the spokesman added.

Through a data bus, one word at a time is taken from memory and stored in a holding register, the company explained. Each word is then broken down into bytes and, starting with the low-order byte, is sent one byte at a time to a line printer.

But before the data goes to the printer, the controller scans each byte and checks for paper control codes, the official said. If any control code remains decoded, the 1200 series holds the control byte until the appropriate paper control action is taken, he added.

For a DG 4215 printer replacement, the 1200 series costs $13,200. Digital Associates is located at 1039 E. Main St., Stamford, Conn. 06902.



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Mohawk Data Sciences

DG Expands Tape Drive Line

WESTBORO, Mass. — Data General Corp. has expanded its tape drive line with two subsystems that reportedly operate at 75 in./sec and provide microprocessor-based controllers for diagnostics and other functions.

Model 6026 operates at 1,600 bit/in., while Model 6027 functions at 800 bit/in., a Data General official said.

Using vacuum column design, both models transfer 60,000 byte/sec at 800 bit/sec, and Model 6026 transfers 120,000 byte/sec at 1,600 bit/sec, he added.

Both subsystems are said to support up to eight 9-track transports. Users can add to the subsystems either the 800/1,600 bit/in. Model 6026-A or the 800 bit/in. Model 6023 transport or combinations of the two, the spokesman said.

The 24.5-in. high transports rewind at 200 in./sec and mount in a standard 19-in. rack, he added.

Both subsystem models reportedly come with integral controllers that provide status reporting and error control as well as autoskip erase on rewrite and auto retry on data transfer.

The Model 6026 tape subsystem costs $14,500, compared with $10,900 for the Model 6027. Model 6026-A and 6023 add-on transports cost $10,300 and $6,700, respectively. All four equipment models are available from DG at Rt. 9, Westboro, Mass. 01581.

Turnkey Vendors Targeted For Combined CA Modules

IRVINE, Calif. — Hardware and software previously available as separate modules are now reportedly combined in what Computer Automation, Inc. described as the first packaged system ever introduced by its Naked Mini Division.

Aimed primarily at OEM suppliers of turnkey office systems, the Basic Desk system comes in two configurations, a CA official said. One of these configurations, the CA/100, accommodates one to four users in a floppy disk drive-based environment, he explained.

The other configuration, dubbed the CA/200, combines the CA/100 with added cartridge disk support and optional swapping software, the spokesman added.

Both configurations are said to come with an extended Basic software system that provides nine-digit floating-point arithmetic and 16-digit decimal arithmetic.

Typical applications for the Basic Desk system include inventory control, management science and scientific calculations as well as the standard business functions, the company official said.

In price and performance, the system occupies a position between high-end, 16-bit business computers and low-end desktop computers using microprocessors, the source explained.

A standard configuration consisting of a 16-bit minicomputer with 32K words of 700-nsec random-access memory, a CRT terminal, operator's console, software system and desk costs $11,700 in quantities of 25 and $9,750 in quantities of 100.

The second configuration with the basic hardware/software combination plus 10M-byte cartridge disk and floppy disk add-on modules costs $13,200 and $11,000 in quantities of 25 and 100, respectively. CA is located at 18651 Von Karman, Irvine, Calif. 92713.

Megamini Gets Control Store

OCEANPORT, N.J. — Users of the Interdata 8/32 Megamini can reportedly boost the capabilities of their systems with a 2K-byte writable control store introduced here recently by Perkin-Elmer Corp.'s Interdata division.

Equipped with four times more control memory than its predecessor, the control store allows users to microcode in firmware all common, time-critical operations unique to their applications, an Interdata spokesman explained.

Typical users of the product, an extension of the 8/32's architecture, will include businesses that implement decimal arithmetic and character string instructions to speed operations, the official said.

The unit's software development package includes a microassembler, which lets users develop microprograms in the same way they would create assembly-level programs, and a support program; which provides debugging facilities, the spokesman added.

In the U.S., the unit costs $6,000 and is available from Interdata at 2 Crescent Place, Oceanport, N.J. 07757.

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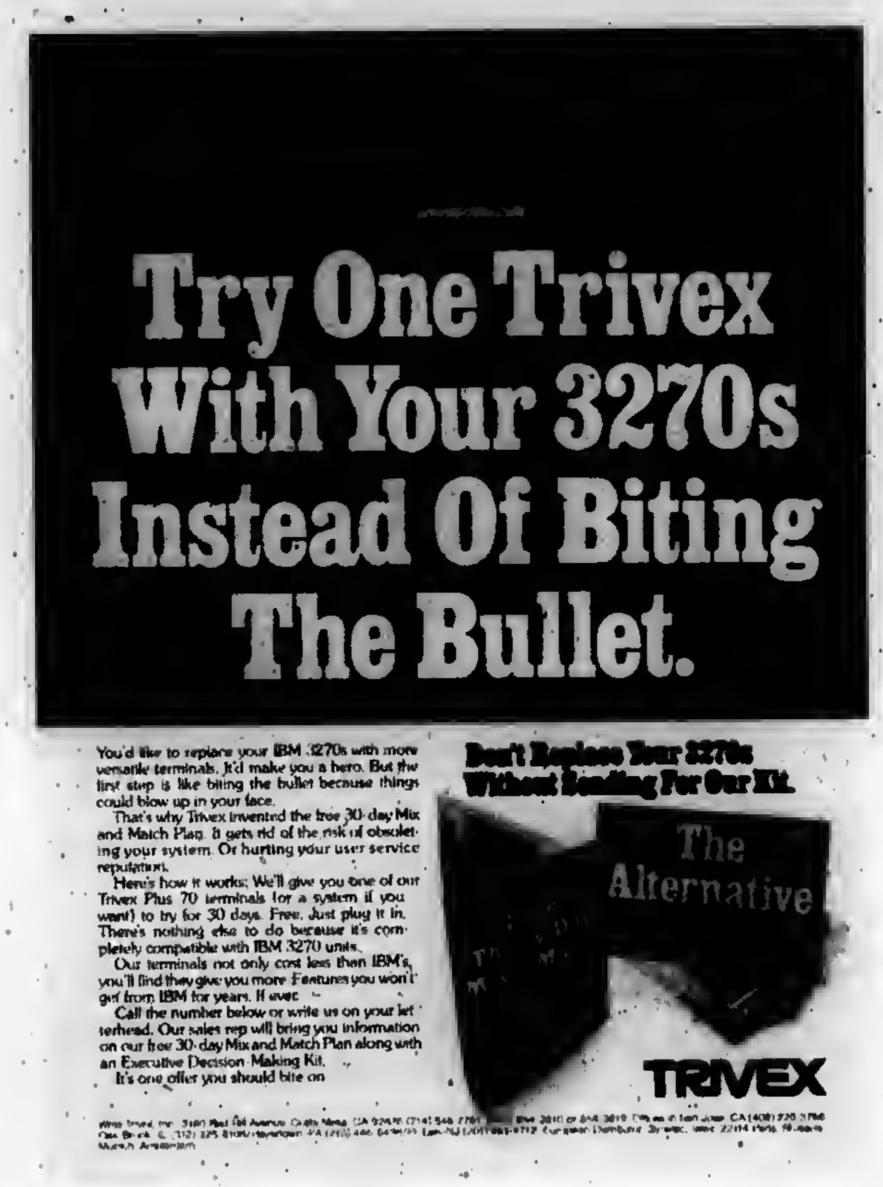

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Now you've got to admit biting on an offer like this is a lot better than biting the bullet. Just call the number below or write us on your letterhead. A salesman will bring you information on our Mix and Match Plan along with an Executive Decision-Making Kit, complete with operating instructions and a real bullet.

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Allows System Expansion

Mini Can Run Any Instruction Set

VAN NUYS, Calif. — A minicomputer that reportedly can be microprogrammed to run the instruction set of any known mini or micro has been introduced by Dynamic Sciences, Inc.

With T-1000, users can expand current systems or develop alternative ones while using existing software and interface designs, a company official said.

Bipolar construction and byte-slice architecture are said to allow the mini to perform 300,000 operation/sec and emulate 8-, 12-, 16- or 32-bit CPUs. The T-1000 holds 16 (16-bit) hardware registers and stores up to 65K words of directly addressable memory with 262K words of extended addressing available, a Dynamic Sciences spokesman said.

The mini operates from one 5V power supply and, depending on the model and option, consumes 8W to 16W, he added.

A binary, general-purpose computer, the T-1000 reportedly derives its emulation control from a variable-length microprogrammable memory.

Although contained on one printed circuit board, the basic system comes with various options that are available on additional boards, which can be specified in assorted sizes and customized to fit a user's individual mechanical requirements, the spokesman explained.

Options available with the system include additional memory, programmed I/O, various interfaces and a series of data option modules such as floating point and memory management, the official added.

Capable of executing microinstructions in 10 MHz, the T-1000 also comes with a direct memory access channel and is available in both military and commercial versions. Users can specify temperature ranges of -55° to +125°C and ruggedized boards, Dynamic Sciences said.

The T-1000 costs $1,000 from the firm at 7660 Gloria Ave., Van Nuys, Calif. 91406.

Inforex Cuts Price Of Series 5000s

BURLINGTON, Mass.— Inforex, Inc. has trimmed the prices of some its Series 5000 automated file handling systems, the company said.

With the revised prices, a configuration consisting of a minicomputer-based control unit, tape drive, two 1,920-character CRT work stations, 25M-byte disk drive unit and 30 char./sec printer leases for $1,700/mo (including maintenance) on a 42-month contract, company officials said.

System Produces Horoscopes, Biorhythms

(Continued from Page 63)

cording to Kuhlman. Microprocessor technology is conducive to designing specialized systems at low cost, he added.

Another reason for the switch was better maintenance capability so that the user wouldn't have to worry about service problems, Kuhlman noted. Because half the users move from location to location, the system is now portable and all the cabinets are separate for shipping, he added.

Computer Portraits switched from a Digital Equipment Corp. PDP-8 minicomputer to an 8080-based system. "Everything else we put together ourselves," he noted.

The program is stored in 12K bytes of programmable read-only memory and the data for the pictures is stored on 8K bytes of random-access memory. The system also uses a 300 line/-min Printronix, Inc. printer, a disk unit and a Microterm, Inc. keyboard video terminal.

Astrological Charts

The system has various other features including a horoscope capability, which, after a customer gives his name and birthdate, prints a full-page chart for the current month including the customer's sun and moon sign interactions. The horoscope information is stored on a 5-in. floppy disk with one month's information including 144 sun/moon combinations and 60 weekly printouts.

The information is changed and updated with each weekly and monthly cycle so that the charts are not "canned," according to Kuhlman, who noted that the horoscope information is provided by professional charters.

The biorhythm feature works much the same way. The customer gives the operator his name, birthdate and biorhythm start date, and the system prints a 60-day biorhythm chart including emotional, physical, intellectual cycles and critical days.

When a customer chooses the days-of-your-life feature, he gives the operator his name and birthdate, and the system indicates how many days the customer has been alive and how many days he has spent eating, sleeping, watching TV, playing, relaxing and attending school.

The system also indicates the customer's day of birth, sunsign, birthstone and birth flower and tells what day of the 20th century the customer was born and how old he will be in the year 2000.

The information is obtained using mathematical equations and algorithms based on the customer's age.

Facial Analysis

Facial analysis is performed when the system makes a digitized portrait of the customer's face, which is then "frozen" on a video screen. The system analyzes the digitized picture and scans it step by step to darken and lighten each facial feature.

The system scans the different densities and categorizes each facial area according to the personality trait with which it is associated. Each trait has a specific location on the face, according to some students of facial analysis, and the computer based on the various shading densities, determines if the customer is negative or positive in each trait.

Traits range, for example, from extremely aggressive to extremely passive or from extremely self-controlled to extremely emotional.

The handwriting analysis is performed when a customer signs a computer card for insertion into the system. The equipment scans, digitizes, stores and analyzes the signature as it analyzes the subject's face.

"The system has a lot of flash and we get all sorts of 'oohs' and 'ahs' from the audience," Hendrix said. "Some are skeptical about the horoscope part, but they watch how it works anyway even if they don't try it."

The system's $29,750 cost includes installation and training and is available from Computer Portraits, Inc., Suite J, 2129 Hacienda Way, Sacramento, Calif. 95825.

Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4½ pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process . . . including section-by-section check-lists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. $65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add $3.90. For outside USA, U.S. $76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

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Mini Cuts Furniture Firm's Delinquent Charges

LOS ANGELES — A minicomputer with software from a systems house is helping a decorating firm here keep closer accounts of its customers and sales productivity.

The system at the Bellflower and Fullerton, Calif., branches of Thompson Furniture Co. has been used to establish revolving charge accounts and automate the payables and receivables part of the business.

As a result, delinquent accounts have been reduced from 5% of receivables to less than 2.5%. Contract paperwork that required more than four full-time employees now requires only two part-time employees, allowing reassignment of personnel to other office tasks, the firm said.

"We had been thinking of converting from conditional sales contracts to revolving charge accounts for a number of years because the former were so cumbersome and time-consuming," John F. Thompson, treasurer, said.

"Since we handle a large number of complete decorating jobs, our customers often add items to their original orders. This required us to write multiple add-on contracts."

As sales volume increased, the corresponding volume of handwriting and typwriting grew to the extent that it took up to three weeks after a sale to produce a payment card — blocking cash flow, he added.

Thompson Furniture's boost in accounting management efficiency, according to Thompson, is the result of a software package developed by Commercial Computer Systems, Inc. of Long Beach, Calif. and a Digital Equipment Corp. Datasystem 310 minicomputer.

With this system, more than 1,500 revolving charge accounts are maintained. Maintenance includes storage of all sales ticket information, payments, finance charge credits and merchandise credits for both new and established accounts. Statements are printed by DEC's 160 char./sec line printer.

"Each statement clearly depicts the account number, new balance, billing data, purchases and credits by transaction data and sales ticket number and by store and department," Paul Gysen, office manager, said.

"In addition, finance charges and finance payment history are included." Point-of-sale entry information via a DEC CRT terminal is also provided.

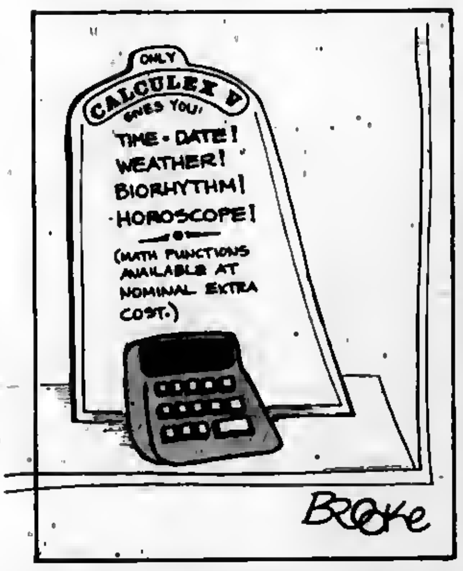
Report Production

"A valuable by-product of our revolving charge system is the variety of reports that are now generated on demand," Thompson stated. "These include a daily report listing sales, payments, finance charges and the preceding day's merchandise credits."

Month-to-date sales recaps, aging reports on overdue accounts delinquent longer than 60 or 90 days and a customer status report are issued weekly.

"Our weekly reports that list dollar amounts and sales quantities per salesperson are an important aid in gauging overall sales progress as well as product and pricing trends," according to William Jolly, a vice-president.

Before the firm obtained the system, the purchase journal was closed by hand. Now, as each invoice is entered, it is identified with one of 18 account numbers and applied to the appropriate account during journal listing.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The Model 1200 also cuts down on host computer loading by automatically setting modified data "tags," whenever a field is updated, so the host computer can request only modified fields, and skip thousands of needless compare operations.

To further lighten the load on the host computer, the Model 1200 has programmable send keys that let the program regulate the amount of data returned to the computer as terminal loading varies.

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Offers Double-Entry Bookkeeping

Business System Backs Accounting Tasks

ORANGE, Calif. — Computer Products of America has introduced a microprocessor-based business system designed to handle basic accounting as well as word processing functions.

The basic Abacus I system includes a Z80 microprocessor with 24K bytes of memory that is expandable to 64K bytes. Additional hardware includes a North Star Computers, Inc. minifloppy disk system, a CRT board and monitor, a keyboard and a 90 char./sec dot matrix printer.

Functions performed by the system include general ledger accounting, accounts receivable, accounts payable, inventory, payroll, mailing lists, data entry, sorting and file management, according to a spokesman. A character-oriented word processing system is available as an option.

The Abacus I also features an interactive double-entry bookkeeping system in which receivables decrease book inventory, payables increase inventory and general ledger accounts are updated automatically with accounting controls, the firm claimed. There are approximately 51 business programs included in the software package.

The inventory control function of the software permits the compiling of status reports, product listings, on-line order entry, invoices, invoice register, purchase orders and purchase order registration, the spokesman said.

The price of the system, including software, is $5,995. Computer Products is at 633 W. Katella Ave., Orange, Calif. 92667.

The Abacus 1 combines accounting and word processing functions.

Sol System Has Floppy Quartet

PLEASANTON, Calif. — Processor Technology Corp. is offering a microcomputer system containing four floppy disk drives with a total capacity of 1.5M bytes and 50K words of random-access memory (RAM).

The Sol System IV incorporates the firm's Sol-20 MPU, a Helios II Model 4 disk memory system, extended disk Basic, a CRT and system documentation, according to a spokesman.

The extended Basic includes string and file functions, timed input, complete matrix algebra, base 10 and rational logarithms, trigonometric functions and exponential numbers, the firm stated. Disk Fortran and Pilot are available as language options.

The system's CRT can be addressed randomly to any position on the screen; the operating system offers editors, assemblers and device-independent and random-indexed files, the firm noted.

Functions of the PTDOS disk operating system include editors, assembler, device-independent files and random indexed files.

Assembled and tested, the system sells for $7,995 from Processor Technology at 7100 Johnson Industrial Drive, Pleasanton, Calif. 94566.

Compucolor System Features 16K ROM, Eight-Color Display

NORCROSS, Ga. — Compucolor Corp. has unveiled a personal computer system that includes an eight-color CRT, keyboard and up to 16K of read-only memory (ROM).

The Compucolor II contains an 8080A MPU with memory sockets for 12K bytes of addititional electrically programmable read-only memory (Eprom) or ROM. Also included with the system are 4K bytes of random access memory (RAM) for user workspace and 4K bytes for screen refresh.

The system was built for 512 ports, with 25 ports implemented into the standard unit. An RS-232 serial asynchronous channel is integrated into the unit for optional printer or modem peripherals.

Editing functions include page/roll mode, erase line, erase page, tab, caps lock, MPU reset and color selection. The system uses the Disk Basic 8001 language interpreter with 27 statement types.

The software also contains 18 mathematical functions, nine string functions and 11 disk commands, a spokesman noted.

The minidisk drive, built into the system, features an average access time of 40 msec and a transfer rate of 76.8k bit/sec, the spokesman said.

The CRT display accommodates 64 characters in 16 lines and is expandable to 32 lines and graphics of 128 by 128, including vector-generating software.

Preprogrammed diskette albums available from the firm for use with the system include: "One-Armed Bandit," a loan and repayment schedule, engineering applications, biorythms, "Othello" and "Star Trek."

The Compucolor II is priced from $1,395 to $1,995 from the firm at P.O. Box 569, Norcross, Ga. 30091.

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Micro Bytes

Controller Formatter Introduced by Xcomp

SAN DIEGO — A hard disk controller formatter designed for 3M-, 6M, 12M- and 24M-byte disk drives has been introduced by Xcomp, Inc.

The DCF10 conforms to disk drives using the IBM 2315 or 5440 removable cartridge and up to three fixed platters, according to a spokesman. The unit may also be used with fixed-only disk drives, he added.

The formatter can be integrated into a microcomputer system by means of a universal 8-bit MPU interface; its overlapping seek/restore operations are accommodated on up to four different drives, the firm said.

The formatter is priced at $1,260 in quantities of 100 from 7571 Convoy Court, San Diego, Calif. 93111.

Module From Wintek Features Four Functions

LAFAYETTE, Ind. — A counter/-timer module introduced by the Wintek Corp. can perform as a frequency counter, free-running timer, period measurement device and event counter, the vendor said.

The module can measure frequencies up to 30 MHz, periods from 2^{-15} to 2^{24} sec and elpased time of up to 100 days, all with an accuracy of .001%, the company claimed.

The module, priced at $149, is available from Wintek at 902 N. 9th St., Lafayette, Ind. 47904.

In 32K- and 64K-Byte Sizes

Intel Brings Out 'Edge-Enabled' ROMs

SANTA CLARA, Calif.— Intel Corp. has announced two "edge-enabled" read-only memories (ROM) that operate at a maximum access time of 300 nsec and are TTL-compatible on all inputs and outputs, according to a spokesman.

The 32K-byte Model 2332 and 64K-byte Model 2364 feature a separate output enable function to eliminate bus contention with multiplexed bus structures, the firm said. Both contain static memory cells and clocked peripheral circuitry which powers up the input circuitry for access.

Other operations are timed by internal circuitry and by an output enable command signal that activates the data output buffers.

The devices have on-chip address latches that are activated within 50 nsec after the chip enable input becomes true, the spokesman said. Thereafter, addresses reportedly can vary without affecting the data cycle in progress.

The models 2332 and 2364 are interchangeable with 8K- and 16K-bit erasable programmable read-only memories (Eprom), allowing storage densities to be upgraded from 8K to 64K without system design changes, the firm explained. The interchangeability is provided by independent chip enable and output enable inputs and the on-chip address latches.

The 32K Model 2332, in a 24-pin plastic package, costs $27 in quantities of 250 while the 64K Model 2364 in a 28-pin plastic package sells for $53.50 in similar quantities. Both ROMs are available in ceramic packages for $32.50 and $67.25, respectively, from Intel, 3065 Bowers Ave., Santa Clara, Calif. 95051.

CRT Interface Board Built For Ohio Scientific Users

AURORA, Ohio — A CRT interface from Ohio Scientific, Inc. is said to feature a 32-row by 64-column display of the standard 64-character Ascii font for users of the firm's Challenger IIP microcomputer.

The Model 540 board includes programmable formatting of the CRT for 32-row by 32-column or 32-row by 64-column formats, a spokesman said. The 32 by 32 mode is useful for animations since it provides square character cells, the firm noted.

The board also features a keyboard port that can be used with a standard Ascii keyboard or the firm's programmable keyboard. The unit can optionally support a graphics character generator that features lowercase and approximately 170 special characters for plotting and gaming.

The programmable keyboard has an auto repeat function on all characters and features up to five levels of shifting to allow single keystroke commands and direct single keystroke graphics. The keyboard also has provisions for character editing and supports formats for video games, the firm said.

The Model 540 sells for $249; the graphics character generator costs $29 from the company at 1333 S. Chillicothe, Aurora, Ohio 44202.

Packages Back Business Jobs

LITTLE ROCK, Ark. — Engram Associates, Inc. has introduced two business software systems coded in Fortran and designed to operate on 8080-based MPUs.

The first, a general ledger package, contains more than 20 programs and allows the inclusion of up to 200 different accounts, a spokesman said.

The second package, a payroll program, prints checks, calculates multistate taxes and handles multiple pay periods, the spokesman stated.

The packages are priced at $775 each from the firm at P.O. Box 9885, Little Rock, Ark. 72219.

W

WAITING LIST — Refers to a procedure for organizing and controlling the data of unprocessed operational programs. These liens are ordinarily maintained by the control program. Synonymous with queue.

WAIT TIME — The time interval during which a processing unit is waiting for information to be retrieved from a serial access file or to be located by a search.

WORD — A group of characters occupying one storage location in a computer. It is treated by the computer circuits as an entity, by the control unit as an instruction and by the arithmetic unit as a quantity.

X

XEROGRAPHIC PRINTER — Refers to a page printer in which the character pattern is set for a full page before printing, using nonchemical photographic process in which light discharges a charged dielectric surface.

Z

ZERO BIT — The two high-order bits of the program counter are labeled the Z (zero) and L (link) bits. Typically the Z bit will be set to 1 whenever an operation results in the accumulator bits all being clean (accumulator contains zero value); the Z bit will be zero otherwise.

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc. 207 Kenyon Road, Champagne, Ill. 61820

COMPUTERWORLD

P&T Links S-100 Bus Users With IEEE 488 Interfaces

GOLETA, Calif. — Pickles & Trout (P&T) has unveiled an interface board that reportedly allows users of S-100 bus microcomputers to interface their units to instruments and peripherals operating on the IEEE 488 digital interface for programmable instrumentation.

The P&T-488 can be operated as an interrupt-driven or polled device and can be configured as a controller, allowing the MPU to define I/O devices, clear interfaces and remotely control instruments; as a transmitter, allowing the MPU to send out data on the bus; and as a receiver, permitting the MPU to input data from the bus, the firm said.

The P&T-488 appears as four read/-write registers to the S-100 host machine. These registers permit the microcomputer to manipulate the data, hand shake and manage lines of the 488 bus, the firm noted.

Hardware is provided to meet the standard for response to attention (ATN), parallel poll and interface clear (IFC). Interrupts from the board can also be disabled under software control, permitting interrupts from another device to be recognized even in a machine without a vectored interrupt capability, P&T said.

Software Package 1.0 is distributed with the interface on cassette tape. The software is supplied as source code in Intel Corp. mnemonics so the user can locate the software in the region of memory most suitable for the system involved.

The interface, software and cable assembly is priced at $250 in kit form or $325 assembled from P&T, P.O. Box 1206, Goleta, Calif. 93017.

Course Slated For Engineers

MADISON, Wis. — The University of Wisconsin Extension's Department of Engineering and Applied Science will present a four-day course on microprocessors here beginning Aug. 29.

"Understanding Microprocessors and Their Applications" is intended for design engineers and engineering managers associated with manufacturing firms. The course will cover the basics of microprocessor design as well as the processor's capabilities, limitations and economic feasibility, a spokesman said.

The program will discuss the engineering skills necessary for machine implementation, the capital costs needed and the microprocessor's role in the manufacturing process.

Registration fee for the seminar is $390. Information on the course and specific program content can be obtained from the University at 432 N. Lake St., Madison, Wis. 53706.

S-100 Bus Micros Get Communications Unit

CHURCH FALLS, Va. — International Data Systems, Inc. has introduced its synchronous/asynchronous interface for S-100 bus microcomputers.

The 88-SAI reportedly allows the transmission rate, word size, parity and number of stop bits to be selected completely under software control. Also under software control is mode selection and functions associated with synchronous communications such as the number of synchronous characters, a spokesman claimed.

The 88-SAI is compatible with RS-232 interfaces, the spokesman said, noting provisions have been made to interface to nonstandard devices requiring various signal or handshake lines to be inverted.

The board is available in kit form for $199 or $299 assembled and tested with a limited warranty from the firm at Suite 200, 400 North Washington St., Falls Church, Va. 22046.

Motorolas Gain 'Personality'

CUPERTINO, Calif. — A "personality" board used in conjunction with a systems analyzer, both developed by Millennium Systems, Inc., enables users to perform hardware/software integration, functional testing and fault diagnostics on systems employing Motorola Semiconductor Products, Inc. microprocessors.

The Microsystem Analyzer and EM6800 board are programmed in the same language as the system under test and its diagnostics provide pulse, interval and frequency measurements as well as transition and pulse counting.

The analyzer incorporates in-circuit emulators and does not require test points or data generation logic to be built into the user's system, according to a spokesman.

Application areas for the unit include laboratory development, production testing, repair depot and field service of microprocessor-based systems or products, Millennium said.

In field maintenance applications, the unit can be used to analyze printed wiring boards in the product under test, enabling technicians to isolate and remote only the board requiring repair, the firm said.

The Microsystem Analyzer costs $1,495 in single quantities; the personality card costs an additional $895 from Millennium at 19020 Pruneridge Ave., Cupertino, Calif. 95104.

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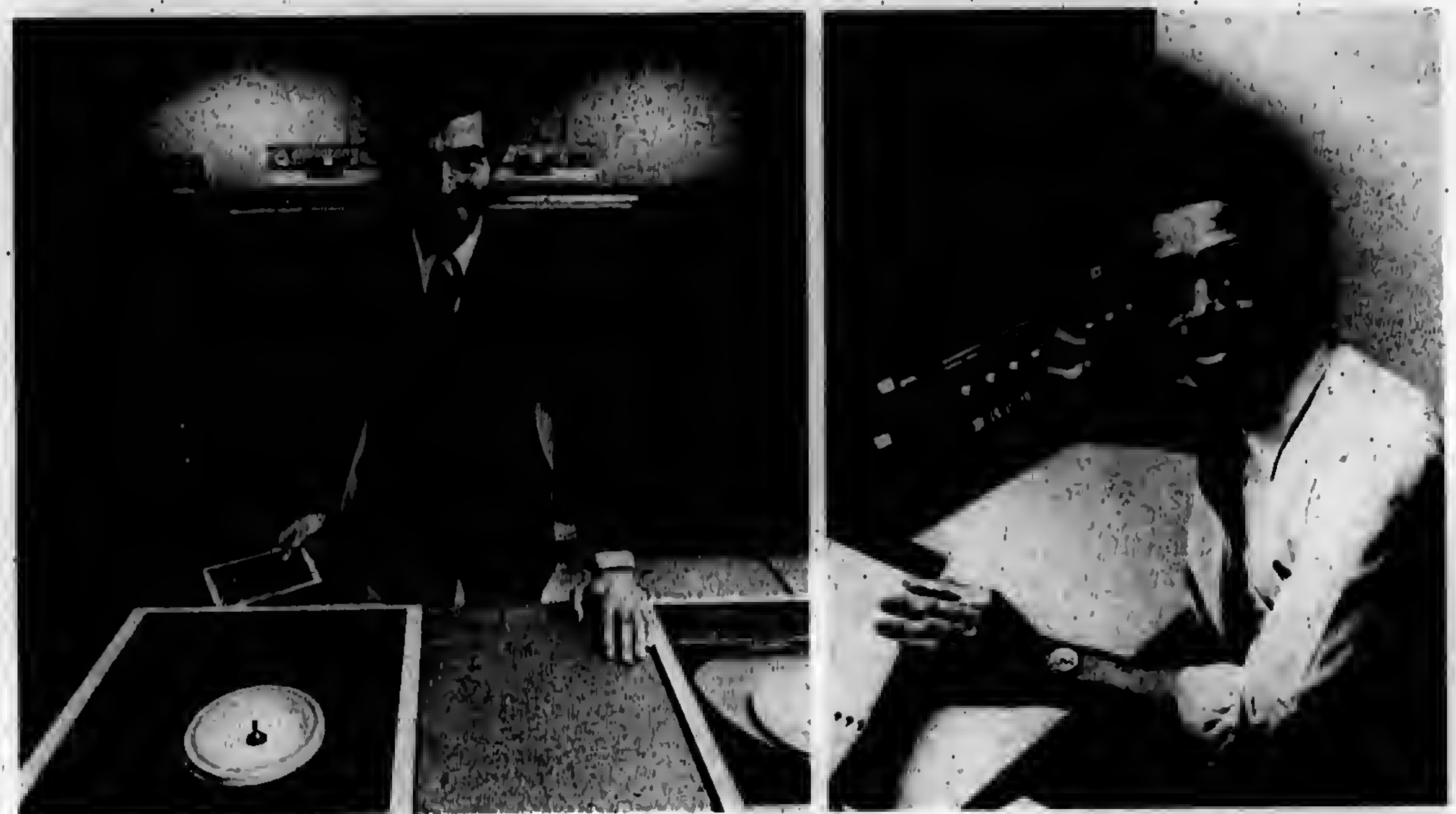

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As Recession Continues

Plug-Compatibles on Upswing in Japan

By Marcia Blumenthal
CW Staff

TOKYO — As a prolonged recession continues here, a growing cost-consciousness among Japanese users is resulting in a windfall for plug-compatible equipment manufacturers, according to *EDP/Japan Report* (EDP/JR), a publication of International Data Corp.

Until recently, users have tended to choose systems based on the manufacturer's reputation and not on machine price or performance, usually acquiring an entire system from one maker.

Single-vendor systems, particularly those of domestic manufacturers, offer advantages. Usually peripherals and software as well as consulting services are free when customers rent or purchase CPUs.

However, stringent economic conditions are beginning to change buying habits. EDP/JR's latest survey showed that 34 of 48 large-scale single-vendor system users plan to introduce plug-compatible equipment from other makers, especially if the equipment is better suited to company applications and operating conditions.

Daiwa Spinning Co., Ltd. of Osaka, one of the firms planning to use multiple vendors, currently has an IBM 370/115 and plans to transfer to a 370/115-II in May, but does not intend to upgrade its mainframe for the next four years.

Instead, Daiwa plans to install 10 Unicos 1600 floppy-based intelligent terminals (produced by Japan-based Nikkyo Denki) as replacements for IBM 3270 terminals at its local plants, resulting in a more efficient distributed processing system that will permit system enhancement at a 30% savings, according to EDP/JR.

Fujitsu, Hitachi Commitment

Another stimulus to multiple-vendor acceptance is the continued full-fledged commitment of industry leaders Fujitsu, Ltd. and Hitachi, Ltd. to manufacture plug-compatible mainframes and peripherals.

Fujitsu's M series opened up new dimensions in the use of computer systems in Japan. In addition, the company is developing systems software fully compatible with IBM but also covering additional unique functions, according to EDP/JR. The M series software, consisting of OSIV/F4, OSIV/X8 and OSIV/F2, assures easy conversion from IBM 370s, the company has claimed.

Recently, Hitachi announced an IBM 3800-type non-impact printer, the H8197, for use with IBM operating systems.

The products of some peripherals manufacturers are already widely used. Nippon Memorex was the first trading firm to introduce plug-compatible disks and tapes to the Japanese market. Primarily doing business with large companies, Nippon Memorex now finds that small- to medium-scale users are showing interest in plug-compatible peripherals.

According to an executive of Takachiho Trading Co., replacement of on-line terminal systems, including communications processors, presently being used in IBM networks is a primary company objective because the majority of on-line systems users in Japan have IBM machines as host CPUs.

This trend will receive further impetus as the number of IBM-compatible M series CPUs are installed.

Hitachi Struggling With JECC Developing Path to M Series

TOKYO — Hitachi, Ltd. continues to be a thorn in the side of the Japanese Electronic Computer Co. (JECC) and at the same time it is pursuing expansion into the mainframe and overseas market segments, according to International Data Corp.'s *EDP/Japan Report* (EDP/JR).

The new controversy centers around Hitachi's proposed revisions of JECC's paid-in capital ratio system, which Hitachi wants reduced to reflect the actual value of computers rented through JECC. Currently, the company holds 17.4% of the capital shares of JECC but rents only 3% of its equipment through JECC.

If Hitachi's paid-in capital is reduced, heavy financial burdens would be placed on those firms that greatly depend on JECC, and this in turn could result in reduced incentives for those firms to sell their equipment through JECC, accordingto EDP/JR.

Industry analysts point to Fujitsu Ltd.'s recent establishment of a leasing company, tentatively named Joho Kiki Lease Co., Ltd., as a trend toward deaffiliation with JECC. The new company, set up in cooperation with eight financial institutions, will concentrate on leasing minicomputers and small business systems that generate monthly rentals of less than $6,000.

Another conflict is the current system of liabilities-on-guarantee, which requires the six mainframe makers participating in JECC to assume joint responsibility for covering JECC's debts from commercial banks.

System Development

In addition to its struggles with JECC, Hitachi is developing new systems to ease the migration from its Hitac 8000 series to the M series computers.

Although the switch has proceeded smoothly for the medium- to large-scale systems, the low end models of the 800 series computers — Hitac 8120 and 8250, both available since 1972 — are considered too far from the M series migration path in both price and performance.

To overcome this difficulty, Hitachi recently announced the Hitac 1-330 models 5 and 6 and the Hitac L-340, claiming they can be used as stand-alone "office computers" as well as on-line terminal systems.

Because the computers are stand-alone, design efforts were centered on emulation and conversion functions so that the users of the Hitac 8150 and 8250 can convert with a minimum of effort, EDP/JR reported.

In a surprising move, Hitachi announced its plan to introduce a super large-scale computer with the code name "L-7" by the middle of this year. This tactic, EDP/JR stated, astounded officials of the Ministry of International Trade and Industry and Fujitsu, because Hitachi had once declared it had no intention of entering this market.

"Though the markets for super-large-scale computers are rather limited in this country," an Hitachi official said, "such machines can stand as a symbol of a mainframe maker and thus establish a strong corporate image."

In addition, Hitachi is attempting to strengthen its position in overseas markets, according to EDP/JR. It recently delivered M-160 and M-170 models to mainland China and shipped six AS/6 processors to Itel Corp. during the first quarter of 1978.

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Connector Costs to Drop

General Use of Fiber Optics Predicted in 1980s

NEW YORK — Fiber optic systems will be in general use for wide bandwidth internal distribution of information, graphics material and electronic mail by 1982, according to an analysis published here by Quantum Science Corp.

Currently, the major limiting factor affecting adoption of fiber optics is the high cost of connectors, particularly those for multipoint distribution of information in offices, Quantum said. However, as the technology for connectors and distribution advances, the cost is expected to drop dramatically. Plastic connectors will supersede precision metal connectors by 1985 and will cost about 30 cents per connector. Even the cost of metal connectors will plunge from the current $10 per connector to as low as $2 per connector, Quantum forecast.

Fiber optic light guides or cables, a key element in fiber optic systems, are already well developed and available at reasonable costs.

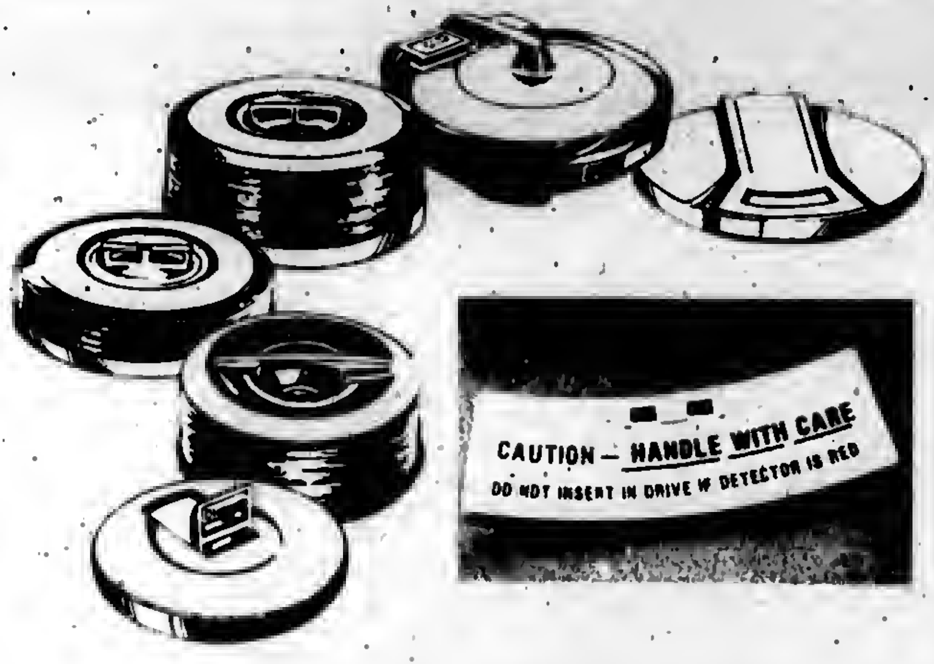
Fiber optic technologies offer several advantages, Quantum pointed out. The smaller size and weight of fiber optic systems allows larger bandwidth, easier installation in existing ducts and significantly lighter weight, which is particularly important in military applications.

Also cited in the report as attractive features of fiber optic systems are the deletion of electromagnetic noise and greater security as well as greater information capacity and reduction of safety hazards in explosive environments because of spark elimination.

Beginning in 1979, telephone companies will implement point-to-point voice and data transmission using fiber optic links, Quantum said. Quantum's predictions for the 1980s also included local television distribution and use of fiber optics in business offices by 1981.

Switched video capability for use in business offices for video conferencesand remote information storage/retrieval systems will be economically feasible, the research firm said.

Glass fibers will be the major means of communication, with plastic fibers limited to short distance systems such as distribution within aircraft.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Supershorts

Memorex Corp. has elevated its Communications Division to group status, recognizing the need for expansion in the field of communications products. The new Communications Group is in charge of the engineering, manufacturing and support of the communications product line and will be headed by Richard C. Allen, group vice-president and general manager.

— — —

Etatech, Inc. of Placentia, Calif. has signed a licensing agreement with Burroughs Corp. to allow Burroughs to use Etatech's Univerter design in its manufacture of switching power supplies. The Univerter is a PWM inverter that employs one switch transistor. Control is achieved by a single DC voltage.

— — —

In a special presentation on the plant floor witnessed by the production staff and management, Lee Falco, general manager of Lear Siegler, Inc.'s Data Products Group, delivered the company's 50,000th video display terminal — an ADM-3A dumb terminal — to Bruce Woodall, chief executive officer of Teleprint GMBH, Frankfurt, the largest independent distributor of computers and computer peripheral hardware in Germany, Belgium and Holland.

— — —

NCR Corp. and Quantor Corp. have announced an agreement under which NCR will service and maintain equipment sold by Quantor. It follows earlier agreements under which NCR has serviced Quantor computer output microfilm (COM) recorders and OCM duplicators for the past six years.

— — —

Mini-Computer Systems, Inc. has executed a long-term marketing agreement with Marubeni Electronics, Ltd. of Tokyo. Under this agreement, Marubeni will have the exclusive rights to market Mini-Computers' Micos systems throughout Japan.

— — —

RCA Corp. and Intel Corp. have signed a nonexclusive agreement whereby RCA will design high-density silicone-on-sapphire (SOS) versions of the Intel 8085 and 8048 microprocessors. Intel will receive information which will allow it to manufacture complementary metal oxide (CMOS) SOS versions of these components.

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Service Held Critical Factor for New Vendors

LOS ANGELES — Many computer companies with brilliant new ideas will eventually go out of business for lack of adequate field service, the president of the Association of Field Service Managers has warned.

"It is almost impossible for a small computer company to position a repairman within 20 minutes of each customer and not go broke," according to George Harmon, who is also vice-president and general manager of Pertec Computer Corp.'s Service Division, which has 400 employees in nearly 90 locations.

As an example, Harmon said Pertec's Service Division recently signed a third-party maintenance contract with a small manufacturer which had billings of $8 million a year but losses of $20,000 a month on its service network.

A company cannot control where its sales will originate. Therefore, in servicing accounts, the manufacturer is torn between extensive travel budgets or the need to place several service representatives within easy access to all of its customers, Harmon noted.

Whatever option the company chooses, costs will escalate quickly, he said.

Third-party maintenance is one of the solutions to this dilemma, Harmon suggested, because it enables the manufacturer to assign service responsibility to a company that has many offices already established and can benefit from economies of scale.

Another service alternative is confining sales to regions that can be reached by service personnel within an hour, he observed.

Regardless of the service alternative a company selects, Harmon stressed, it must recognize service is the major factor in product costing — more expensive than manufacturing, marketing, quality control and even research and development.

Contracts

Honeywell Information Systems, Inc. has been awarded a $7 million, four-year contract by the Army for the U.S. Corps of Engineers for five Level 66/20 systems, maintenance, technical support and operating software.

Trivex, Inc. has signed a contract to supply IBM 3270-compatible controllers to Memorex Corp. over the next year. The initial release is $1.5 million; Memorex has options on additional units that would increase the total order to over $6 million.

Modular Computer Systems, Inc. has contracted with Hazeltine Corp. for 1,000 CRT terminals in the Hazeltine 1500 series to be supplied during the next two years.

Bolt, Beranek and Newman, Inc. has received a three-year contract from the National Institutes of Health to continue development of the Prophet system, a computer-based information-handling system used in cancer research and other applications.

American National Bank and Trust Co. of St. Paul, Minn., has signed a five-year contract with National Sharedata Corp. to manage and operate American National's DP operations. The contract is valued at $6 million..

CMC Colleges Associated has awarded Quodata Corp.'s educational subsidiary, Educomp, a contract to design, provide and install an educational computer facility. Funds for the project were provided by the Hall Foundation and exceed $330,000. The system will provide services to the three colleges in the association: Coe, Cornell and Mt. Mercy.

First Computer Corp. has signed a $3.5 million contract with the Digital Equipment Corp. for its LSI-11/2 family of micros.

Optimum Systems, Inc. has been awarded a contract to support the Medicare operations of the Aetna Life and Casualty Co. with its Medicare B claims-processing system. The total value of the contract is more than $5 million.

Computer Devices, Inc. (CDI) has signed a three-year OEM contract for 3,000 printers with National Semiconductor Corp. In addition, CDI has received a 2,000-unit follow-on order from an English terminal manufacturer as well as two contracts totaling $500,000 for Miniterm terminals from Haggar Slacks and Steak & Ale.

General Automation, Inc. has received a contract valued at $1.4 million to supply all minicomputer hardware, software and engineering support to the Chinese Government Radio Administration, Taipei, Taiwan, Republic of China.

Optimum Systems, Inc. has been awarded a $2.5 million Medicare DP subcontract to provide full DP and support services to Blue Cross and Blue Shield of Minnesota for the State of Minnesota Part B Medicare operations.

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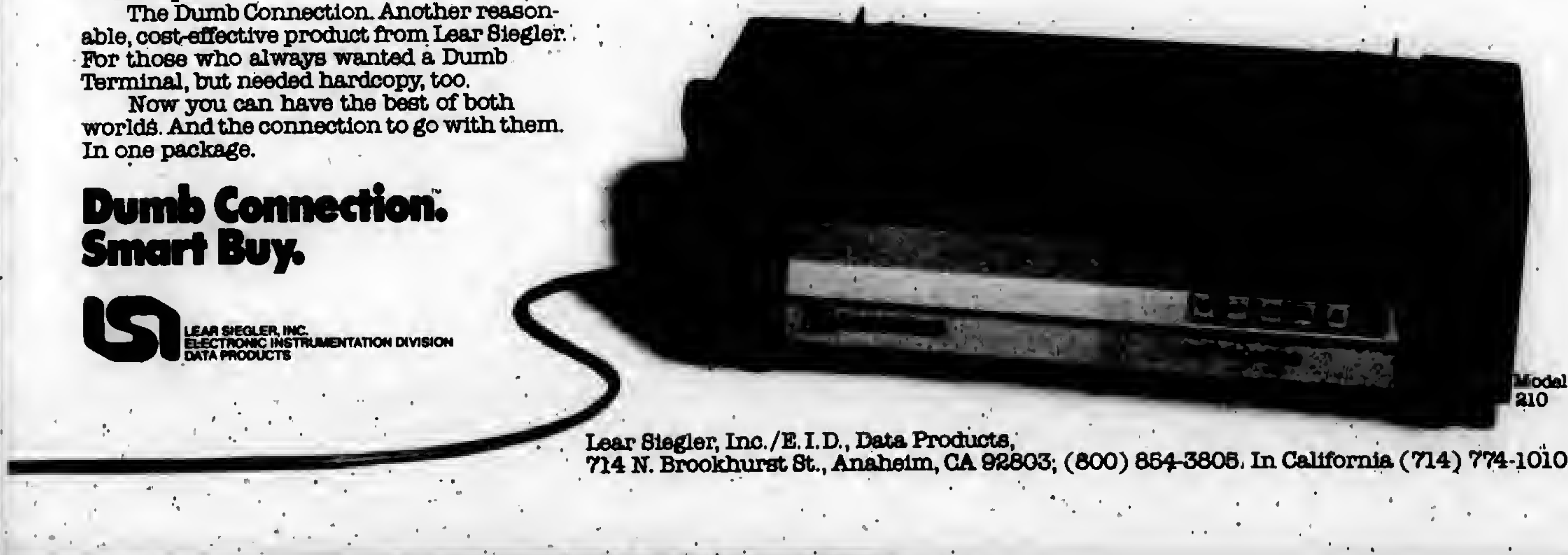

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CI Notes

Wangco Providing Drives for Heath

LOS ANGELES — The Perkin-Elmer Corp.'s Wangco Division will supply its Model 82 microfloppy diskette drives to Heath Co. for use in Heath's H-17 floppy disk subsystem.

The H-17, available in single- and dual-unit configurations, is an optional accessory for Heath's H-8 personal computer kit.

"The Model 82 is the only floppy drive with a lead screw positioning system, which, we feel, will prove to be faster and more reliable for our customers than the ordinary spiral cam," according to Tom Yeager, Heath's manager of computer engineering.

Yeager also pointed to storage capacity and the speed of the Wangco drive, which upon Heath's evaluation typically operated at 10 msec track-to-track access time, exceeding Wangco's specifications of 30 msec.

The personal computing market is expected to reach $240 million in sales during 1979.

HIS, Mitsubishi Agree On Joint Venture

MINNEAPOLIS, Minn. — Honeywell Informations Systems, Inc. and Mitsubishi Office Machinery Company, Ltd. have signed a memorandum of intent for the establishment of a jointly owned Japanese corporation.

The new company would acquire the sections of Mitsubishi distributing and servicing HIS computers and communications equipment.

Under the terms of the memorandum, HIS would own 80% and be responsible for the management of the new company, to be named Honeywell Information Systems (Japan), Inc. (HIS-Japan).

Subject to the approval of the Japanese government, which is anticipated within 120 days, HIS-Japan is expected to have paid-in capital of one billion yen at the beginning of operations.

Patent Action Brings Award to Racal-Milgo

KANSAS CITY, Kan. — Racal-Milgo, Inc. has been awarded approximately $3 million in a patent infringement action against United Business Communications, Inc., a subsidiary of United Telecommunications, Inc. (UTI).

In handing down the final decision, Senior Judge George Templar said, "In view of the defendant's willful and deliberate infringement and the unusual lengths to which the defendant went in copying Milgo's invention, this is an exceptional case.

"In such circumstances, Milgo is entitled to treble damages, costs, expenses and attorney's fees because defendant has knowingly, deliberately, willfully and wantonly infringed the patents."

The suit, initiated in 1971, involved three data communications patents.

UII will appeal the decision, a spokesman for the firm said.

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DECwriter III	2,895	275	145	99
DECprinter I	2,495	240	125	86
VT52 DECscope	1,695	162	85	59
VT55 DECgraphic CRT	2,695	260	135	94
ADM 3A CRT	875	84	45	30
ADDS Regent 100	1,325	126	67	46
TI 745 Portable	1,875	175	94	65
TI 765 Bubble Mem.	2,995	285	152	99
TI 810 RO Printer	1,895	181	97	66
Data Products 2230	7,900	725	395	275
QUME, Ltr. Qual. KSR	3,195	306	163	112
QUME, Ltr. Qual. RO	2,795	268	143	98
FlexiFile 21, Flpy. Disk	1,995	190	102	70

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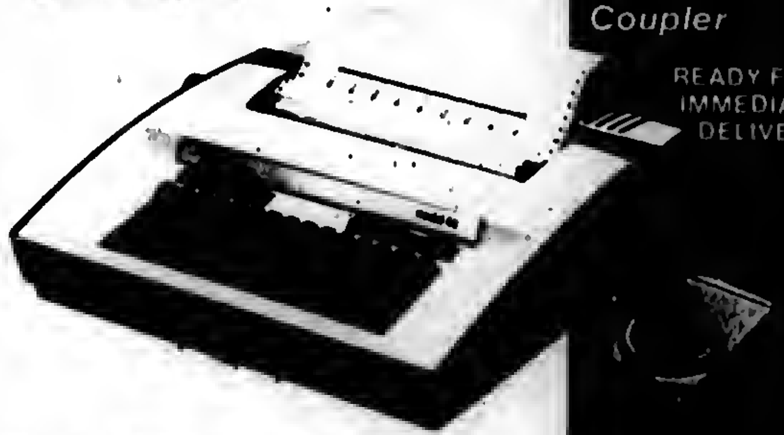

Orders & Installations

Eastern Airlines has become the first airline to order a Racal-Milgo, Inc. System 200 Network Management Center, part of an order that includes 300 24 LSI Mark II modems and 36 Model 96 multimode modems. The equipment will carry data in Eastern's System One airline reservation system.

Market Development Corp. of Hazelwood, Mo. and the University of San Francisco have purchased a Univac 90/60 system. United Airlines has ordered Univac's 1100/83 processor, valued at $8.2 million and a Univac 1100/11 has been ordered by the Board of Water and Light for the city of Lansing, Mich.

Galbraith and Green, Inc., which provides consulting, administration and actuarial services, has installed a Burroughs B6800 system at its home office in Salt Lake City, Utah, and is expanding its on-line terminal network in offices in seven states. The equipment installed is valued at $1.2 million. Additional peripherals, valued at $400,000, are on order.

Harris Bank of Chicago has ordered Bank Control System 90 from the Bunker Ramo Corp. The equipment will process both checking and savings transactions and is valued at approximately $500,000.

Rolled Steel Corp. of Skokie, Ill., has ordered a Honeywell Information Systems, Inc., Level 62 system to run sales history, distribution and financial management applicaitons. The system is valued at $126,000.

Irving Savings and Loan Association of Patterson, N.J. has ordered an on-line Financial Terminal System from Datasaab Systems, Inc. to handle teller and administration transactions.

Geo. W. Park Seed Co., Inc., a mail order house, has ordered a Honeywell Information Systems, Inc. Level 62 system to shorten the time between receiving orders and mailing seeds to customers and to help maintain accurate address lists for mailing catalogs.

Inter Systems, Inc. (ISI) has selected a Harris Corp. System 125 for use in its facility at Arlington, Va. It will be used to support existing contracts and to execute the company's proprietary software packages. ISI will also offer general-purpose time-sharing on the system.

P. Kaufman, Inc. of New York has ordered a 2903 system from International Computers, Ltd.

Eleven banks and holding companies have ordered new or expanded Insci computer-based personnel information systems during the past three months from Information Science, Inc.

General Electric Co.'s Engineering and Manufacturing Engineering, Corporate Production and Operating Services Staff has entered into a license agreement with Manufacturing Data Systems, Inc. (MDSI) to make available MDSI's Code system and software to GE facilities worldwide.

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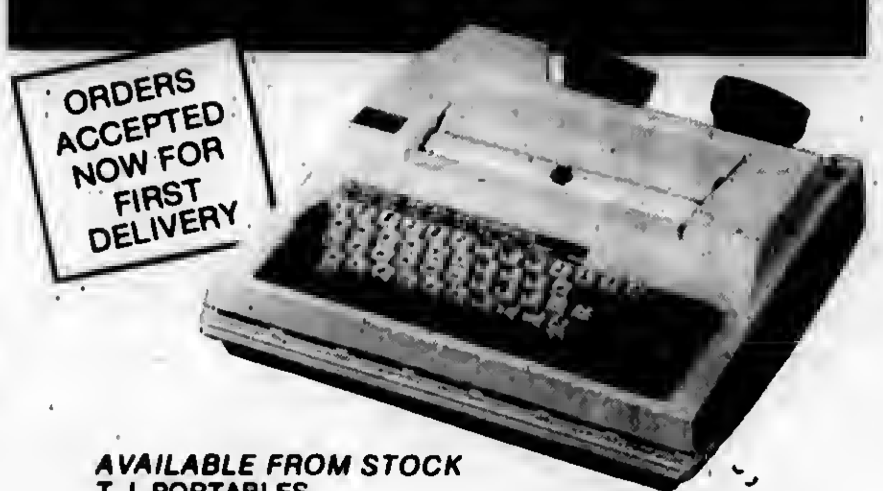

Hungarian Engineers Running 'Pics' Adaptation

Special to CW

BUDAPEST, Hungary — A Hungarian electrical engineering enterprise, Ganz Measuring Instruments (GMM) has become the first East European computer user to adapt IBM's Production and Inventory Control System (Pics) for use in a socialist environment.

The package, which has undergone considerable modification, is mainly run here on an IBM 370/145 under the aegis of the Central Office for Statistics. But part of the IBM data base has been transferred to GMM's in-house minicomputer, an R-10 from Videoton Computer, and updates are performed in parallel on both machines. More than 30 programs have been developed for the system by GMM's own software team and local manufacturer Videoton Computer, mainly in the fields of purchasing, inventory, payroll and personnel records.

GMM is best known for its production of electricity meters, which have been exported worldwide since the 1920s. Today, however, the company's product line encompasses more than 400 separate items spread across four factories, two in Budapest and two in the provinces.

The data base contains about 100,000 items in the engineering data file, 140,000 product structure list records, 90,000 items connected with manufacturing operations and 10,000 individual fixed assets. All are held on disk. Data base files can be interrogated by display terminals, either on the IBM machine or on the Videoton R-10.

The system is batch-processed on a monthly basis at present, although certain pilot modules are being run on a 10-day production control cycle. Longer term aims are to increase the real-time component of the system, possibly with a direct link between the R-10 and the IBM mainframe, and thus move to eventual daily production control runs.

"Our target is full file integration," Miklos Podmaniczky, GMM's computer manager, said. "All new subsystems are developed with due regard for earlier developments, but ideally we would like to have one input instead of two and we would like to eliminate redundancy in the data base organization."

GMM's Videoton R-10 mainframe is the largest single configuration of this model yet installed. It has a 64K-byte main memory backed by two 5M-byte disk drives and four magnetic tape decks made in East Germany.

The 132 line/min line printer is made by Videoton under license from Dataproducts Corp. Three Videoton display units are installed at remote manufacturing locations, communicating with the R-10 over 240 bit/sec lines. Data exchange with the 370/145, located 12 kilometers from the R-10, is by magnetic tape.

According to Podmaniczky, the GMM adaptation of Pics could prove valuable to other East European manufacturers with a broadly similar profile. "I could recommend the system to any manufacturing enterprise with several production units," he said.

Foreign Orders & Installations

Amagasaki Naniwa Credit Bank, headquartered in Amagasaki City, Hyogo Prefecture, Japan, has ordered a Univac 1100/82 system valued at approximately $10 million to improve customer services. The order was placed with Nippon Univac Kaisha, Ltd.

Simon Engineering Ltd. of Stockport, Cheshire, UK, has signed a contract for a large-scale Honeywell Information Systems, Inc. Level 66 system, seven Level 6 minicomputers and 50 display terminals valued at about $2 million.

***El Nacional*, a morning newspaper in Caracas, Venezuela, awarded Harris Corp.'s Composition Systems Division of Melbourne, Fla., a contract to install a Harris Model 2540 copy processing system and a Harris Model 2240 video layout system with two terminals.**

One of the first Digital Equipment Corp. VT 78 video data processor systems in England has been installed by Arbat Systems of New York and City of London Computer banking specialists. The system is being used by the Arbat staff for in-house training and customer demonstrations.

A Norwegian government agency, the Norwegian Medical Depot, has placed a $1.8 million order with Saab Univac Norge A/S for a Univac 90/80-2 system.

The Iran Housing Corp. of Teheran, Iran, has purchased six 75 KVA Model S systems from Computer Power Systems Corp. to power its Itel Corp. AS/5 installation.

Provincial Insurance Co. of England has installed Computer Automation Inc.'s Syfa network processing systems in its Kendal headquarters and a branch office in Leeds.

CII Honeywell Bull of France has been awarded a contract for a Series 60 system for the joint use of two hospital centers in Saudi Arabia. The Series 60 Model 66/10 will be used for administrative and medical applications at the Riyadh Military Hospital and the Al-Kharj Hospital.

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Shakeout Under Way

ATM Market Seen Not Fulfilling Early Promise

WALTHAM, Mass. — The disappointing installation rate of automated teller machines (ATM) is forcing major competitors to retrench and reconsider an industry that once promised to make ATMs as popular as pretzel vendors.

A shakeout foreshadowing major shifts in the industry is definitely under way, according to *Autotransaction Industry Report* (AT/IR), a publication of International Data Corp. (IDC) here.

Although predictions for 1977 ATM installations were 7,800 units, only 6,400 were actually installed. Impediments to industry performance were high prices, spotty vendor support, lack of reliability and consumer resistance, according to AT/IR.

In addition, legal and regulatory actions on both the state and federal levels have squelched electronic funds transfer (EFT) system development.

Some states require that remotely located ATMs be shared by all classes of financial institutions; other states prohibit stand-alone units, considering them branches and therefore in conflict with branching regulations, the publication pointed out.

Vendor Reactions

Docutel Corp., the industry leader with a 53% share of the ATM market, has delayed announcement of its Total Teller 2000 and laid off most of its marketing staff; its engineers were sent back to the drawing boards to design a machine that is cheaper, more reliable and more convenient for banker and customer alike, the report said.

NCR Corp. is feeling the effects of a lukewarm reception of its 2500 System; only 60 systems have been installed over its 18-month life span, AT/IR reported.

TRW, Inc. will acquire Mosler's 7.1% share of the ATM market by June 30, the report continued.

This all points to disappointing — but not catastrophic — performance, according to AT/IR, which predicted increasing growth by 1980.

Citing its reasons for optimism, AT/IR noted NCR, IBM and Incoterm Corp. have lowered prices and all offer units starting in the $13,000 range compared with previous price levels averaging $30,000.

Price reductions reflect a growing emphasis on indoor units, which require fewer security and antivandalism features, the newsletter observed.

The favorable reception of IBM's Model 3624 ($13,000 to $29,000) which, unlike other less expensive models, operates in both vestibule and through-the-wall environments may point to an upswing. According to AT/IR, IBM is the most successful new market entrant with an 8.6% market share.

Also, the escalation of building costs resulting in a $10,000 per teller station price tag may fuel the indoor installation market.

While EFT systems may cut into cash transactions, there will always be a vigorous demand for cash. AT/IR suggested financial institutions will increasingly adopt ATMs, at least for on-site use, as prices are lowered, building costs rise and regulatory agencies and the courts iron out branching and antitrust issues.

Earnings Reports

EMM
Three Monthe Ended April 1

	1978	1977
Shr Ernd	$.14	$.13
Revenue	30,632,000	28,364,000
Earninge	1,026,000	984,000

FOUR-PHASE SYSTEMS
Three Months Ended March 31

	1976	1977
Shr Ernd	$.60	$.58
Revenue	29,340,000	18,798,000
Tax Cred	.....	735,000
Eernings	2,582,000	2,334,000

HARRIS
Three Months Ended March 31

	1978	1977
Shr Ernd	$1.04	$.82
Revenue	216,112,000	189,949,000
Earnings	13,480,000	10,525,000
9 Mo Shr	2.87	2.15
Revenue	617,872,000	447,456,000
Earnings	36,890,000	27,572,000

HONEYWELL
Three Months Ended March 31

	1978	1977
Shr Ernd	$1.68	$1.47
Revenue	788,772,000	662,768,000
Tax Cred	1,603,000	3,980,000
Esrninge	35,376,000	30,658,000

ITEL
Three Months Ended Merch 31

	1978	1977
Shr Ernd	$.62	$.81
Revenue	123,600,000	76,600,000
Spec Cred	.....	a1,900,000
Earnings	7,400,000	5,500,000

a-Cumulative effect of en eccounting chenge.

COMDISCO
Three Months Ended Merch 31

	1978	1977
Shr Ernd	$.64	a$.46
Revenue	28,131,998	26,358,220
Earnings	892,644	722,957
8 Mo Shr	1.10	a.93
Revenue	56,288,847	65,259,168
Eernings	1,762,786	1,449,985

a-Adjusted to reflect 50% slock distribution in March 1978.

COMPUSERVE
Three Monihs Ended Merch 24

	1976	1977
Shr Ernd	$.11	$.30
Revenue	3,383,976	3,196,559
Earnings	120,291	341,890

OPF
Three Months Ended Feb. 26

	1976	a1977
Shr Ernd	$.44	$.03
Revenus	147,581,000	137,911,000
Tsx Cred	66,000	14,000
Earnings	1,865,000	126,000
9 Mo Shr	1.44	.74
Revenue	369,726,000	351,866,000
Tsx Cred	777,000	342,000
Earnings	8,060,000	3,067,000

a-Restated.

ELECTRONIC ASSOCIATES
Three Monthe Ended March 31

	1978	1977
Shr.Ernd	$.21	.....
Revenue	7,392,000	$5,683,000
Tsx Crsd	240,000	52,000
Earninge	574,000	(884,000)

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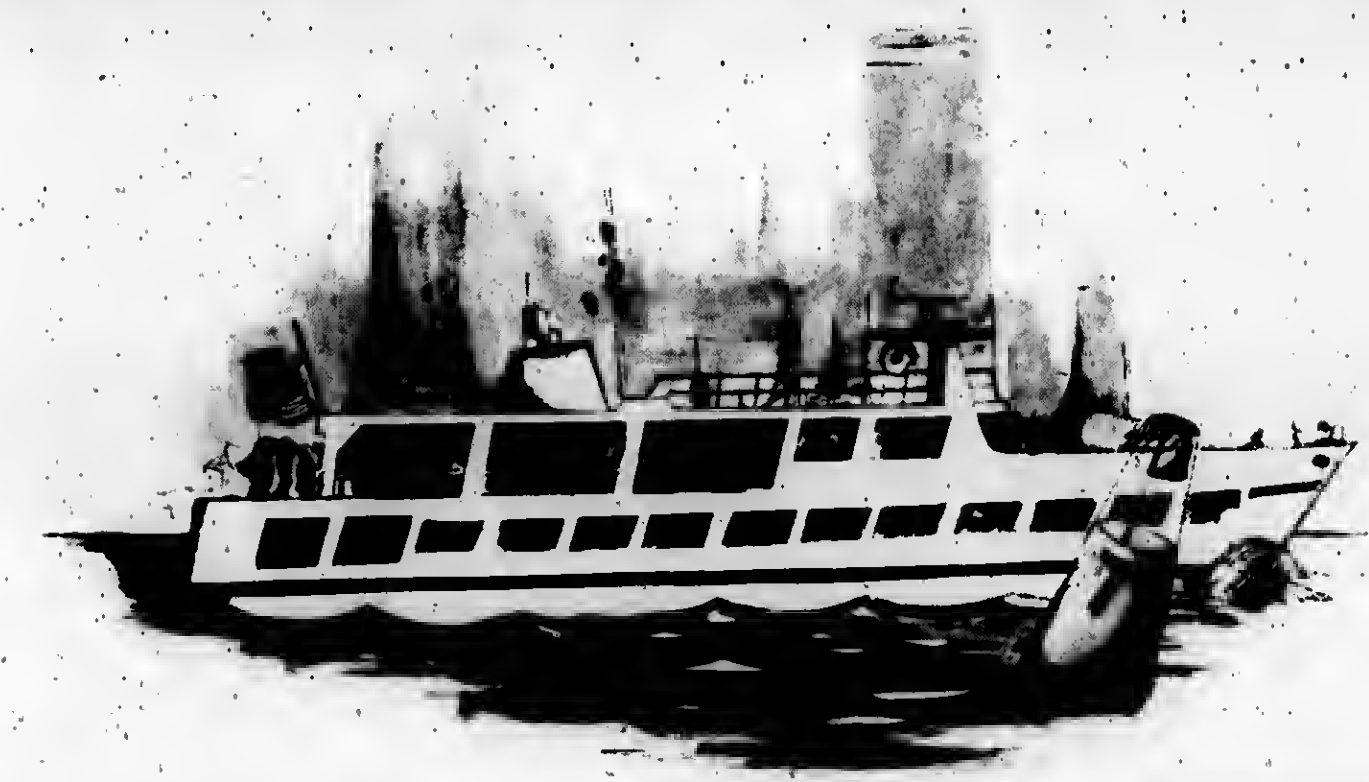

Cruise Boston Harbor with Us. If you're a talented engineering professional in Boston for Electro '78, join GTE Sylvania's Electronic Systems Group (ESG) for a Career Cruise of Boston Harbor Wednesday or Thursday, May 24 or 25. It's our way of introducing you to the many career opportunities in our world of communications.

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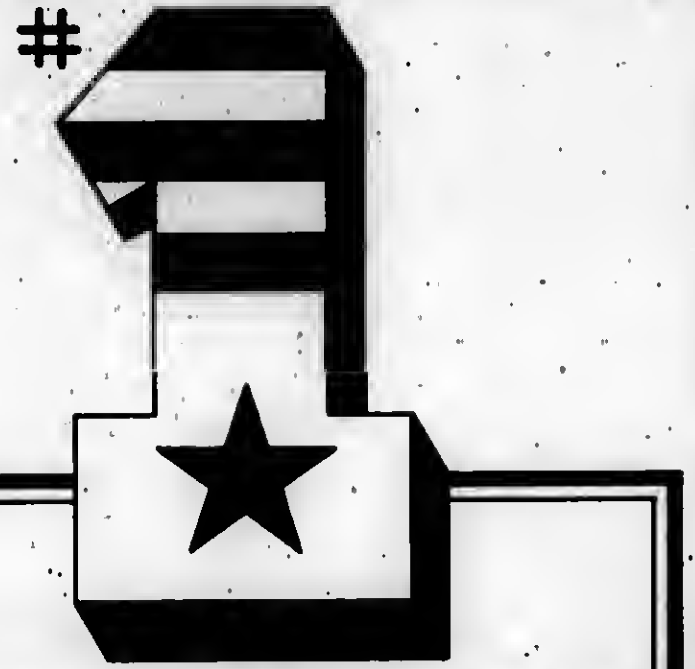

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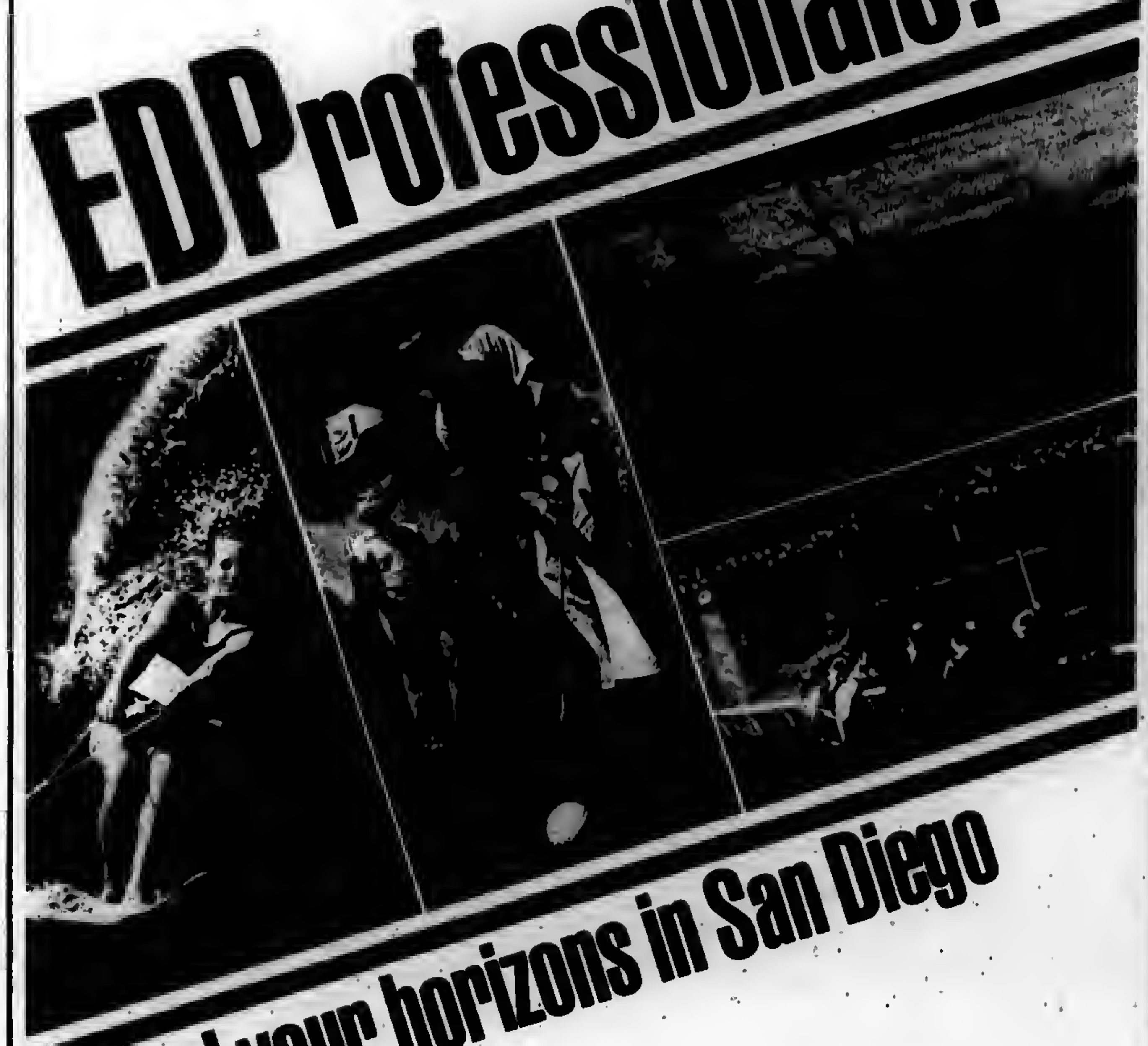

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Please rush your letter or resume on a strictly confidential basis to:

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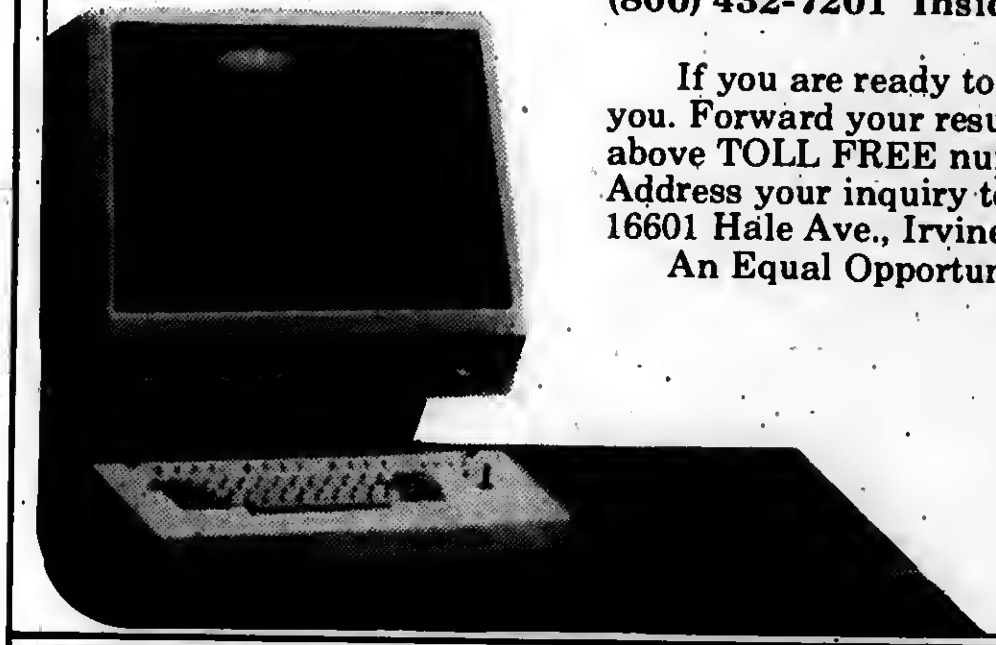

If you are ready to put your talents to work, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to Tod Sorensen, TEKTRONIX, INC., 16601 Hale Ave., Irvine, CA 92714.

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Three faculty teaching positions will be available beginning September, 1978 or January, 1979. One of these positions requires the teaching of applied Computer Science courses with a particular emphasis on Business Data Processing, the two others require teaching undergraduate Computer Science courses. All three positions are eligible to be on the tenure track.

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EDP Director

Gannet/West

P.O. Box 462
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Applicants must demonstrate the ability to confer with managers, scientists, engineers and graduate students in order to define business or scientific/engineering data processing problems, formulating statements of these problems and devising solutions. Requirements include a BS or MS degree in Science or Engineering, with a strong background in Mathematics and Statistics. Applicants should have 5-10 years computing background, including academic experience, with broad computer exposure in the areas of time sharing and batch. Experience in FORTRAN is required, PL/1 and some BAL desired. Salary open, and dependent upon qualifications and experience.

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Director of Personnel
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Above represent just a few of several active nationwide searches. All costs paid by hiring companies. Send resume in confidence, including current salary and geographic requirements, to Ron Spang (404) 393-0933), FOX-MORRIS PERSONNEL CONSULTANTS; 47 Perimeter Center East, N.E., Atlanta, GA 30346.

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Is needed in the Developmental and Special Services Group for the Educational Network in West Virginia. The responsibilities will include maintenance and distribution of PDP-11 systems software, consultation on DEC and IBM hardware/software, provision of seminars and documentation, analysis/design of applications, and some programming. Applicants should have at least three years experience providing similar services preferably in a mixed vendor network environment and should possess good oral and written communication skills. A college degree in an engineering, scientific, or computer discipline or equivalent education and experience is required. Apply by May 26 to Dick Bryan, WVNET 837 Chestnut Ridge Road, Morgantown, WV 26505 (304) 293-5192.

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A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:

- Who is creative and self-starting
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If you have the experience and are interested in this growth position, we want to speak with you.

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The Education Center has a rewarding and challenging opportunity for a person who has been successful in sales and has the ability to train salespeople in product and skills. This is a highly visible position which requires a person to have:

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- Assist operations in running Batch orientated operating systems.

Current hardware consists of a 2 meg 370/158 with 22 3330's running 50 CMS users concurrently under VM/370 Release 5.

Preferred qualifications include a Bachelor's Degree – scientific curriculum, varying levels of experience with large-scale operating systems and a thorough knowledge of BAL, PL-1, Fortran, with some telecommunications and/or minicomputer background.

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- Analyze problems pertaining to business applications.
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Preferred qualifications include a Bachelor's Degree – Business, Engineering, Math or Computer Science, with 2-5 years full time programming experience primarily in financial or marketing systems.

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Ext. 264, 384

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DEC/System 10

Systems Programmer for dual 1090 site, Network, COBOL/DBMS, substantially modified 6.03 TOPS-10. Requiras good working knowledge of Monitor of CUSPS or COBOL/LIBOL Internals. Additional background in PDP-11 or 370 OS/VSI will be an asset.

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Now that you know, speak with Gerry Clancy, Director of Software, or Ron Gruner, Director of Engineering. Call collect, Tuesday through Thursday, May 16–18 between 6:00 and 10:00 p.m. EST, or Saturday, May 20 between 10:00 a.m. and 3:00 p.m. If calling isn't convenient, simply send your resume to Allen Sabourin, Data General Corporation, P.O. Box 12358, Research Triangle Park, NC 27709.

MANAGER—DIAGNOSTIC PROGRAMMING

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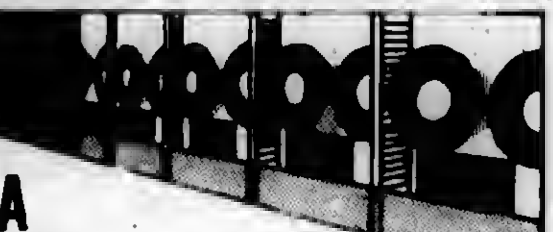

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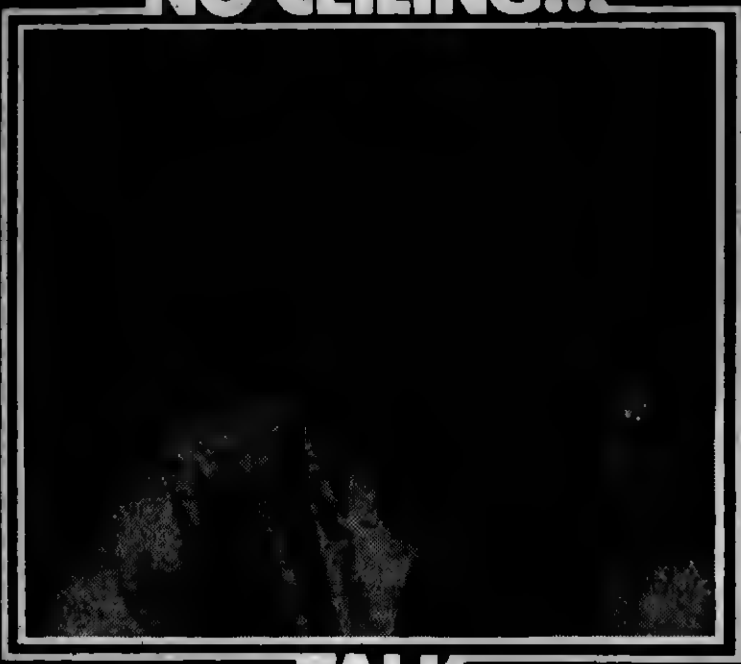

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452-bed hospital in Central California seeks programmer with at least 5 years experience in business & or medical applications with working knowledge of Cobol, Basic & Assembler. Knowledge of DEC Model 10 or 20 helpful. Excellent creative environment for new systems development. Excellent salary & benefits. Send resume to: Marle Delarios, Personnel Office.

Fresno Community Hospital
P.O. Box 1232
Fresno, CA. 93715

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PROGRAMMER

Barclays Bank of California has an opening at its San Jose Data Center for a COBOL programmer. This position requires a minimum of 2 years experience programming bank applications in COBOL for Burroughs Medium Systems. Salary commensurate with experience. Please send resume or apply in person at 3550 Stevens Creek Blvd., Room 315, San Jose, CA. Telephone: (408) 244-3500 Ext. 47.

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If you have 5-8 years experience in one or more of these areas and are interested in becoming a part of this once in a lifetime opportunity, please send your resume with salary history in confidence to:

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STORAGE TECHNOLOGY CORPORATION
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ANNOUNCING A NEW POSITION:

DIRECTOR, INFORMATION SERVICES DEPARTMENT
For a Major California County Government

The emphasis is on management and administrative skills, attitudes and orientation.

In a location overlooking San Francisco Bay, a group of department heads, a member of the Board of Supervisors, and the management consulting team of Jan and Paul Weber met recently to define the qualifications for a very special person: the Director of a new Information Services Department for Alameda County.

This new Department will play a major role supporting the delivery of criminal justice, welfare, health care, and other essential services to over one million people. It will combine the existing centralized Data Processing Center with a new Information Management Division, which will coordinate Countywide distributed systems, data bases, standards and training.

The Department's budget of ten million dollars will include a staff over over 200, two 370/158's and a 370/155 serving more than 600 terminals in eight Bay Area counties. Distributed equipment will incude twelve minicomputers, and more installations are planned..

Alameda County is located in a lively, beautiful, varied area of great culture, climate, history and dynamic change. It encompasses thirteen cities, including Berkeley, site of the University of California.

To meet the challenge of this position, the Director of the Information Services Department must have strength, intelligence and a flexible, innovative approach; be a good listener and an articulate, dynamic communicator; display and inspire trust; have a broad management background including data processing; work effectively in County government; understand current issues and future trends of this technical field; have a service philosophy and be able to instill it in others; be able to attract, select, and retain quality personnel; and be committed to affirmative action.

The position offers great challenge and equally great potential for success. Over a year of studies has set the stage for creating the Information Services Department on July 1, 1978. The Director should be aboard soon thereafter to take charge of the new Department and oversee the selection of an Assistant Director for the new Division. Recognizing the need for an exceptional individual, the County is offering a salary negotiable to $45,000 and an extensive package of management benefits.

If you feel that you are this special person and that this challenging position will provide you with the growth and job satisfaction you are looking for, act now. Mail your resume to Tom Duncan, Alameda County Personnel, 1221 Oak St., Oakland, CA 94612. Or call him at (415) 874-7111. Alameda County is an Equal Opportunity/Affirmative Action Employer.

SCIENTIFIC APPLICATION PROGRAMMER/ ANALYST

For a non-profit medical foundation in the Longwood medical Area with large research program and academic orientation. Position involves responsibility for development of diverse applications (business, clinical and scientific)on PDP 11. Choosing among available hardware and software tools for carrying out assigned tasks.

3 years programming experience which includes at least 1 year as a programmer/analyst and language experience with PL1 (or Fortran). (RPG II experience helpful but not required.) Preference will be given to applicants with hardware knowledge.

We offer an excellent benefit program and salary commensurate with experience. Send resume including salary history to

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Your responsibilities will include contributing to the system's architectural definition, designing components of the system, and providing programmer leadership during implementation. You must be goal oriented and capable of setting your own objectives with a minimum of direction.

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Vice-President, Human Resources
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Corporate Data Center of diversified multi-plant manufacturing company with sales approaching $1 Billion has a challenging job opportunity for an individual with detailed knowledge in data transmission. Minimum 3 years experience in networking, telecommunications equipment, communications protocols and support packages required. Responsibilities include configuring and managing a communication network with combined RJE and on-line processing communicating to HASP, CICS and TSO on a large-scale IBM mainframe. Familiarity with Canadian communication environment desirable. Send resume and salary requirements to:

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Memphis, Tennessee 38134

SYSTEMS PROGRAMMERS

The Los Alamos Scientific Laboratory's Computer Science and Services Division is seeking experienced operating systems programmers to join our Systems Software Group. This group is responsible for the design and development of an operating system for the CRAY-1 computer system and for the development of system software for medium-scale time-sharing computer systems to support the CRAY-1. These positions require the individuals with a B.S. or M.S. in computer science or a related field. Also required is three years experience in design and development of operating systems for either medium-scale time sharing systems or large-scale advanced systems.

The University of California's Los Alamos Scientific Laboratory is located high in the mountains of northern New Mexico. The living is uncrowded; casual; the environment is pollution free; the climate is superb - cool summers and mild winters; school system is excellent. The Laboratory sponsors a variety of degree-level courses. Recreational opportunities include skiing, golf, backpacking, hunting, fishing, tennis, etc.; fringe benefits provide for 24 days annual vacation.

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Mr. James Trout
Employment Representative
Division - 78 PP
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, New Mexico

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We are seeking individuals with 3-5 years' systems design and programming experience in an IBM 360/370 environment. Areas of competence should include: ANSI COBOL Programming, Systems Design and JCL in the administrative areas with emphasis on manufacturing or general accounting. Experience in capital hardgoods industry a plus. Wages and salary commensurate with training and experience. If you are interested in this challenging opportunity kindly send your resume including salary history to:

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Contact Romac & Associates, A. L. Lemay, President; 2 Sun Life Executive Park, Wellesley Hills, MA 02181 for transmission to our Partners in Atlanta, Boston, Buffalo, Charlotte, Hartford, New Haven, New York, Philadelphia, Portland, Rhode Island, Rochester/Syracuse, Stamford

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COMPUTER SCIENCE FACULTY POSITION

For Fall 1978 at State University College at Geneseo, New York. Salary $15,000 - $17,000. Minimum requirement of a Master's degree in Computer Science or related area (or equivalent professional computer experience). Emphasis on teaching. Applicant should have a broad background in computers, knowledge of at least two major higher-level languages, and some special area of competence (such as computer business applications, databases, hardware, etc.). Application deadline extended to June 15, 1978. Apply with resume to: Ms. Stacey Edgar, Search Committee, Computer Science, State University College, Geneseo, N.Y. 14454. AN EQUAL OPPORTUNITY/ AFFIRMATIVE ACTION EMPLOYER.

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PROGRAMMER/ANALYSTS

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Prograssiva Phoenix based grocary chain seeking systems analyst/programmar. Minimum 5 years experience. COBOL, BAL, DOS 4 yr degree in accounting raquired, Ratail grocery/warehousa axperianca helpful.

Salary 18K to 21K.

Send resume to:

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P.O. Box 20230
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PROGRAMMER ANALYST I

Two Programmars required to assist in the developmant of administrative applications on large IBM equipment and DEC system-20. Must heve one to two years experience using COBOL. Collage dagree preferred but equivalent axperiana can be substituted. Experience with CICS, OS/VSI, CMS, or TOPS will be considerad a plus.

CONTACT:
Tha Univ. of Texas Haalth
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CAREER OPPORTUNITY DATA BASE ADMINISTRATION

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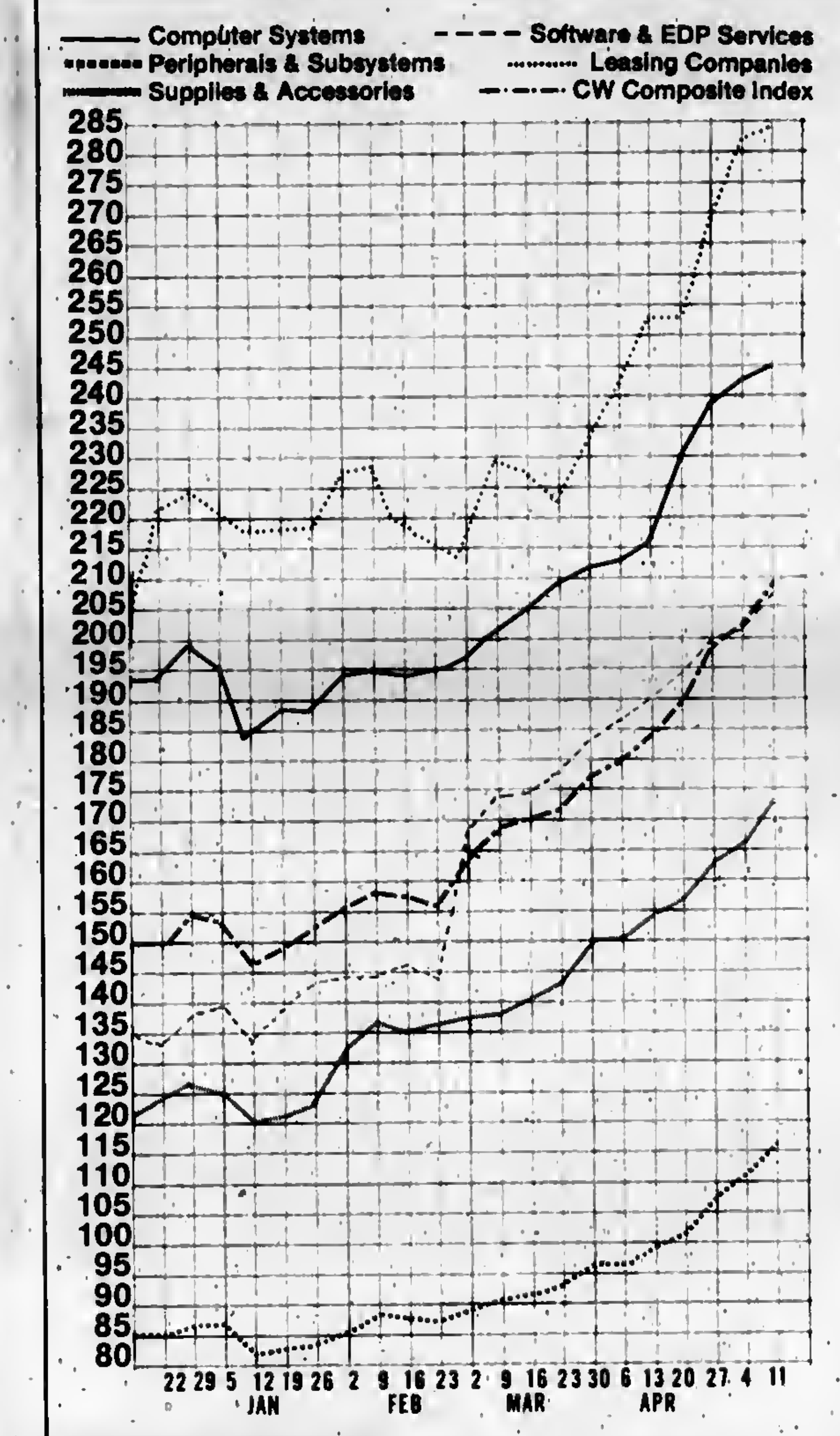

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 10, 1978

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COMPUTER SYSTEMS

EXCH		PRICE			
		1977-78 RANGE (1)	CLOSE MAY 10 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 56	28 3/8	-27	-48.7
N	BURROUGHS CORP	55- 91	68	0	0.0
C	COMPUTER AUTOMATION	18- 32	31 1/2	+1 3/4	+5.8
N	CONTROL DATA CORP	23- 31	31	+ 3/4	+2.4
C	CRAY RESEARCH INC	15- 45	44 1/2	+3	+7.2
N	DATA GENERAL CORP	35- 55	53 1/4	+ 1/2	+0.9
N	DATAPOINT CORP	18- 50	49 3/8	+ 1/4	+0.5
N	DIGITAL EQUIPMENT	37- 53	47	+2 1/4	+5.0
N	ELECTRONIC ASSOC.	2- 5	5 1/4	+ 1/8	+2.4
A	ELECTRONIC ENGINEER.	8- 17	16 1/2	- 3/8	-2.2
C	FOUR-PHASE SYSTEMS	13- 29	28 1/2	+1 3/8	+5.0
N	FOXBORO	28- 54	33	- 1/8	-0.3
O	GENERAL AUTOMATION	6- 10	9 3/4	+ 5/8	+6.8
C	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	62- 81	74	-1	-1.3
N	HONEYWELL INC	43- 55	52	+1 1/8	+2.2
N	IBM	236-286	259 3/4	-3 1/2	-1.3
O	MANAGEMENT ASSIST	5- 16	16	+1 1/4	+8.4
C	MICRODATA CORP	7- 18	13	+ 7/8	+7.2
O	MINI-COMPUTER SYST	5- 12	7	+1 1/4	+21.7
C	MODULAR COMPUTER SYS	5- 14	12 1/2	- 1/4	-1.9
N	NCR	32- 52	51 1/2	+1 1/2	+3.0
C	PRIME COMPUTER INC	12- 39	35 3/4	-1 5/8	-4.3
N	PERKIN-ELMER	17- 22	20 7/8	+1 3/4	+9.1
N	RAYTHEON CO	16- 42	42 3/8	+2	+4.9
N	SPERRY RAND	30- 42	39 3/4	+ 1/2	+1.2
C	SYCOR INC	8- 23	22 1/8	- 3/4	-3.2
A	SYSTEMS ENG. LABS	5- 16	15 3/4	+ 1/4	+1.6
A	WANG LABS.	10- 20	18 3/8	- 1/8	-0.6

LEASING COMPANIES

EXCH		PRICE			
		1977-78 RANGE (1)	CLOSE MAY 10 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	5 7/8	0	0.0
C	BOOTHE COURIER CORP	8- 16	16 5/8	0	0.0
C	COMDISCO INC	9- 17	14 1/2	-1 3/4	-10.7
A	COMMERCE GROUP CORP	1- 3	7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	- 1/4	-22.2
M	DATRONIC RENTAL	0- 2	1 5/8	0	0.0
A	DCL INC	1- 4	4 1/8	+1 1/8	+37.5
N	DPF INC	6- 11	11 3/8	+ 3/8	+3.4
N	ITEL	13- 25	24 3/8	+1 1/8	+4.8
N	LEASCO CORP	19- 34	32 1/2	- 1/4	-0.7
C	LEASPAC CORP	1- 2	1 5/8	- 1/8	-7.1
A	PIONEER TEX CORP	5- 11	5 7/8	+ 1/4	+4.4
N	U.S. LEASING	10- 16	14 7/8	- 1/4	-1.6

SOFTWARE & EDP SERVICES

EXCH		PRICE			
		1977-78 RANGE (1)	CLOSE MAY 10 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1	0	0.0
C	ANACOMP INC	7- 12	11 1/4	0	0.0
A	APPLIED DATA RES.	5- 13	11 1/2	+ 1/2	+4.5
N	AUTOMATIC DATA PROC	23- 30	30 1/4	+ 3/4	+2.5
C	COLEMAN AMERICAN COS	1- 2	1 1/2	0	0.0
C	COMPU-SERV NETWORK	7- 15	8 3/4	+1 1/4	+16.6
C	COMP ELECTION SYSTMS	6- 10	9	0	0.0
C	COMPUTER HORIZONS	1- 2	2 1/4	0	0.0
C	COMPUTER NETWORK	6- 11	9 3/8	- 1/2	-5.0
N	COMPUTER SCIENCES	7- 12	11 1/8	0	0.0
C	COMPUTER TASK GROUP	1- 2	2 3/4	0	0.0
C	COMPUTER USAGE	1- 4	3 3/8	0	0.0
C	COMSHARE	5- 12	12	+ 1/2	+4.3
O	DATA DIMENSIONS INC	3- 5	3 1/2	- 1/8	-3.4
C	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	18 7/8	- 1/8	-0.6
C	INSYTE CORP	2- 3	1 1/4	- 1/8	-9.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
C	KEANE ASSOCIATES	3- 4	3 5/8	+ 1/8	+3.5
C	KEYDATA CORP	1- 3	1 7/8	- 1/8	-6.2
A	LOGICON	7- 17	14 1/4	+1 1/8	+8.5
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 22	21 1/4	- 3/4	-3.4
C	NATIONAL DATA CORP	4- 12	10 3/4	- 1/2	-4.4
A	ON LINE SYSTEMS INC	16- 24	23 1/2	+1 1/2	+6.8
N	PLANNING RESEARCH	3- 7	6 7/8	+1 5/8	+30.9
C	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 5	4 3/8	- 1/8	-2.7
C	REYNOLDS & REYNOLD	17- 25	22 3/4	- 3/4	-3.1
C	SCIENTIFIC COMPUTERS	1- 4	5 1/2	+ 1/4	+4.7
C	TYMSHARE INC	14- 23	23	+1	+4.5
A	URS SYSTEMS	4- 6	6	+ 1/4	+4.3
N	WYLY CORP	1- 5	5	+1	+25.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE			
		1977-78 RANGE (1)	CLOSE MAY 10 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 22	21 1/4	+2 3/4	+14.8
O	ADVANCED MEMORY SYS	7- 13	12 3/8	+ 5/8	+5.3
N	AMPEX CORP	8- 15	14 1/2	- 1/8	-0.8
C	ANDERSON JACOBSON	3- 8	7 1/4	- 5/8	-7.9
N	APPLIED DIG DATA SYS	10- 20	14 3/8	+ 1/2	+3.6
C	ARCHIVE INT'L	5- 12	6 1/4	+ 5/8	+11.1
A	BOLT,BERANEK & NEW	6- 9	7 7/8	- 1/8	-1.5
N	BUNKER-RAMO	8- 17	16 7/8	+ 7/8	+5.4
A	CALCOMP	3- 9	7 3/8	+ 3/8	+5.3
C	CAMBRIDGE MEMORIES	1- 5	5	+ 3/8	+8.1
N	CENTRONICS DATA COMP	16- 30	21 1/4	- 3/4	-3.4
C	COGNITRONICS	1- 1	3/4	0	0.0
C	COMPUTER COMMUN.	5- 9	9 3/4	+ 1/8	+1.4
C	COMPUTER CONSOLES	4- 7	6 1/4	+ 1/4	+4.1
A	COMPUTER EQUIPMENT	2- 6	5	+ 1/2	+11.1
C	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
C	COMTEN	9- 22	19 7/8	- 7/8	-4.2
N	CONRAC CORP	19- 28	23 1/2	+ 3/8	+1.6
O	DATA ACCESS SYSTEMS	4- 5	4 1/2	0	0.0
C	DATA 100	6- 17	16 3/4	+1 1/4	+8.0
A	DATA PRODUCTS CORP	9- 20	19 1/8	+ 3/8	+2.0
O	DATA TECHNOLOGY	3- 4	4 1/4	+ 1/4	+6.2
C	DATUM INC	1- 4	3 7/8	0	0.0
O	DECISION DATA COMPUT	2- 3	2 1/8	+ 1/2	+30.7
O	DELTA DATA SYSTEMS	1- 1	3/8	+ 1/8	+50.0
A	DOCUMATION INC	6- 18	11 7/8	+2 1/2	+16.2
O	DATARAM CORP	2- 24	19 1/2	+ 1/4	+1.2
N	ELECTRONIC M & M	4- 6	5 5/8	+ 1/8	+2.2
C	FABRI-TEK	1- 2	1 3/8	- 1/8	-8.3
C	GENERAL COMPUTER SYS	0- 2	1	- 1/8	-11.1
N	HAZELTINE CORP	8- 15	14	+ 3/8	+2.7
N	HARRIS CORP	28- 54	53	+2 1/4	+4.4
C	INFOREX INC	4- 9	8 3/8	- 1/4	-2.8
C	INFORMATION INTL INC	8- 14	9 3/4	+ 1/4	+2.6
C	INTEL CORP	38- 57	53	+1 1/2	+2.9
A	LUNDY ELECTRONICS	3- 6	4	0	0.0
O	MSI DATA CORP	6- 18	17 1/4	+2	+13.1
N	MEMOREX	23- 44	43 1/2	+1 3/4	+4.1
N	MOHAWK DATA SCI	5- 10	9 7/8	- 1/8	-1.2
O	PENRIL CORP	2- 8	8 1/2	+1	+13.3
N	PERTEC CORP	7- 14	13 7/8	+1 1/8	+8.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	2- 2	2	0	0.0
C	QUANTOR CORP	3- 5	3 3/8	- 1/4	-6.8
O	RECOGNITION EQUIP	6- 10	8 5/8	- 1/8	-1.4
C	SCAN DATA	1- 4	3 1/2	+ 7/8	+36.5
C	STORAGE TECHNOLOGY	10- 39	38 1/4	+ 1/2	+1.3
C	T BAR INC.	7- 19	11 1/4	- 1/4	-1.4
C	TALLY CORP.	4- 9	9	0	0.0
A	TEC INC	6- 10	7 7/8	- 1/8	-1.5
N	TEKTRONIX INC	29- 42	40 5/8	- 1/2	-1.2
N	TELEX	2- 5	4 7/8	+ 1/4	+5.4
C	TESDATA SYSTEMS CP	13- 20	18 1/2	+2 1/4	+13.8
O	WILTEK INC	1- 1	1/2	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE			
		1977-78 RANGE (1)	CLOSE MAY 10 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	8 3/8	+ 1/8	+1.5
O	BALTIMORE BUS FORMS	1- 4	3 1/2	+ 1/4	+7.6
A	BARRY WRIGHT	10- 23	22 1/8	+ 7/8	+4.1
C	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 23	23 3/8	+3 1/8	+15.4
N	ENNIS BUS. FORMS	6- 15	14 3/8	+2 1/8	+17.3
N	3M COMPANY	43- 56	51 1/2	+ 3/4	+1.4
C	MOORE CORP LTD	24- 37	28 1/2	- 1/4	-0.8
N	NASHUA CORP	16- 30	28 5/8	+ 1/4	+0.8
O	STANDARD REGISTER	18- 26	25 1/4	0	0.0
C	TAB PRODUCTS CO	8- 19	11 3/8	- 5/8	-5.2
N	UARCO	18- 27	27	+2 3/4	+11.3
A	WABASH MAGNETICS	10- 15	12 7/8	+ 7/8	+7.2
N	WALLACE BUS FORMS	17- 23	23 1/4	+ 1/2	+2.1

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Pertec Laboring for Lost Loves

By Ann Dooley
CW Staff

CHATSWORTH, Calif. — Romeo and Juliet might have lived to tell about it, Penelope might never have taken up knitting while awaiting Odysseus' return and Prince Charming wouldn't have had to play footsy with anyone but Cinderella if someone had only programmed a computer system to find lost lovers.

Pertec Computer Corp. (PCC) has done just that for present-day lovers who have lost touch and want to find each other again. The vendor is playing Cupid as a promotion for Columbia Pictures' new film, "If Ever I See You Again," the story of a composer reunited with his former sweetheart after 12 years.

PCC went into the lost-love business to "help change the image of computers to a more humane and personal one," according to a spokeswoman. It's a positive and fun way to introduce computers to people who ordinarily don't have anything to do with them and have misconceptions about them, she said.

Nearly 18 other computer companies turned hard hearts on the project before PCC agreed to

(Continued on Page 6)

Double IBM Power Promised by Two CPUs Unveiled by Magnuson

By Jeffry Beeler
CW Staff

NEW YORK — Modular expandability and throughput as much as twice that of IBM's medium-scale systems reportedly highlight a family of 360-, 370- and Series 30-compatible central processors introduced last week by Magnuson Systems Corp.

The M80 series of general-purpose mainframes currently consists of two members — the Models 3 and 4, which are said to emulate the 370/138 and 370/148, respectively. Depending on the application, both models provide 20% to 100% greater processing power than their IBM counterparts, Magnuson officials said.

Later this year, Magnuson plans to extend the M80 series upward with the introduction of the Model 5, which will provide the same 1.2- to two-fold performance edge over its IBM equivalent — the 370/158.

When all the upward and downward extensions are added, a basic M80 processor will expand in power from a 370/115 to "well beyond" a 3031, according to company spokesmen.

Each member of the Magnuson series will also support all IBM operating systems as well as competing vendors' software, they added.

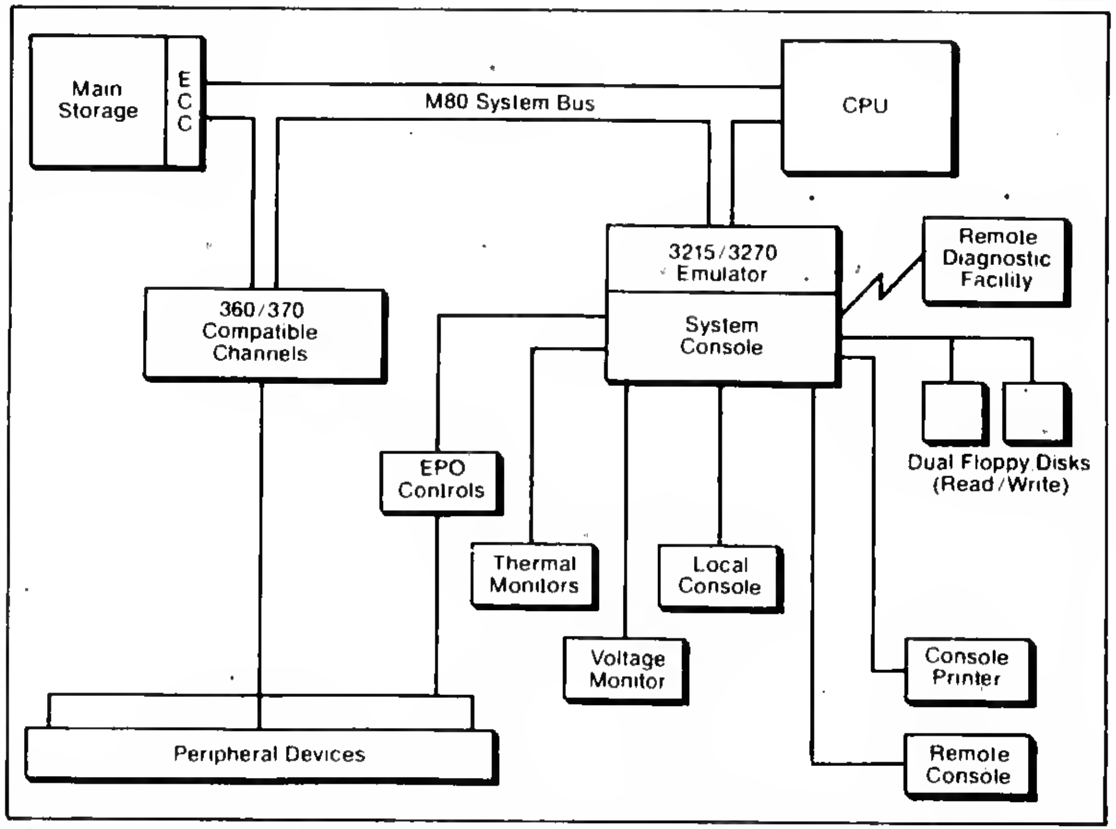
Company officials attributed the M80's reputed performance edge over its IBM rivals to the series' 32-bit bus structure, which minimizes internal cabling and connects all four main systems elements — the CPU, memory, system console and data channels. This "strategic architecture" reportedly yields a structural modularity that allows users to expand the system by adding or replacing processor, memory or console boards.

A minimum M80 configuration, for example, incorporates logic for a CPU, 128K bytes of main memory and an IBM-compatible data channel on 27 modular printed circuit (PC) boards. Users, however, can upgrade this configuration to 4M bytes and nine data channels without increasing the number of boards merely by swapping some of the modules with more powerful replacements, Magnuson officials explained.

When additional PC cards are plugged into the system bus, an M80 series configuration can expand to accommodate as many as 16M bytes of main memory, eight system consoles and 16 data channels, they noted.

The bus architecture and structural modularity are also said to allow the system to accommodate future advances in hardware and software technology. For example, if IBM changed

(Continued on Page 6)



The structural modularity of Magnuson Systems' M80 series of IBM-compatible mainframes results from a 32-bit bus that links the line's four principal hardware elements — the CPU, main memory, console and data channels.

ICA Attendees Get Glimpse Of Business Satellite Use

By Ronald A. Frank
CW Staff

LAS VEGAS — Integrated business communications using satellite links came a step closer to everyday reality last week with the introduction here of the Office of the Future Controller by American Satellite Corp.

The device was among almost a dozen products introduced at the International Communications Association's (ICA) annual meeting

The controller allows a company to utilize a full-duplex 56k bit/sec satellite channel for digital voice, data communications up to 9,600 bit/sec, facsimile, teleconferencing and other uses, according to a spokesman.

The unit includes a satellite delay compensation unit for data, an integrated voice data unit for digital voice and other control circuitry to handle a wideband satellite channel.

The Office of the Future Controller is believed to be one of the first to offer users an integrated facility via satellite

(Continued on Page 8)

White House Taps Interdata

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — Interdata has found a first user for its "business" computer system, a reconfigured version of its 7/32 minicomputer. And that user is none other than the White House.

Two weeks ago the firm installed the system in the Executive Office Building, where many of President Carter's staff and advisors are housed.

The mini and assorted accompanying I/O and communications gear will be used on an interim basis to develop information system applications, according to Carl Calo, assistant director of the Information Systems Division in the Executive Office of the President (EOP).

Calo and his staff have also drawn up and are circulating the preliminary specifications for the system they hope to have in place by the end of 1978 [CW, April 3]. "If the federal govern-

(Continued on Page 6)

IN DEPTH
IN DEPTH

The data management software available today allows four different approaches to the data management problem, according to Ronald G. Ross. See Part I of "Data Base Systems: Design, Implementation and Management, beginning on Page 17.

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British Paper Maintains Micros Portend Higher Unemployment, Less Women's Lib

By Nicholas Enticknap
Special to CW

LONDON — Technological advances — particularly the microprocessor — could increase unemployment, weaken the women's equality movement and further increase social upheaval, according to a report published here recently by Earth Resources Research Ltd.

"The Chips Are Down," a discussion paper written by Colin Hines, a researcher in environmental affairs who does not claim to be an expert in either computer science or economics, asserts that microprocessors will influence employment in three important ways.

First, they will prevent the government from ever solving the unemployment problem; second, by diminishing the number of secretarial jobs, they will have an important effect on the women's liberation movement; and, thirdly, they will make the work of middle management and of many professional people resemble that of an assembly line worker.

Hines argued these effects will exacerbate the strain of unemployment levels which is already being imposed by a number of other factors. Among these are the shift in emphasis from increasing output to increasing productivity in industry and the legacy of the high birth rate in the late 1950s and early 1960s.

The report warns that "the miseries of the upheaval of the 1930s will pale into comparative insignificance should Britain continue to drift on as at present and find itself in the situation where two, four, six or even seven million are out of work."

The mainly philosophical argument concentrates on the capabilities of computers rather than on examples of their effect on employment. However, Hines does quote the case of National Cash Register Corp. which reduced its manufacturing workforce here from 37,000 to 18,000 between 1970 and 1975 as a result of adopting microcircuitry in its cash registers.

Another example is the case of Western Electric, whose labor force dropped from 39,200 in 1970 to 19,000 in 1976 for similar reasons.

Hines concluded by saying "there will be no easy, wand-waving solutions," adding "priority must be given first to admitting the enormity of the problem and secondly to assembling the best brains in government, research establishments, industry, unions and the community to tackle this problem.

"Whatever happens, the effects of automation will be felt at every level of our society, and to prevent it from being torn apart will require the commitment of expertise and resources on a scale probably not seen since the war," he believes.

Earth Resource Research Ltd. is the policymaking arm of Friends of the Earth, well-known environmental organization. It published the report "in an attempt to stimulate discussion of an extremely important topic which, hitherto, has been the subject of very limited debate," the report said.

"The Chips Are Down" can be obtained from Earth Resources Research at 40 James St., London W1, England.

U.S. vs. IBM Antitrust Trial Plods by Third Anniversary

NEW YORK — U.S. vs. IBM, the longest antitrust trial in the history of this country, plodded past its third anniversary in court last Friday with little notice.

Opening statements were made on May 19, 1975. The government predicted its direct case would last six months; it finally rested its case on Apirl 26, 1978.

IBM is now estimating its defense will last six months to a year. Believe it at your own risk.

There are some indications, however, that IBM's presentation will move at a faster pace than did the government's. The defense attorneys have developed a rapid-fire method of placing documents into evidence that enables them to offer 200 documents in a matter of minutes. This procedure formerly took days of court time.

IBM also agreed to drop 58 of the 70 user witnesses it had planned to call after the government agreed to stipulate that those eliminated would have testified in the same way as the first 12. This stipulation could signify a willingness by both sides to compromise — a willingness rarely shown during the last three years.

Nevertheless, IBM still has 96 witnesses left on its witness list, plus a reserve list of 47 people it may or may not call. Even if the trial's pace were stepped up to two witnesses a week, as some IBM attorneys have predicted it will, it is unlikely the defense will rest in a year.

Judging by current performance, it is even more unlikely there will be two witnesses a week. Richard Case, IBM's group director of Advanced Systems Development, has already been on the stand three weeks under direct examination.

On the Inside This Week

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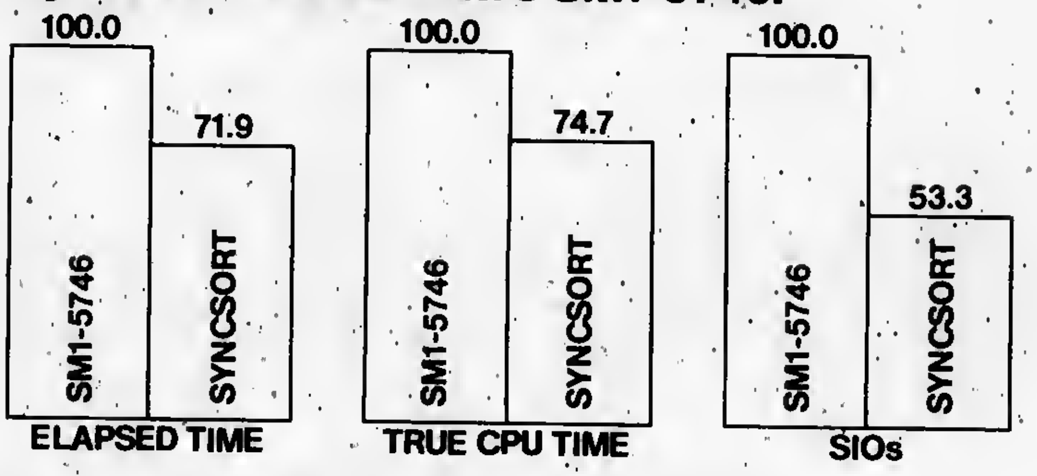
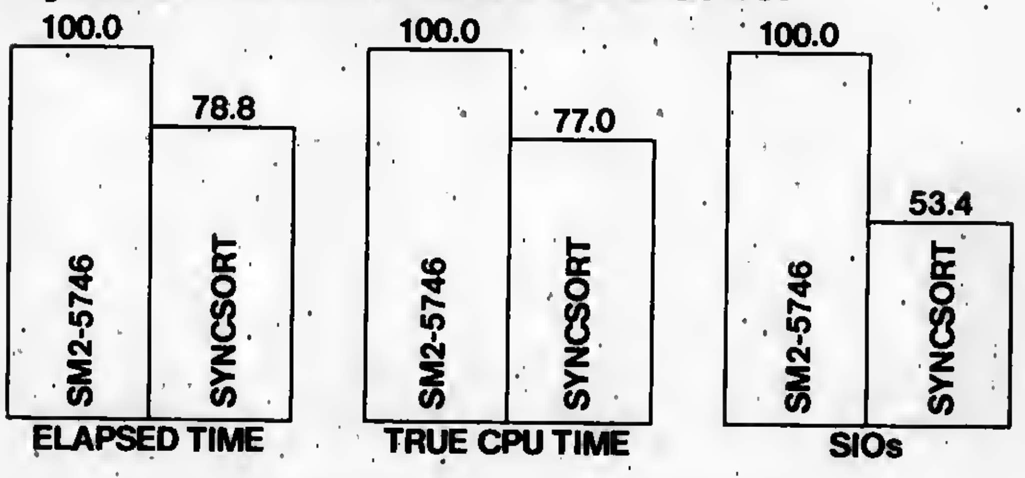
But if IBM has us outnumbered in *quantity*, there's just no comparison in *quality*. That's become increasingly apparent as more and more DOS processors have come around to see if their sorting slippers fit SyncSort.

We are, of course, somewhat nutty on the subject of benchmarks. And most of our users prefer to test SyncSort before they sign on the dotted line. Here are the results of 42 recent benchmarks, covering 213 files, that compare SyncSort's use of computer resources to that of IBM's two "top-of-the-line" sorts:

SyncSort DOS vs. IBM's SM1-5746.



SyncSort DOS vs. IBM's SM2-5746.



How did SyncSort do against IBM's other two "paid-for" sorts. Even better. And as for SyncSort's performance against old SM-483, IBM's "free sort," we can only remind you that the most expensive luxury in the world is a piece of free software!

Another interesting piece of information came out of these tests. We discovered that IBM's DOS sorts perform almost *exactly* the same as their OS sorts. Which is to say, somewhat lackadaisically.

And that may be the real moral of this piece. If you're about to propose to a new DOS sort, maybe you'd better meet the rest of the family first!

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Suggested by DP Revamp Team

Local Centers Eyed for Social Services Delivery

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – Neighborhood centers that house or have access to automated systems capable of determining an individual's eligibility for a variety of human services are the key to improving the delivery record of federal welfare and benefit services, a Presidential study team said here last week.

The human resources team of the President's DP reorganization project recommended that President Carter establish a task force to smooth the way for states and local governments to implement systems that can decide welfare and benefit eligibility accurately at the time an individual applies for such services.

The team's recommendations were based on an examination of the Veterans Administration and three Cabinet-level departments: Labor; Health, Education and Welfare; and Housing and Urban Development.

States Ahead

Automated eligibility systems are already being used successfully in Wisconsin and South Dakota, the team noted. Federal leadership is needed to standardize the eligibility criteria for all human service delivery programs and to develop a uniform application form and prototype eligibility systems, it said in its draft report.

The President should also direct the Department of Labor to investigate the use of DP and communications technology to predict eligibility for black lung program benefits, the group said. Labor should take advantage of "existing, readily available, computerized technology" to clear up its backlog of several hundred thousand black lung benefit applications, each of which now takes an average of 296 days to process, the human resources team noted.

Like many of the programs examined by the team in its study, the black lung program has suffered from a failure on the part of the federal government to give sufficient consideration to the ways DP technology might be used to shorten the claims-processing cycle, the report stated.

Open to public comment on its work between now and June 2, the human resources team praised those innovative states and localities for their unaided efforts and sought, in its recommendations to the federal government, "to place [DP] in the context of the management of the human service delivery enterprise, rather than to consider it as a resource to be managed in isolation by technicians."

Executive Order Asked

The reorganization team's study of the federal human resource agencies — which will spend more than $260 billion during the next fiscal year to support and administer hundreds of programs that account for more than 50% of the federal budget and touch the lives of more than 100 million Americans — led to the further recommendations that an executive order be issued directing these agencies to define and focus on human service objectives.

These objectives include the timely, accurate and adequate processing of claims and applications; appropriate, adequate and consistent program coverage; and competent program administration, the report stated.

One-Step Centers

State agencies urged the team to adopt the concept of the one-step neighborhood center, where all program information and eligibility criteria would be concentrated and automated, to achieve these objectives. The government can assure smooth service delivery by continuously tracking how well these objectives are being met at the local program level, the team suggested.

The decentralization of services delivery "is capable of removing the security and privacy problems associated with the maintenance of large central files," the report said. "At the same time, a hierarchical structure of summary reporting measures can assure the continuing evaluation of the service delivery programs."

Uniform Definitions Needed

The federal government will find it easier to automate the delivery of human services if its first develops uniform definitions and performance standards for human services, the team stated.

Since 1974, an interagency team has been working on these definitions and standards, and the reorganization group recommended that a second Presidential task force carry that work still further.

The existing project, aimed at producing a common application for major, federally funded human service programs, is called the Single-Purpose Application With Automated Referral System (Spaars). Its definitions and classifications depend on an analysis of the statutes and regulations that govern seven major welfare and benefit programs, including Supplemental Security Income, food stamps and housing assistance.

The human resoures team would have the task force spend three months pursuing the Spaars effort — the only one of its kind in the federal government — and develop an interagency agreement on human service definitions. The work of this group would aid the attempts of the first Presidential task force, assigned for six months to enable states and local governments to implement automated eligibility systems.

End to Paternalism

The government should drop its "paternal" attitude toward the states and localities in the area of human services delivery, according to the reorganization team. The agencies in Washington can learn much from states like Wisconsin which, for the past two years, has used a single human service application form with computer-assisted prediction of an individual's eligibility for services.

In that state, caseworkers now can complete eight to 10 cases each day, rather than the two cases per day of two years ago. The Wisconsin project uses one application form for four human service programs — food stamps, Aid to Families with Dependent Children (AFDC), medical assistance and Supplemental Security Income — and a computer system, which predicts eligibility.

The increased caseworker productivity in Wisconsin has occurred despite the fact that the mainframe being used must be shared with 17 state departments and the state legislature. Moreover, the project has increased the accuracy of eligibility determination and made these determinations more consistent throughout the state, the human resources team reported.

Too Little Spending

Overall, the federal government invests too little in DP in comparison with the private sector to provide the proper support to service delivery programs, the reorganization team concluded. Low DP spending and a failure to relate the cost of DP and communications technology to the delivery of particular services are symptomatic of the federal "neglect" of automation as a resource, the group added.

To improve the transfer of technologies between agencies, resource sharing and information exchange, the human resources team recommended that Carter establish a Council on Information Quality and that senior DP people be appointed as advisors to Cabinet officers and agency heads. These "assistants to the secretaries for information" would provide advice on the management of information resources, consult on the availability of alternate technologies and maintain open communications between the agencies and other organizations.

Finally, the reorganization team urged the creation of an agency to provide all federal programs — including human services — with technical support. This agency would essentially be a pool of senior technical manpower, available to assist in the application of DP and communications to federal programs.

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Call for Papers

33RD ANNUAL TECHNICAL CONFERENCE ON THE AMERICAN SOCIETY FOR QUALITY CONTROL, Houston, Texas, May 14-16, 1979.

The theme of the conference is "Quality — Fundamental, Universal and Now." Papers are requested in the quality control field and related disciplines.

Persons wishing to submit a paper should first request a speaker's data sheet from the chairman of the technical conference program committee, John M. Wiesen, Org. 1220, Sandia Laboratories, Albuquerque, N.M. 87185. The form should be returned, with an abstract, by July 15.

ASSOCIATION FOR THE DEVELOPMENT OF COMPUTER-BASED INSTRUCTIONAL SYSTEMS WINTER MEETING, San Diego, Calif., Feb. 26 to March 1.

To participate, send a two- to three-page abstract by June 1 to John J. Hirschbuhl, Ph.D., 206 Carroll Hall, The University of Akron, Akron, Ohio 44325.

Hinchman: Execunet Decision Undermines FCC

By Ronald A. Frank
CW Staff

LAS VEGAS — Recent decisions by a U.S. appeals court appear to have destroyed the careful introduction of telecommunications competition fostered by the Federal Communications Commission (FCC), according to Walter Hinchman, chief of the commission's Common Carrier Bureau.

Because of the court's decision ordering AT&T to provide local service to MCI Telecommunications, Inc.'s Execunet service [CW, May 15], a free-for-all entry policy has developed for the entire long distance communications business, Hinchman said.

Speaking at the opening session here last week of the annual conference of the International Communications Association (ICA), Hinchman said neither the FCC nor the court has developed sufficient data to show conclusively that competition in the Message Toll Service (MTS) and Wats areas will serve the public interest.

The court seems to have taken on the role of the commission in authorizing the Execunet service, he contended, adding there is a certain sense of madness in this confrontation between the commission and the court, in which the roles of each appear to have been reversed.

Because of the Execunet decision, the public is vulnerable to the potential deaveraging of MTS and Wats rates, which now defray part of the cost of local exchange facilities, he said. The telephone industry now has the right to file deaveraged rates at any time.

If the telephone carriers elect to file such deaveraged tariffs, it would be very difficult for the FCC to challenge such a rate structure simply because there is not enough cost-related information available, he pointed out.

In the long run, the real issue that must be faced is what should be done with the Bell System, Hinchman said. Many of the current policy and regulatory issues, such as Execunet, are a direct result of the sheer pervasiveness of the Bell System.

This applies not only to the telecommunications service industry, but also to the electronics manufacturing and financial segments, he added.

The FCC official said he is "virtually convinced" the Bell System is beyond the effective reach of both federal and state regulation and may therefore be impervious to most attempts at competition.

"I wonder how long we can ignore this basic structural issue while laboring mightily over all the peripheral issues that result primarily from it," Hinchman told the attendees.

Commission Limited

Echoing Hinchman's views, Charles D. Ferris, FCC chairman, said the Execunet decisions have severely limited the commission's flexibility to deal with difficult issues of competition in an orderly manner and to determine where the public interest lies.

CW Photo by R. Frank

Walter Hinchman

In the past, the FCC pro-competition rulings have deliberately avoided the MTS and Wats areas because no competition was contempleted for those segments, he said, noting the FCC's specialized carrier decision did not deal with this question. Now the commission has initiated a proceeding to examine the effect of these services.

One of the questions to be addressed is whether special tariff treatment should be given to favored customers at the expense of the general public, since there is no clear information on whether the big customer is subsidizing the small user or vice-versa. The effects of favored treatment such as bulk discounts must be shown to be in the public interest, Ferris said.

Prophet Spinoff Offered by BBN

CAMBRIDGE, Mass. — A version of Prophet, the graphics system used by a San Francisco pharmacologist to help develop cancer-killing drugs [CW, April 10], is now available as a standalone system for use on a Digital Equipment Corp. PDP-11 minicomputer..

Known as Mission, the system is said to provide many of the statistical and graphics data-handling facilities of Prophet and is available to anyone who wishes to license the product.

Prophet was developed by Bolt Beranek and Newman, Inc. here for the National Institutes of Health (HIH) and was only available to a few handpicked researchers funded by NIH on an already overloaded time-sharing network, NIH said. Dr. Martin A. Apple, the San Francisco pharmacologist, did his work under such a grant.

The Mission system is available through BBN's Computer Systems Division. BBN is located at 50 Moulton st., Cambridge, Mass. 02138.

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Magnuson CPUs Rival IBM

(Continued from Page 1)

its system software standards to permit memory expansion beyond the current 16M-byte limit; the existing M80 structure could adapt to accommodate a memory as large as 4G bytes, Magnuson claimed.

Moreover, the system could accept intelligent controllers and allow users to replace its current MOS memory with more advanced storage technologies like charge-coupled devices and bubble memory, the mainframer added.

Among its other purported advantages, Magnuson's strategic architecture reportedly permits the M80 to emulate mainframes from Burroughs Corp., Honeywell Information Systems, Inc., Univac and other non-IBM vendors.

'Voting' Boards

Finally, the system's bus design allows the use of "fail-soft" hardware, which in effect provides circuit backup and prevents CPU shutdowns during component failures, Magnuson spokesmen said.

One of these fail-soft hardware features is an optional "triplex voting" capability, which is said to allow processor boards to diagnose systems failures by comparing their processing results.

An M80 configuration can use up to four copies of each processor board simultaneously, the officials explained. If the system uses three boards, each "votes" on its processing results.

If the vote goes 3-0, all three continue running. If the boards vote 2-1, the system shuts down the offending module and allows the other two to remain operating.

If a subsequent vote by the remaining boards proves 1-1, the M80's console diagnostics reportedly allow the user to determine which of the two has failed. During system failure, the fourth PC card can serve as an operational spare to restore triplex voting, Magnuson said.

A memory error-correction capability built into the system's 1K random-access memory storage control module corrects single-bit errors, detects both double-bit and multiple-bit errors and displays error locations on the operator's console.

The system is also said to provide a minimum 8K bytes of firmware, which is required for the microcode translation features that ensure software transparency between the various M80 series models. Users can reportedly expand the system's firmware ot 256K bytes.

Able to work on 70% less power than its 370 counterparts, the M80 series cycles in 100 nsec and accesses memory in 250 nsec.

A typical Model 3 configuration with a CPU, console, 512K-byte main memory and three data channels costs $200,000. A similar Model 4 configuration with a 1M-byte memory and five data channels costs about $395,000.

Deliveries of both models will begin in June from Magnuson at 2500 Augustine Drive, Santa Clara, Calif. 95051.

The Amdahl Factor

SANTA CLARA, Calif. — Magnuson Systems Corp., which entered the mainframe market last week with the introduction of its M80 series, was founded in January 1977 mainly by ex-Amdahl Corp. personnel — and its roster even includes Carl Amdahl, son of Amdahl Corp. founder Dr. Gene Amdahl, as executive vice-president.

Other founding officers include Paul Magnuson, president, formerly with Amdahl Corp., and Raymond A. Williams Jr. another Amdahl graduate, now serving as vice-president for finance.

Robert McCullough, who serves as vice-president for operations and is also a founding member of Magnuson, was formerly with National Semiconductor Corp., where he worked on the IBM 370/168 add-on memory program.

Magnuson was originally financed by private investors, but received a major infusion of capital earlier this year, when Fairchild Camera & Instrument Co. entered into an agreement with the firm. Fairchild will purchase stock and convertible notes leading up to a one-third interest in Magnuson.

Pertec Finding Lost Loves

(Continued from Page 1)

the idea. Several were afraid of possible legal implications; others claimed they did not want to be held responsible for breaking up marriages.

The love matching began May 1. Since then nearly 5,000 calls have come into PCC facilities. The calls are expected to increase very soon, when the film is released, and continue at a high rate until the project ends July 1.

Three Matches

Out of thousands of calls that have come in, only three verifiable matches have been made, according to the spokeswoman.

Anyone wishing to find a former love can call PCC headquarters on a toll free line — (800) 423-5250 or, in California, (800) 382-3666 — and give his name and phone number, the name of the person to be located and the city where their romance bloomed.

An operator enters the information into a PCC XL40 data entry system via one of six 480-character CRTs. If the person being sought has already called PCC, a flashing heart with a moving arrow will appear on the screen to indicate a match. The system also displays the time of the matching call and the phone number where the second caller can be reached.

If a match is not made, the information is entered into the file inquiry system and stored in case the partner calls.

The system works only if both former lovers are looking for each other and each calls in requesting the other. A caller's privacy is protected since an individual can be reached only by the person he is trying to locate.

The data is coded so a match will be made only if each individual comes up with both the other person's name and the state they were living in when they knew each other. PCC officials further verify matches by calling back both parties.

The system is an XL40 distributed processing, state-of-the-heart microprocessor-based system with 128K memory, three 8.8M-byte disks and a 300 line/min printer. Its information retrieval package allows an operator to enter, validate, retrieve and update a file directly at the source.

White House Taps Interdata

(Continued from Page 1)

ment can have 'Sun Day' on a Wednesday, I can have Christmas in July," the White House DP head said of the formal request for proposal (RFP) he will issue early in July.

In the meantime, the Information Systems Division will develop and experiment with applications such as the First Lady's schedule and the White House photographer's rounds on the Interdata business system Model 700.

32-Bit Machine

The 32-bit machine will provide the EOP with 256K bytes of memory and was installed last week with two 80M-byte disks, two 1,600 bit/in. tape drives and a dynamic OS/32 operating system.

The business system will also support an initial 16 terminals and eventually will accommodate 32 CRTs and keyboards under the Interdata Telecommunications Access Method (Itam), according to an Interdata spokesman. No terminals have been delivered yet, however.

The firm also included Cobol and Interdata's soft-merge package in the system.

While Interdata's standard delivery time is 30 days, the spokesman indicated the system was in place in the Executive Office Building 10 days after the contracts were signed because "the White House asked us to move as quickly as we could."

Calo commented at a recent private meeting here that the addition of the Model 700 represents little or no increase in the Information System Division's expenditures. He also stressed that the machine will be replaced by the final White House information system procurement.

The final system procurement will involve a variety of terminals and other I/O devices designed to serve individual user needs and at least one secure mini that can be used to process classified and sensitive information in a stand-alone capacity and to communicate with other EOP network components.

The procurement will also include a communications processor or processors that will let users communicate with public and private external systems as well as with each other and main CPUs that will provide capacity and backup for critical processing and large internal systems such as the Office of Management and Budget's budget management system, sources close to the White House said.

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Building Data Base on 370/168

USDA Banking National Land Ownership Data

By Ann Dooley
CW Staff

WASHINGTON, D.C. — A nationwide land ownership survey being conducted by the U.S. Department of Agriculture (USDA) here will provide information never before gathered on who owns land in this country and to what use it's being put, a USDA spokesman said.

Data on income bracket, nationality, age, race, sex and place of residence from randomly selected land owners will be compiled and processed by the USDA's IBM 370/168. The resulting information base will enable land planners to determine current and future trends, according to USDA senior economist Gene Wunderlich.

The survey will be based on information provided by owners of 60,000 "points" of land in the continental U.S. The "points" are sites selected by the Soil Conservation Service for which the owner, soil type and land use are already documented.

How Many Very Large Owners

Once the 370/168 has processed the information, "we should be able to say how much land is owned by very large owners of over one million acres and how much is owned in tracts of less than one acre," according to USDA economist Robert Otte.

It also will be possible to determine how much land is owned by individuals, how much by corporations and what type of owners own what type of land, Otte said.

In addition, it will now be possible to test hypotheses such as whether age or income makes a difference in land conservation, for example, Wunderlich noted.

The U.S. survey was developed in part from a prototype study done in Rappahannock County, Va. That study revealed striking information about absentee land ownership, estate size and wealth and land distribution.

Questionnaires Mailed

In the national survey, questionnaires were recently mailed out to land owners across the country and they are now starting to come back in, according to the economist. Once all the questionnaires are completed and returned, the data will be coded onto punch cards and then transferred to magnetic tapes at the USDA computer center, he said. The compiled statistics will be printed in summary tables according to the department's requested specifications and will probably be finished some time this fall, Wunderlich predicted. The system runs on VS/2 and is generated in Fortran.

It is intended to be a one-time survey, although the USDA would like to repeat it in another five years in order to keep a current base of data, he noted.

The survey will gather only land-ownership-related information, Wunderlich said, and no personal information such as Social Security numbers will be used.

The survey information will also be used for analytical purposes in determining owner characteristics and type of land use. The data may also provide clearer perspectives for enacting land policies, such as determining whether the right people will actually benefit from proposed land reform measures, he said.

In addition, knowledge of the structure of land ownership in particular communities provided by the computer base of information will enable decision makers to learn how a subsidy will affect a community, he said.

Impetus for Survey

The survey was conducted for a variety of reasons, among them the need to know more about the steady decline of crop land and also about the potential impact of foreign investment in this country, he said.

Statistics compiled from the experimental Rappahannock County study showed that 53% of the landowners lived elsewhere. Further, 9% of the owners earned $50,000 or more per year and owned 41% of the land, while 31% of the owners had incomes of less than $10,000 and owned only 13% of the land.

The study also showed that 47% of the owners had 58% of the land, 43% considered themselves professional, technical or managerial, 25% were retired and only 5% were farmers.

The DP system for the county was designed as "an inexpensive land information system for small rural counties which could not afford a more sophisticated recordkeeping system," according to Wunderlich. Since the program was experimental, all the DP work was performed on the USDA's central 370/168 but with the capability of being converted to a small business system.

The county system used a special computerized code for each parcel of land and linked taxes, transfer and land use records to provide tax billing, assessment and planning systems. The county had its own local identifier that replaced all national codes for the county-level recordkeeping, he said.

Such a system could also theoretically be used in a county-to-county link providing each participant with up-to-date information on changes in land use and ownership.

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ICA Glimpses Use of Satellites for Business

(Continued from Page 1)

to serve varied telecommunications needs.

To demonstrate the capabilities of the Office of the Future Controller, American Satellite erected an all-digital, 16-foot earth station that enabled users at the ICA conference to listen to digital voice communications and to transmit data communications over the 56k bit/sec link. Facsimile and video conferencing techniques were also demonstrated.

The satellite carrier announced the first users of the integrated office approach to telecommunications would be Univac, Boeing Computer Services and Western Bancorp DP Co. Univac is expected to begin using the satellite facility sometime in June.

A typical system includes the controller system, two 16-foot transmit/receive earth stations and a 56k bit/sec channel. The system costs about $12,000/mo depending on options.

Delivery takes about eight months to allow for site preparation and installation of the earth stations and other required equipment. American Satellite Corp. is at 20301 Century Blvd., Germantown, Md. 20767.

Teletype Corp. went to the ICA meeting to introduce a teleprinter, the Model 42, aimed at five-level code applications. The company also added a buffered memory capability to its Model 43.

The Model 42 is available in buffered receive-only, buffered send/receive and buffered automatic send/receive versions. Designed as a replacement for Teletype's earlier Model 32, it was developed for Telex operations with operator-selectable speeds at 45.5-, 50-, 75-, 100- and 225 bit/sec, the firm said.

Buffered versions of the Model 42 contain up to 20K characters of solid-state memory. The buffered terminal can send and receive data on-line via the buffer while messages are simultaneously prepared for future transmission.

Transmitted text is stored in the memory; if a message is not received correctly, it can be retrieved, edited and re-sent, a spokesman said.

Friction-feed and pin-feed printer options are available with the Model 42 series.

The Model 42 is compatible with the CCITT standard No. 2 for international Telex use, the company said.

The basic five-level Model 42 is priced at about $3,100 with a paper tape capability adding about $1,300 and buffering priced at about $1,000.

Added to the Model 43 series was a buffered version with a microprocessor-controlled memory that provides up to 20,000 characters of storage. The Model 43 transmits at 1,200 bit/sec; tapeless text editing allows an operator to locate text by string searching.

Text can be corrected or changed by character deletion and insertion prior to or after transmission, the spokesman noted.

The printer operates at 30 char./sec and can produce an original and up to two copies, the company said.

The basic buffered terminal costs about $2,900. The addition of paper tape and buffering costs the same as on the Model 42.

Deliveries of the units will begin early in 1979, although some models of the 43 are available this year. The purchase-only terminals will be supported by Teletype; service centers have been set up in 43 cities. Teletype is at 5555 Touhy Ave., Skokie, Ill. 60076.

Video 200 Terminal

Western Union Data Services introduced a microprocessor-based intelligent CRT that operates with the earlier Smarts controller to provide a terminal system that can handle multiple applications.

Called the Video 200, the terminal can support full- and half-duplex transmissions, Teletype mode, TWX messages and binary synchronous protocol. It is compatible with Bell 103- and 202-type data sets.

The unit includes a 12-in. screen with a 128-char. upper/lower case Ascii display set. Eight preprogrammed function keys can move data from the Smart controller's floppy disk storage to the screen.

A typical configuration of the Video 200, EDT 33 teleprinter and Smarts controller programmed for 1,200 bit/sec operation leases for $360/mo on a three-year lease including maintenance. Deliveries are scheduled for the fourth quarter.

Western Union Data Services is at 70 McKee Drive, Mahwah, N.J. 07430.

Racal-Milgo Additions

Racal-Milgo Corp. introduced three modem series operating at 4,800-, 7,200- and 9,600 bit/sec. The microprocessor-controlled data sets called the MPS family, include single-port or multiport configurations for point-to-point, multipoint and polling applications.

The modems feature a high-speed training capability called Fastran, which is said to achieve a 30 msec RTS/CTS response time.

The MPS 9601 series operates all three speeds and is on-line-compatible with the firm's 96 Multi-Mode series. The single-port version costs $8,250 or $179/mo on a 30-month lease.

The MPS 7201 runs at 7,200- or 4,800 bit/sec. A single-port version costs $6,675 or $160/mo on a 30-month lease.

The MPS 4801 runs at 4,800 bit/sec and costs $4,850 or $120/mo on a 30-month contract. Racal-Milgo is at 8600 N.W. 41st St., Miami, Fla. 33166.

Infocom Buffer

TRT Telecommunications Corp. displayed an intelligent communications buffer that allows Western Union Infocom users to link directly into international overseas private-line circuits.

Called Infolink, the buffered service provides automatic code and speed conversion from 10- or 30 char./sec Ascii to 50- or 75 bit/sec Baudot code for compatibility with international links. Infolink costs $229/mo from TRT Telecommunications, 1747 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Gandalf Modem

Gandalf Data, Inc. showed its LDS 140 asynchronous local data set that reportedly can transmit data up to 12 miles on loaded wire pairs at speeds up to 4,800 bit/sec. At 9,600 bit/sec, the unit can transmit up to six miles over unloaded wire, the firm said.

The four-wire, full-duplex unit is priced at $450 from Gandalf, 1019 Noel Ave., Wheeling, Ill. 60090.

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Terms Imprecise: Fiedelman

Poor Definitions Called Barrier to DDP Talks

By Howard A. Karten
CW Staff

NEW YORK — One of the difficulties users encounter in discussions about distributed data processing (DDP) is the imprecise terms and equipment definitions used in this rapidly emerging field, according to Lawrence Fiedelman, president of Management Information Corp. and publisher of the "Datacomm & Distributed Processing Report."

Speaking before a workshop on equipment selection at the Mid-Atlantic Computer Expo '78 here recently, Fiedelman pointed out that "today's DDP product was a key-to-disk product six months ago and a data entry product two years ago."

According to Fiedelman, "DDP is the division of logically related DP functions among multiple, geographically dispersed computer systems." Further, "yes" answers to the following questions would indicate a company really has adopted DDP:

- Are the DP activities themselves decentralized?
- Does the company have multiple systems?
- Is there some form of data communications?

Fiedelman, who is also a consultant, offered several equipment "look-for" criteria to the seminar group. These include the ability to support multiple terminals and multiprogramming, the ability to handle file management and the presence of business-oriented software.

Additional criteria include the existence of data communications software, a user-oriented langauge, data entry software and transaction-oriented processing.

The file management capability of a minicomputer under consideration, according to Fiedelman, should include the ability to access data from the system's own files or from a central data base, while the need for a data entry capability means a user will have to invest a considerable amount of money to provide such a feature if it is not already present.

Discussing the data communications features of a system under consideration, Fiedelman mentioned five items to consider. These are the ability to do remote batch work or otherwise emulate an IBM 2780 or 3780 terminal, the ability to perform interactively like an IBM 3270 CRT, the presence of Synchronous Data Link Control protocol, a concurrency ability and a networking capability.

Major concerns of a user in undertaking equipment selection should include security, data integrity, backup by the vendor and service and support. Additionally, questions of program development, systems usage and system control must be addressed, he noted.

Discussing the security aspect, Fiedelman commented that DDP "can open up a system to unauthorized entry better than anything I know." The program development question, he added, is particularly relevant since hardware support from a vendor may be close at hand, while the author of a particular piece of software "may be across the country."

More Seeing DP As Privacy Peril

NEW YORK — An increasingly large number of Americans fear they are relinquishing their privacy when they apply for credit cards and buy goods on an installment plan, according to Humphrey Taylor, deputy chairman of Louis Harris & Associates.

Speaking on "Individual Rights in the Corporation" or a seminar here sponsored by the New York University Law School and the "Civil Liberties Review," Taylor said about 54% of the public thinks computer data banks pose a threat to personal privacy, compared with 38% four years ago. The statistics came from a series of Louis Harris Polls, he said.

The statement that "when Americans open their first charge account, take out a loan, buy something on the installment plan or apply for credit they begin surrendering their privacy" met with agreement by 71% of the public, up from 48% four years ago, Taylor said.

Report Debuts On DP Misuse

RYE, N.Y. — A report entitled "Detecting and Preventing Misuse of Data Processing Systems" has been issued for the first time for DP management, systems designers and DP auditors who are concerned with the problems of computer fraud and violations of information privacy.'

The report defines 15 major exposures that can result from unauthorized acts by both internal personnel and outsiders. It also describes 83 procedures or safeguards that can help detect and/or prevent misuse of computer systems.

The report is available from Reymont Associates, 29 Reymont Ave., Rye, N.Y. 10580 for $5 per copy postpaid.

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Lists Ownership Histories

Art Dealer Builds Data Base on Rare Paintings

By Brad Schultz
CW Staff

NEWBURYPORT, Mass. — An art dealer here can generate the ownership history, including the current location, of rare and valuable paintings with its minicomputer-based data retrieval system. The dealer may soon offer this capability to galleries, museums and other institutions.

Steven Straw Co. is using computer technology to establish itself as an archivist of art information. Straw is now transferring its inventory data base to an IBM System/34 CPU, according to its vice-president, Peter F. Fagley.

Each record in the data base stores an artwork's "provenance" — the history of who has owned the work, where it is currently located and when and where it has been exhibited.

Each record also includes the artist's name, the painting's title, its physical dimensions, its medium, whether the work is signed and the date it was completed.

There are no other galleries using computers in the same fashion, Fagley noted. The National Collection of Fine Arts — a museum of the Smithsonian Institute — has the only other computer system of this type, which is called Selgem. Selgem is used to keep track of American paintings executed before 1914.

Straw normally sells paintings by approaching museums and private collectors in the U.S. and Western Europe. The firm basically tries to match each painting it has for sale with the indicated desires of a client and must therefore stay apprised of a painting's market demand, recording the information in a manner that facilitates comparison with its inventory data base. Typically clients register their wants by responding to questionnaires the dealer regularly mails out or via telephone inquiries.

Straw acquires its inventory information from other galleries, private collectors and art buffs, museums and similar institutions. Often the information is volunteered without solicitation, Fagley said, indicating a number of organizations and individuals simply wish to help his firm build one of the nation's most comprehensive archives of paintings.

Each Straw client receives a regularly mailed summary of the dealer's offerings and may thus contact the dealer when an item of interest becomes available, Fagley said. When Straw matches a client with a painting, the dealer will generally deliver a documentation package on the painting to that client.

End to File Draws

Before automating, Straw stored its inventory and customer data in file drawers. Mere scraps of information — for example, that a certain painting had been exhibited in the Metropolitan Museum 40 years ago — could only be incorporated in the files by a "laborious" hand procedure, Fagley said.

Straw personnel must cross-reference information on many records to compile such data as the titles of all works in stock by a given artist or a list of all watercolors available in a given retail price range. To keep cross-indexes accurate, a number of records must be modified every time a given record is updated.

Compelled to automate in order to meet its need for high-speed editing of many records in a data base, the firm initiated its retrieval system on a Digital Equipment Corp. Datasystem 310 list processor about two years ago. The machine failed to meet Straw's needs, however.

Straw purchased the DEC processor from a third-party dealer "who didn't understand our requirements and led us to believe the machine could do a lot more," Fagley said.

"The programming was very, very simple. We just bought a standard package for list processing, and that was it. There was very little tailored design to our specifications," he continued, noting the chief complaints with the 310 were its slowness and inability to edit information.

Moving to Third System

Last September, Straw ordered the System/34 to drive its system and, at the same time, replaced the 310 with a leased IBM System/82 for use until the 34 arrived. McCracken Computer, Inc. of Lexington, Mass., installed the 32 and has implemented inventory, client maintenance, historical archives, accounting and general ledger programs for Straw in RPG-II.

McCracken consultant Walter Cole described the System/34 configuration now being installed as including a 53/40 processor with 64K bytes of memory, a 27.1M-byte disk storage device, a double-density diskette reader, a matrix printer, a 160 line/min printer and four CRT workstations.

Remote terminal access to the data base may become a service of Straw soon after the current CPU conversion ends, Fagley indicated.

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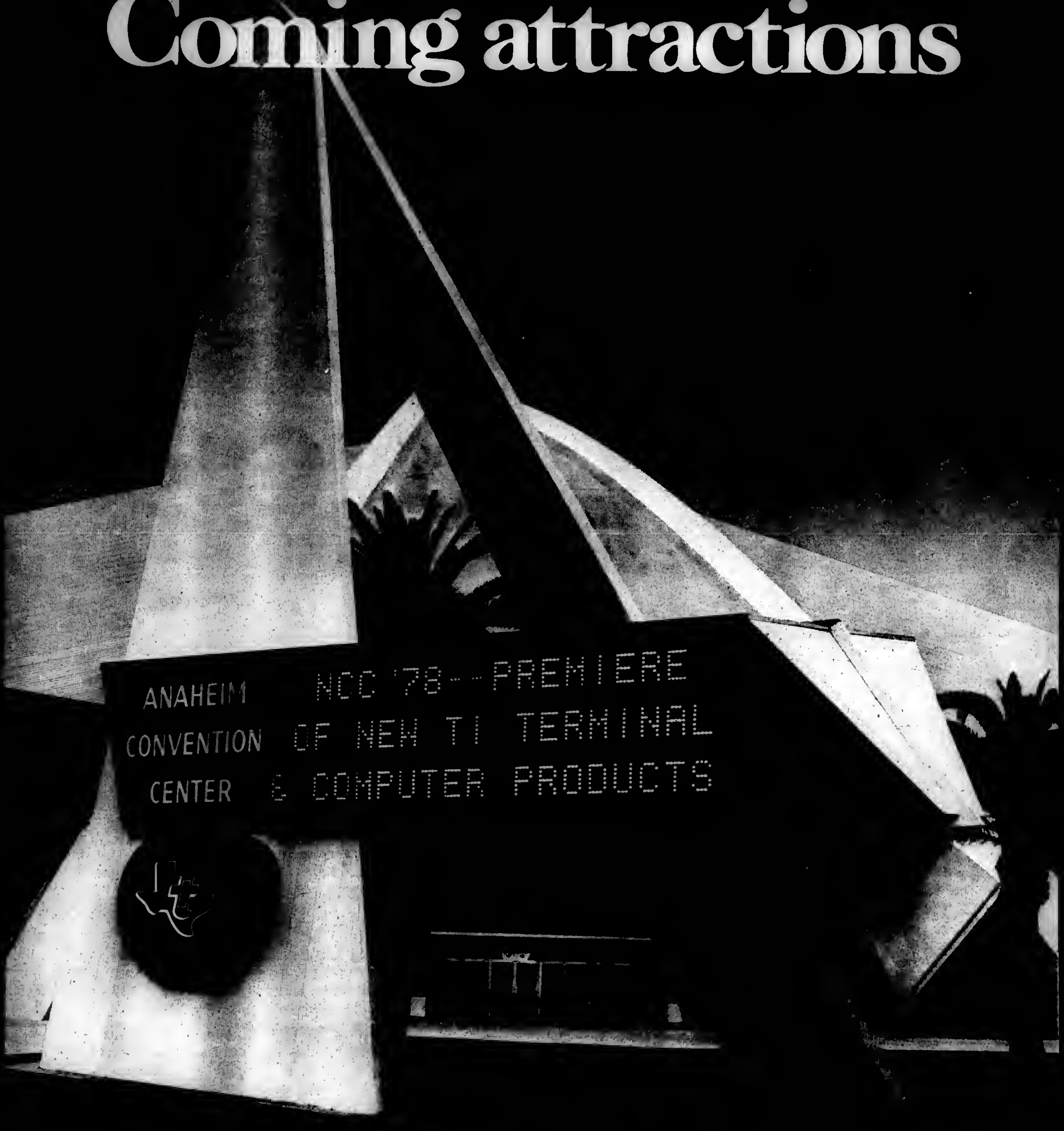
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TEXAS INSTRUMENTS.

Seminar Series on Professional Development

ANAHEIM, Calif. — In addition to the more than 100 conference sessions planned for the National Computer Conference here June 4-8, "Professional Development Series" made up of 15 tutorial seminars will be presented.

The series will run concurrently with NCC, which is sponsored by the American Federation of Information Processing Societies (Afips).

Each of the seminars in the series — which will be run under the direction of Gopal K. Kapur, consultant with Kapur and Associates — will be limited to 100 registrants and will cost $45, which includes complete course material plus admission to the NCC exhibit program and the Personal Computing Festival.

The seminars are:

• An Overview of Word **Processing** will describe the discipline of word processing and include information on equipment, planning, implementation and changes in organizational structure.

The course, presented by Amy D. Wolh of Datapro Research Corp. will also include coverage of anticipated trends in office automation as they relate to word processing.

• Women and Management Update — Skills for Winning. This course will provide the information, skills and techniques important to working women who are engaged in, or about to assume, management responsibilities.

Topics will cover "tokenism," strategies for getting a fast start on a new job, deciding when one has been in a job too long, selecting the right boss, getting the most from meetings and overcoming barriers in being first woman on the job. It will be presented by Dr. Dru Scott of Dru Scott Associates, Inc.

• How to Get Started With **Microcomputers** will cover the decisions involved in development, production and marketing of products using microcomputer technology. The seminar is designed for decision makers with responsibility for planning, marketing and production management.

This seminar will be presented by Eric R. Garen of Integrated Computer Systems, Inc.

• **Developing Managerial Skills** will analyze the job requirements of the DP manager with emphasis on required skills and training. The course will examine the managerial function and the concepts of interpersonal communication and will be presented by Donn L. O'Neil of the National Learning Institute, Inc.

• **Information System Architecture — A Management Perspective.** A philosophy for information system analysis and design, based on a functional analysis of organizational data resource, will be examined.

Included will be establishment of the need for a more formalized approach to the building of information systems, creation of a conceptual framework for the information system design task and suggestions for a structure for information system architecture projects.

Recent experiences with this methodology will also be evaluated. This seminar will be presented by Cory K. Foster and Ocie M. Gamble of Cincom Systems, Inc.

• **Requirements Analysis and Definition** will analyze requirements analysis and definition and how they relate to other aspects of software development. The nature of this task will be examined with special attention to three techniques currently used in this area — Hipo, PSL and structured analysis and design techniques (SADT), including measures of their effectiveness.

SADT will be described in detail, including an example of its application, by Peter Freeman, Softech, Inc.

• **Computer System Capacity Planning and Performance Evaluation.** A number of techniques in computer system ca-

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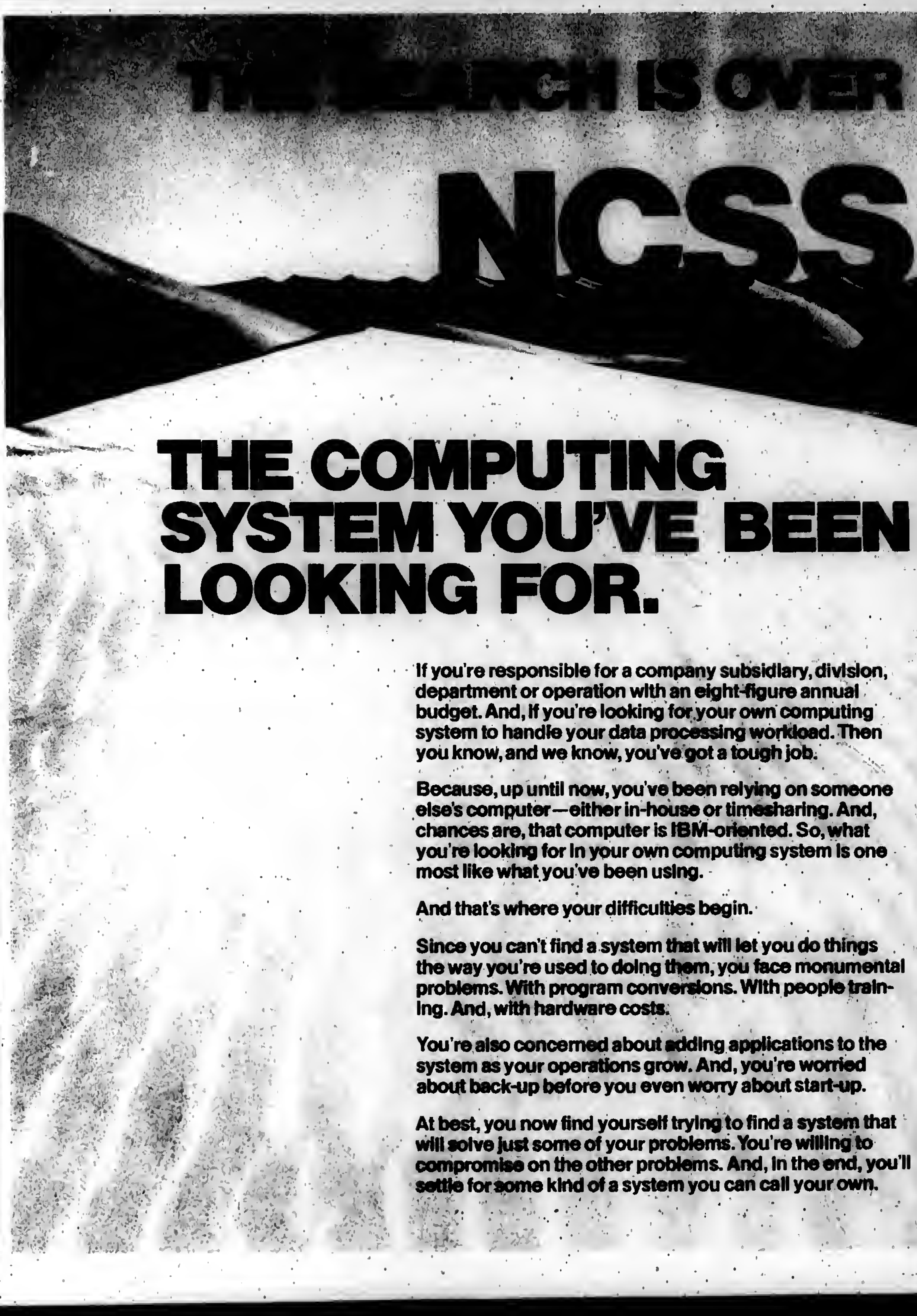

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Scheduled to Run Concurrently With NCC

pacity planning will be reviewed. Attendees will learn what quantities to measure, how to obtain necessary measurements and how to apply measurements to existing problems.

Benchmarking and modeling will be discussed and case studies will be reviewed. Emphasis will be on the capabilities and limitations of current tools and techniques, plus application of performance evaluation. It will be presented by Dr. Jeffrey P. Buzen of BGS Systems, Inc.

- **An Overview of Distributed Processing** will provide an introduction to distributed processing systems including data communications and networks, minicomputers, terminals, distributed data bases, management, measurement and security.

Emphasis will be on providing attendees with a basic understanding of developing terminology as well as the current state-of-the-art, according to its presenter, Marshall D. Abrams of Integrated Computer Systems, Inc.

- **Managing and Motivating DP Professionals.** Factors which motivate or fail to motivate subordinates will be identified in this seminar intended for the DP manager or those planning a career in management of the DP function. Emphasis will be on effective management strategies for immediate on-the-job application.

Participants will learn to identify performance problems, determine their causes and implement appropriate strategies to encourage superior performance. It will be presented by D. Grote, Performance Systems Corp.

- **How's and Why's of Effective Computer Negotiations** will cover various aspects of negotiations, including assembling the negotiating team, establishing and assigning priorities involving financial and contractual objectives, considering equipment and financing alternatives and planning and implementation of negotiations with emphasis on techniques, tactics and checklists. Kenneth G. Brindle of International Computer Negotiations, Inc., will present the session.

- **Business Protection from Computer Crime and Accidental Loss.** This course will convey actual loss experience with emphasis on computer crime. A strategy for effective security will be outlined that differentiates between protection from accidental loss and intentionally caused losses.

Emphasis will be on identification of vulnerability based on DP occupations, the major source of vulnerability. Scenario techniques will also be employed by Donn B. Parker, SRI International.

- **Cryptographic Protection in Computer Systems** will cover the basic principles of cryptographic algorithms and systems with emphasis on differences between block and stream ciphers. Included will be a description of a cryptographic algorithm developed by IBM and accepted by the National Bureau of Standards as a federal standard.

Also slated for discussion are cryptographic methods for communications security, message authentication and generation and management of cryptographic keys. Principle instructor will be Richard E. Lennon of IBM's Systems Communications Division.

- **Designing the Data Base System Project** will review the planning and design of an optimum data base system project and generation of its requirement statement.

Emphasis will center on determination of a staged development plan, development of a requirements statement, initiation of a data dictionary, establishment of required architecture, plus creation of a project cost/benefit model and implementation planning. It will be presented by Leo J. Cohen of Performance Development Corp.

- **Hands-On Microcomputer Software/Hardware Workshop** will introduce fundamental principles of single-board microcomputer software/hardware interaction through hands-on exercise.

Led by Eric R. Garen of Integrated Computer Systems, Inc., each participant will gain experience in program manipulation of CPU registers, stack pointer operations and memory conventions, as well as memory addressing and program debugging.

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Growing Federal Users Group Sets Conference

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — The Federal ADP Users Group (Fadpug) has begun to rise in the constellation of advisory groups, lobbyists and special interests that are so much a part of the Capitol City scene.

Thirteen members of the government-sponsored organization of federal, state and local government employees currently serve on the President's Reorganization Project team that is inquiring into the need for reorganizing of federal DP resources, the group's president, Paul D. Oyer, noted.

The user group also takes credit for influencing the final version of the Computer Sciences Occupational Standard announced by the U.S. Civil Service Commission a year ago. "The standard is the first professional computer job description the federal government has had," according to Oyer, who is a planning officer of the Treasury Department's Office of Industrial Economics.

Paul D. Oyer

Begun in 1970, Fadpug has grown from 407 members in mid-1976 to over 1,700 members today. One further sign of the organization's health is its first major conference, to be held here June 1-2 with the goal of examining the need to integrate management systems with information systems in the federal government in the 1980s.

The conference, titled "Managing Tomorrow's Information Technology: The Key to Improved Government Operations" will provide a forum for Fadpug's special interest groups.

Fadpug has eight special interest groups — career development and training, management graphics, privacy and security, DP procurement, DP standards, software, the user's involvement in systems and new technology and zero-base budgeting and DP. They plan a program aimed at going beyond data processing and communications to the government operations these tools aid, Oyer stressed.

People "in the computer field tend to believe that the DP tail should wag the government operations dog. That should not be the case," the Fadpug president stated, adding, "On the other hand, we don't want to be the unrecognized tail that drags in the dirt."

Fadpug and its members have been frustrated by the lack of DP involvement in the policy decisions agencies make, he said. Too often, the DP function in an agency is called in after decisions have been made and told to implement a project that might not be amenable to automation.

"DP people are as much to blame as their nontechnical managers," Oyer admitted. "We simply don't communicate in English."

Three Users Eyed

Aimed at three kinds of "users" — those who use the output of computer services, those who produce that output and government policymakers — the Fadpug conference hopes to draw a crowd of 300 to 400 people and to get DP and nontechnical attendees to talk to each other, Oyer said.

The meeting will focus on two themes: the development of improved DP and information policies and enhanced government productivity through DP and communications. Charles P. Lecht, president of Advanced Computer Techniques Corp., and Frank Carr, commissioner of the General Services Administration's ADP and Telecommunicatons Services, will deliver major addresses in these respective areas.

Societies/ User Groups

The conference will center on policy the first day and on productivity the second day, Oyer noted. There will also be a small number of exhibits, largely time-sharing services and modeling systems, geared toward the interests of program and line managers.

Fadpug was given impetus in the late 1960s because the federal government had lost its pioneering stance in the introduction of DP and telecommunications, the organization's president believes. "We want the government to lead again in the 1980s the way it did in the 1950s," Oyer said.

The user group plans to honor Rep. Jack Brooks (D-Texas) at the June conference, presenting him with the first "Fadpug Man-of-the-Year Award" for his impact on the government's use of DP and communications.

Fadpug charges no membership dues, but will charge a fee of $150 for its conference. Anyone interested is invited to attend the meeting and should write to USPDI, Inc., Conference Manager, 719 Belgrade Road, Silver Spring, Md. 20902.

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As Technology Changes in '80s

Firms Seen Hiring Philosophers, Therapists

By Howard A. Karten
CW Staff

NEW YORK — Technological change and the accelerating rate of that change in the 1980s will force busineses to hire several types of employees new to the corporate world, according to Charles P. Lecht, president of Advanced Computer Techniques Corp. here. Among these will be corporate philosophers, psychologists, semanticists and pilots.

Lecht's firm already has a company psychologist who comes in to help talk over employees' complaints. Delegating this job to a psychologist rather than trying to deal with these types of problems himself saves him two days a week, he said.

Keynoting a recent Mid-Atlantic Computer Expo '78 session on managing people problems, Lecht called on present programming languages "garbage," saying the only natural thing about Cobol is the shape of the letters.

The man-machine interface of the future will change "enormously," he forecast, bringing a sudden and massive unemployment of programmers some time in the 1980s. The vocational keys to the future, he said, are library science and linguistics: "Read Japanese or German, it'll guarantee your future."

In a rambling, often humorous speech, Lecht predicted the 1980s would see, in addition to orbiting communications satellites, spaceborne computers. The advantages of "the service bureau in the sky," as he called the development, would be in its maintainability and endurance.

With no need for air conditioning and no biodegradation or other forms of wear and tear, "computers in the sky" would never wear out, he claimed.

Discussing the impact of present and future technology on the structure and content of business conduct, Lecht drew three conclusions. First, he said, training programs, as they now exist will be replaced by an emphasis on the need for "the whole man," not merely the specialist. Secondly, employment of programmers and systems analysts will increase until a natural, easy-to-use man-machine interface exists. At that point, large numbers of these specialists will be unemployed, he predicted.

Universal Incompetence

Citing what he believes will be another important consequence of the changing technology, Lecht said "we will be unable to disguise our inability to think."

The last 10 years, he said, have served to demythify "the idea of a vast difference between the top and bottom of a corporation." One of the things discovered about business, he added, is that "corporations are successful and managements are not running them," indicating it is uncertain just who is running them.

Expanding on his theme of universal incompetence, Lecht, the author of four books on the subject of computers, stated there is good news and bad news attached to the recognition of ineptitude. The bad news, he said, is that it is universal; the good news is that "when it is found out, there will be no change."

"Businessmen and intellectuals will be the heros of the future," Lecht contended, and "companies will boast of the intellectuals and brains on their staffs."

Organizational charts will also change, he said, tomorrow's charts illustrating not only hierarchical structures within organizations, but emotional, technological and administrative dimensions as well.

Booklet Details Foreign Laws On Data Privacy

WASHINGTON, D.C. — The U.S. Department of Commerce has completed its compilation of "Selected Foreign National Data Protection Laws and Bills" and that publication is now available.

Produced by the Office of Telecommunications (OT) — now part of the National Telecommunications and Information Administration (NTIA) — the compilation includes English translations and summaries of data protection laws from the Federal Republic of Germany (promulgated in 1977), France (1978) and Sweden (1973) and bills from Belgium (dated 1977), Denmark (1977), Luxembourg (1977), Norway (1977) and Spain (1976).

The publication also consists of the Council of Europe draft resolution of an international convention on the protection of individuals whose records are part of automated systems (January 1978).

Edited by Charles K. Wilk, the compilation is catalogued OT Special Publication No. 78-19. It can be obtained for $3.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. The publication's stock number is 003-000-00536-R.

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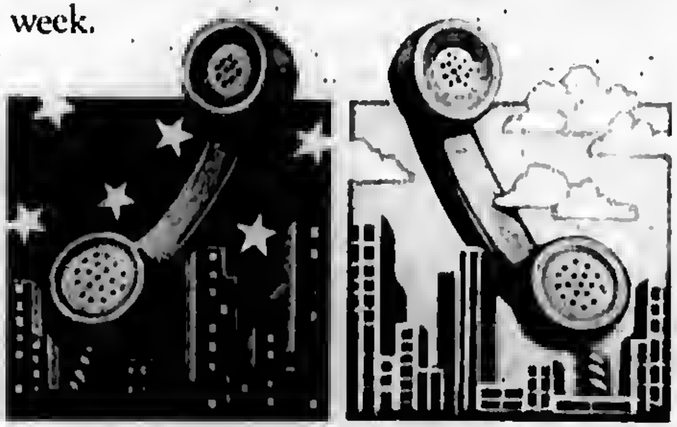

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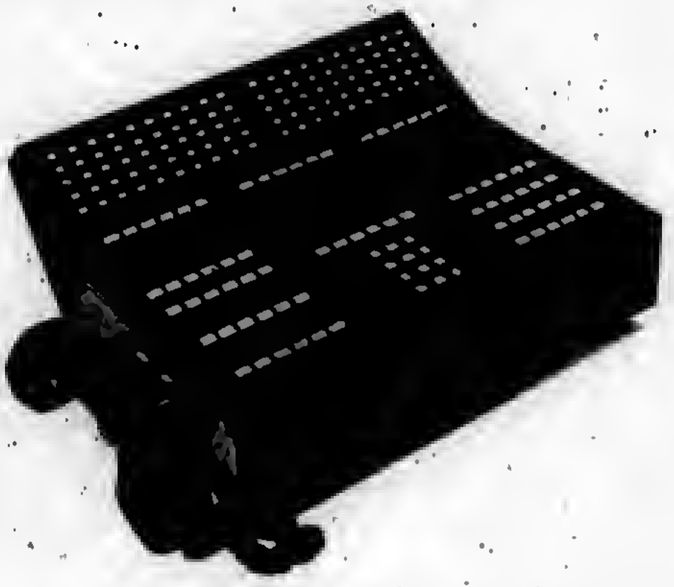

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Aimed at Reducing Pollution

Coast Guard Unit Tracking Marine Safety Data

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — In an effort to reduce the pollution in U.S. ports from both foreign and U.S. vessels that are failing to comply with federal regulations, the U.S. Coast Guard has begun monitoring their comings and goings and their operating records with a computerized information system.

President Carter directed that that the Marine Safety Information System (MSIS) be established following a rash of foreign tanker accidents in U.S. waters during the winter of 1976. At that time, the President ordered the Coast Guard to board and examine all foreign flag tankers entering U.S. ports and to establish an information system to keep track of the safety and pollution records of all vessels.

Using the MSIS since September, captains of the port, marine safety offices and marine inspection offices on the Atlantic, Gulf and Pacific coasts, the Mississippi River system and the Great Lakes can obtain vessel histories through a telephone dial-up link to Texas Instruments, Inc. Model 743 terminals located in 51 port captains' offices and 12 district offices, according to Lt. (j.g.) Christopher Young of Coast Guard headquarters.

The terminals access the Department of Transportation's IBM 370/158 located in Valley Forge, Pa.

The four categories of information maintained in the MSIS data bank are violation histories, boarding and inspection histories, casualty records and pollution incidents. The most important data is included in the boarding and inspection records, Young said, since that is where daily minor and major deficiencies are recorded.

All vessels required to give advance notice of arrival to Coast Guard port captains are included in the MSIS, including tankers and general cargo vessels but excluding fishing vessels and pleasure craft.

"First thing in the morning," Young said, the port captain accesses the system for information on all vessels coming into the port that day. For example, if 20 large oil tankers are scheduled to pull into a port in one day, the port captain would consult a printout of the histories of each one to determine which ones he might just "spot" for the "hookup" and "disconnect", Young said.

If a vessel had a history of oil dripping or leakages, the Coast Guard might want to observe the whole process of oil transfer to see whether human error or faulty equipment is involved.

The real effectiveness of the system is in the maintenance of accumulated histories of vessels, Young explained. In addition to advising the port captain if a vessel was in compliance with safety and environmental protection regulations during previous inspections, boarding and examination personnel can check their findings against previous examinations to see whether violations have been corrected.

HIS Gives Mini To Hub School

BOSTON — Honeywell Information Systems, Inc. has donated a Level 6 minicomputer to Boston University. The system will be used in research into how human beings move.

Given to the school's Health Sciences Department at the Sargent College of Applied Health Professions, the system will be located in the Human Performance Engineering Laboratory, where it will be used by graduate students and faculty.

The computer will facilitate studies on the appropriate treatment and rehabilitation of neuromuscular disorders, according to a university spokesman.

The system will also be used to summarize and analyze a wide variety of data on structural and functional characteristics of the human body as that data relates to motor performance, rehabilitation and occupational health and safety.

An industrial project for which the machine will be used is anatomical and physiological stress testing in industrial settings. It is hoped the results of such studies will be used to make industrial work areas and tools safer and more efficient, the spokesman said.

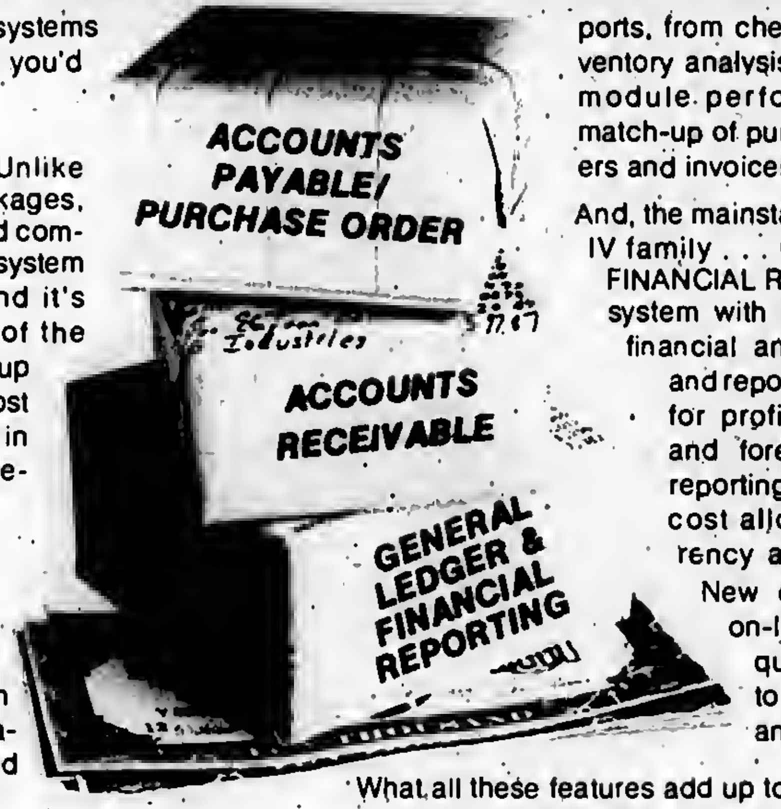
Nasis Meeting Set for Denver

LEXINGTON, Ky. — The annual meeting of the National Association for State Information Systems (Nasis) will be held this year in Denver Aug. 14-16.

Denver was the scene of the organization's first meeting 10 years ago.

Among the topics to be discussed are the federal DP reorganization study, the Comptroller General's guidelines for DP cost accounting and recovery planning for man-made or natural disasters.

Complete program details and reservation materials will be available soon from the group at P.O. Box 11910, Lexington, Ky. 40578.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Data Base Systems: Design, Implementation And Management, Part I

By Ronald G. Ross

DATA BASE MANAGEMENT SYSTEM (DBMS): *A computerized system consisting of numerous components which have as their collective purposes the implementation, management and protection of large-scale data bases.*

DATA BASE SYSTEM (DMS): *A system designed as a facility for the reporting of data from a master file in multiple sequences, usually in a single pass. A DMS exhibits some, but not all, of the features of a DBMS and is, by comparison, more highly oriented toward retrieval and reporting capabilities. Certain varieties of inverted systems are also classified as DMS.*

Mainframe data management software can be classified into four groups representing qualitatively different approaches to the data management problem:

- Physically linked DBMS (hierarchical and network data structures).
- Inverted DBMS (with support for interfile relation).
- Inverted DMS (without support for interfile relation).
- File-pass DMS (sophisticated report generation).

The boundary between inverted DBMS and inverted DMS is somewhat ill-defined since upgrading from the latter to the former is relatively simple. Other factors are involved, however, such as the size of applications that may be supported, on-line access support, support for concurrent access and the integration of multiple record types.

PHYSICALLY LINKED DBMS

System	*Vendor*	*Type*
IMS/VS	IBM.	hierarchical
TOTAL	Cincom Systems, Inc.	network
DMS-II	Burroughs	mixed
I-D-S/II	H.I.S. (Honeywell)	CODASYL
IDMS	Cullinane Corp.	CODASYL
DMS 1100	UNIVAC	CODASYL
DMS/90	UNIVAC	CODASYL
DBMS-10	Digital Equipment (DEC)	CODASYL
EDMS	H.I.S. (formerly Xerox)	CODASYL

INVERTED DBMS

System	*Vendor*
SYSTEM 2000	MRI Systems Corp.
ADABAS	Software AG
Model 204	Computer Corporation of America
DATACOM/DB	Insyte Corp. (formerly C.I.M.)
DMS-170	Control Data Corp. (CDC)
INQUIRE	Infodata Systems, Inc.

FILE-PASS DMS

System	*Vendor*	*DBMS Interface*
MARK IV	Informatics, Inc.	TOTAL, IMS
Easytrieve	Pansophic Systems, Inc.	TOTAL, IMS, ADABAS
ASI-ST	Applications Software, Inc.	TOTAL, IMS
Data Analyzer	Program Products, Inc.	TOTAL, IMS, ADABAS
CULPRIT	Cullinane Corp.	TOTAL, IMS, IDMS, DATACOM/DB

OTHER SYSTEMS

System	*Vendor*
MAGNUM	Tymshare, Inc.
NOMAD	National CSS, Inc.
RAMIS	Mathematica, Inc.

Figure 1. There are many file-pass DMS; only the most widely implemented mainframe systems are listed above.

In addition, there are programmatic means for circumventing the file relation problem, although in order to do so, the user must ply the data structure.

File-pass DMS, by comparison, is a relatively fixed class, and is largely restricted from evolving into full-scale DBMS. DMS of this class often support interfaces with physically linked DBMS, thereby providing significant user-oriented enhancements to those systems. File-pass DMS tend to be predominantly batch-oriented.

Commercially available mainframe software is shown in Figure 1 in three categories loosely corresponding to these four groups (inverted DMS have not been segregated into a distinct class). A number of the systems listed actually represent *families* of systems, the members of which cut across software and hardware versions.

Within the classification presented here, two types of DBMS have been grouped into the category of physically linked DBMS: hierarchical and network systems. Although these two types of systems are often contrasted, in comparison with other types of data management software, they actually exhibit more similarity than difference.

The dependence on physical linkage for data structuring is, of course, the major feature of that similarly. Physical linkage implies that addresses of related records are stored within records themselves so that linkage "paths" exist within and among physical files. The DBMS follows these paths in order to access data.

By way of contrast, inverted DBMS depend on the segregation of data values for given record fields and on their organization into index files, with pointers back to the original data. To effect data access, the inverted DBMS mostly operates on the indexes themselves, prior to actual record access.

Within the physically linked class, hierarchical and network systems are basically distinguished by the way they conceptualize the relationships

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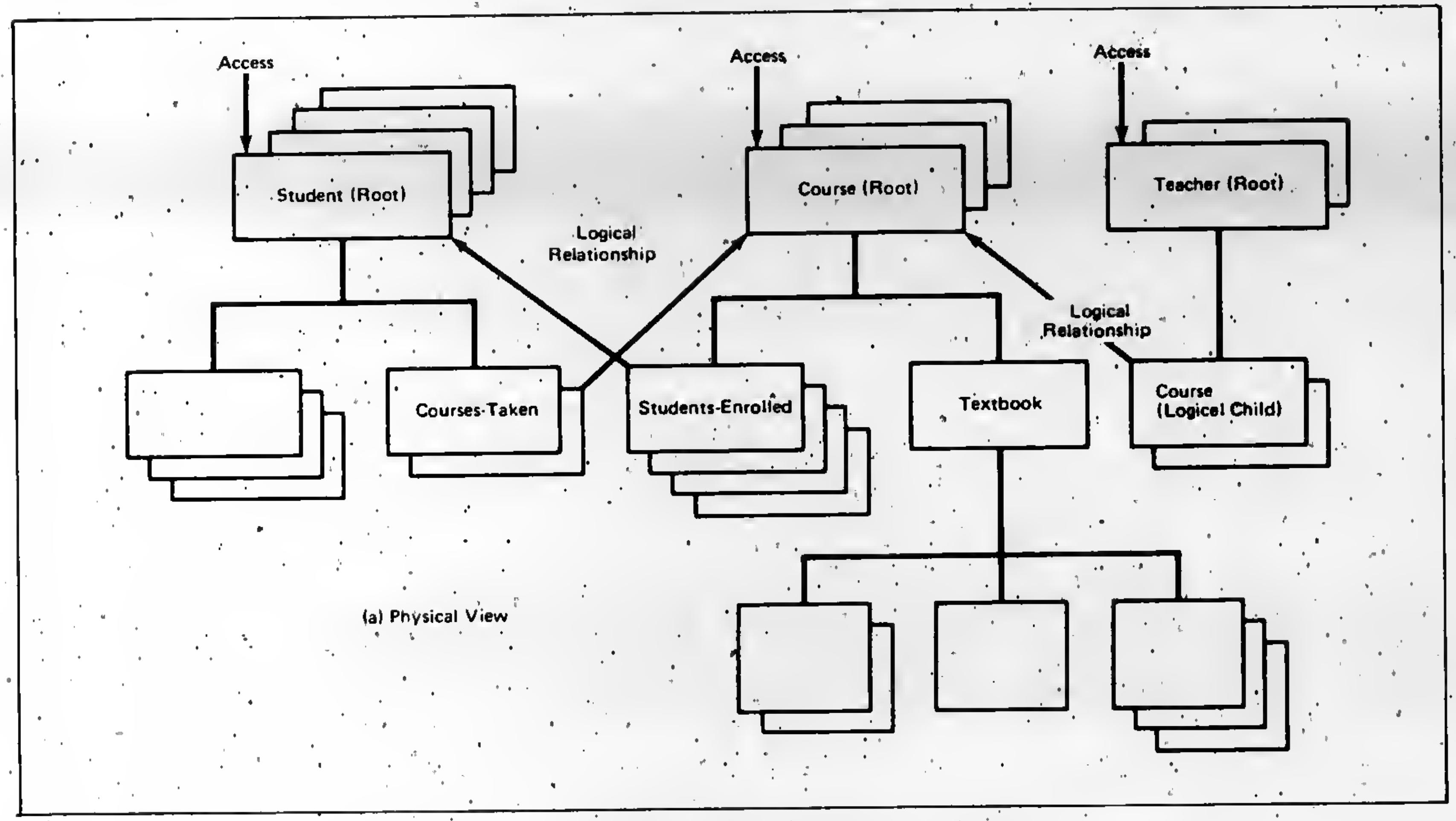
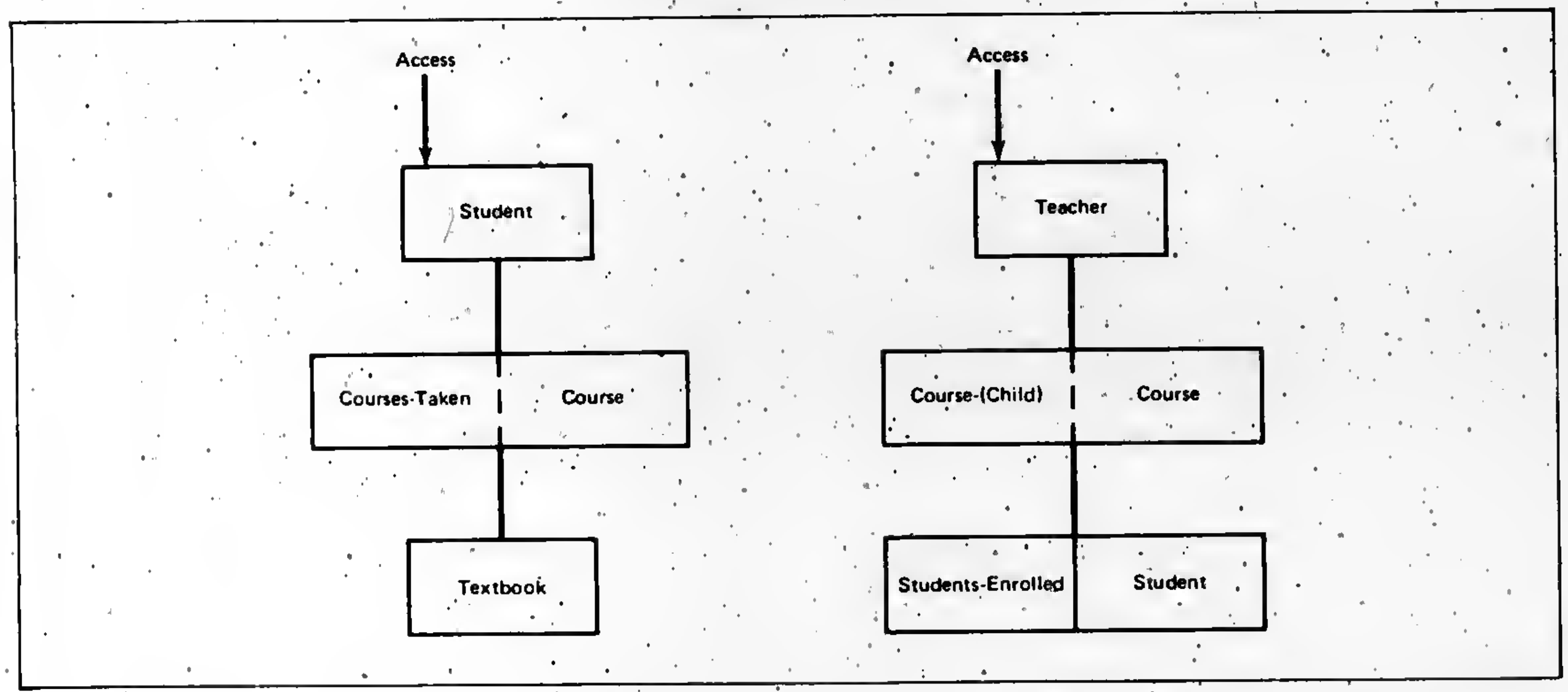
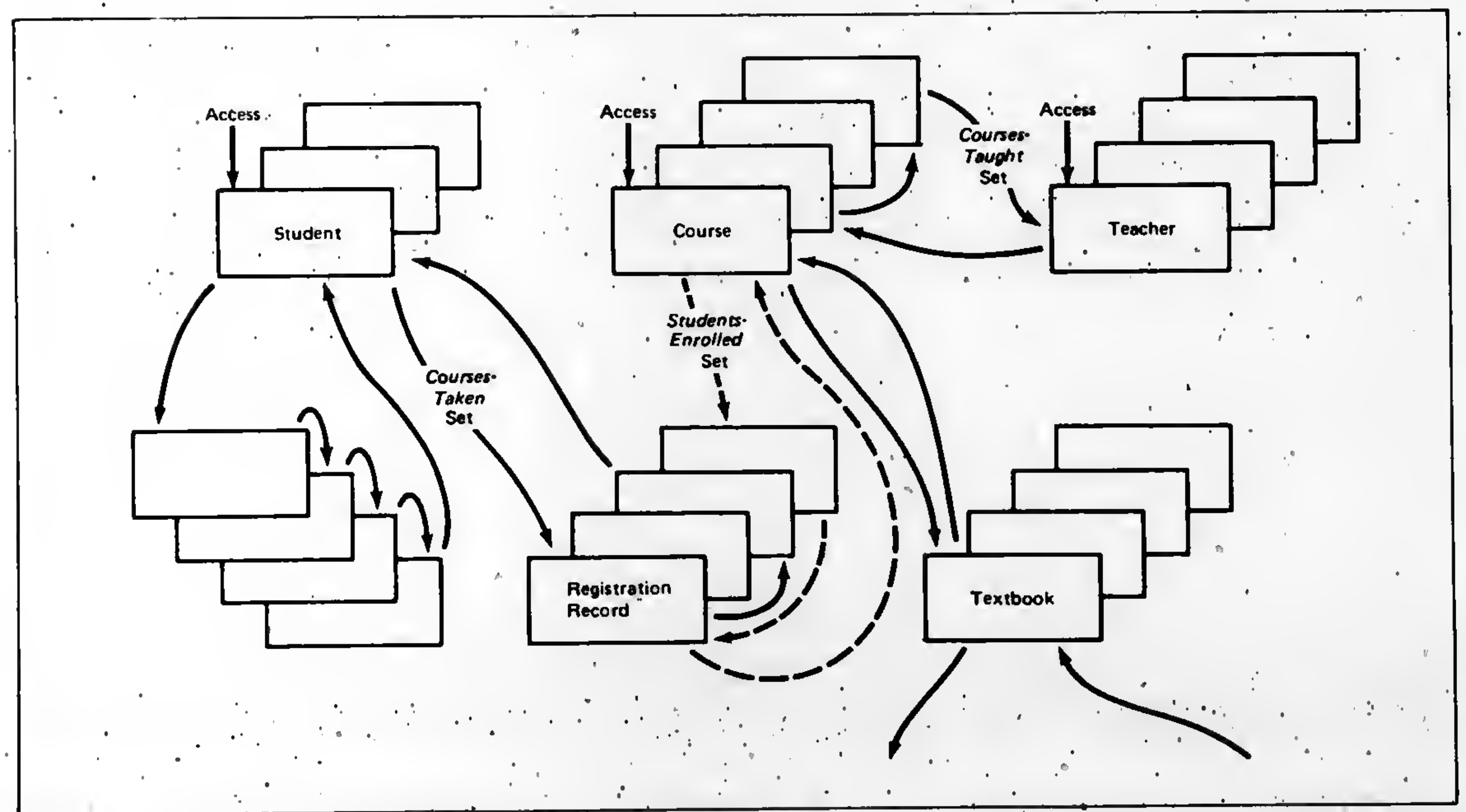






(Continued from Page 17)

between segments or records — that is, by the way they structure the data model. For IBM's IMS/VS — the major representative of the hierarchical family — data is structured into trees which may be "logically related" (by physical linkage in most cases) into a network-like arrangement.

"Logical views" of data related in this fashion are remodeled in order to appear hierarchical to the user.[1] In network systems, which include the Codasyl systems and Cincom Systems, Inc.'s Total, the emphasis is placed on sets of records, which are normally linked by physical means. A given record may be involved in many sets, as defined within the Data Definition Language (DDL).

Figures 2, 3 and 4 illustrate the varying conceptualizations of a hypothetical school data base in a hierarchical and in a network sustem. As the figures demonstrate, differences arise in the structuring of an identical data model.

For example, the hierarchical approach sometimes requires an extra record type to effect linkage between files, particularly in the case of a one-to-many set relationship. This is the relationship that holds between the teacher file and the course file in Figure 2; unlike the network structure, the hierarchical structure requires a record type that specifies the *courses taught* logical relationship.

When the relationship between records becomes many-to-many — for example, if a course is to be taught by more than one teacher — then an extra record type is required by either structure. This is the type of relationship that holds between students and course records in the school data model.[2]

Theorists contend that the hierarchical view is in fact a special case of the network model and that the set terminology of the latter is more precise. From the perspective of traditional methods in data processing, however, the hierarchical view represents less of a departure; for example, the typical Cobol record description may be easily represented by a tree structure (each OCCURS becomes a repeating segment type).

In spite of the differences between the hierarchical and network models, the dependence on physical linkage for DBMS of this class results in several concerns that are largely identical for any member DBMS. The first of these concerns is navigational access,[3] which characterizes programming in physically linked systems.

Navigational access means that "po-

Figure 2. (top) shows a sample conceptualization (schema) of a school data base by a hierarchical DBMS; Figure 3 shows the logical views of that data base; and Figure 4 (bottom) shows a sample conceptualization of the school data base by a network DBMS.

sition" in the data base is established on the basis of the currently accessed record. The programmer must then supply information so that the DBMS can "choose" between paths to get the next record.

It is important to note that, for the programmer, paths exist within the data structure; in all cases, the DBMS is responsible for access at the storage structure level. Path selection is typically a matter of specifying function, record (or set) type and key value(s) where appropriate. After each access, status checking is required to ensure that the operation succeeded as intended.

A second concern in physically linked DBMS, related to data base design rather than programming, is the definition of paths that match navigational requirements in direction, volume and type. This definition requires, on the one hand, adequate analysis of the data model and its use and, on the other, appropriate selection of pointer types within the DDL for the data structure; in other words, it is a question of both "where" and "how."

The list in Figure 5 presents various options in the definition of pointer types, along with typical functions in navigational access.[4]

Pointer Types

IMS/VS

SNGL A pointer to the first occurrence of a subordinate segment is placed in the parent.

DBLE Pointers to the first and last occurrences of a subordinate segment are placed in the parent.

HIER A pointer to the next segment occurrence is placed in each occurrence of given segment types.

HIERBW Pointers to the next and previous segment occurrences are placed in each occurrence of given segment types.

TWIN A pointer to the next segment occurrence is placed in each occurrence of a given segment type.

TWINBWD Pointers to the next and previous segment occurrences are placed in each occurrence of a given segment type.

LPARNT A pointer to a segment occurrence in another data base is placed in a given segment occurrence.

CODASYL

SET: MODE IS CHAIN [LINKED TO PRIOR]

- If LINKED TO PRIOR clause is included, pointers to the next and previous record occurrences are placed in each record occurrence of a set.
- If LINKED TO PRIOR clause is omitted, a pointer to the next record occurrence is placed in each record occurrence of a set.

MEMBER: [LINKED TO OWNER]

- If LINKED TO OWNER clause is included, a pointer to the owner record occurrence is placed in each record occurrence of the given type.
- If LINKED TO OWNER clause is omitted, no pointer is stored.

Access Functions

IMS/VS

GET UNIQUE Access a segment occurrence on the basis of supplied keys.

GET NEXT Access the next segment occurrence within the tree structure on the basis of current position and supplied information.

GET NEXT WITHIN PARENT Access the next segment occurrence under a given segment on which position was previously established.

CODASYL

FIND . . . USING Access a record occurrence of a set on the basis of item values.

FIND NEXT . . . Access the next record occurrence within the data base on the basis of current position and supplied information.

FIND CURRENT . . . Access the record occurrence on which position is established, supplying set and record information.

FIND OWNER . . . Access the owner record occurrence of a given set.

Figure 5

The similarity of the concerns in physically linked DBMS, whether under IMS/VS or a Codasyl system, demonstrates a correspondence of function between these systems. This correspondence has recently been matched by a convergence of operational capabilities.

Univac's DMS 1100, for example, supports an indexed sequential RECORD LOCATION MODE (entry-point access), indexing and variable-length records — all also offered by IMS/VS under the Vsam access method (enhanced Isam). These similarities are often obscured by the more noticeable, yet less significant, differences in data structuring.

Data Structuring

Before proceeding to a discussion of inverted DBMS, it is worth noting that the data structuring involved in the hierarchical and network models may be implemented by inversion as well as by physical linkage. MRI System Corp.'s System 2000, for example, — an inverted DBMS — follows the hierarchical model.

The Codasyl specifications allow for implementation by inversion, although DBMS of that group up until recently tended not to support it.

From this, it is clear that the distinction between physically linked DBMS and inverted DBMS is basically defined by characteristics at the storage structure level (that is, by access methods), whereas the distinction between hierarchical DBMS and network DBMS is more closely associated with differences in the conceptualization of data models — that is, by the data structures supported within the DDL. These several dimensions make possible the classification presented in Figure 6.

There are, however, several limitations to this classification. For one thing, physically linked DBMS sometimes offer supplemental indexing capabilities. Examples of such capabilities may be found within IMS/VS and DMS 1100.

A more significant problem is that there are a number of systems, particularly among inverted DBMS, which simply do not fall neatly within the strict hierarchical vs. network groupings. Such systems include Software AG's Adabas and Control Data Corp.'s DMS-170, which might be placed within the network class, although this does not entirely characterize their approach to data structuring.[5] Finally, there is inevitably some overlap between data structuring and access methods since the DDL is often involved in defining both. In spite of these limitations, the classification in Figure 6 is useful as far as it goes.

There are several issues in data inversion at the storage structure level that must be classified in order to reach a

(Continued on Page 20)

		PRINCIPAL ACCESS METHOD	
		Physical Linkage	*Inversion*
DATA STRUCTURING	*Hierarchical*	IMS/VS	SYSTEM 2000
	Network	TOTAL CODASYL Systems*	(possible)

*Support is provided within the CODASYL DDL specifications for the indexing of sets.

Figure 6. This is a classification of DBMS by data structuring and principal access method.

Biology	(Jim Jones)
Computer Science	(Jim Jones)
Computer Science	(James Smith)
Geology	(John Doe)

(a)

Biology	(Jim Jones)
Computer Science	(Jim Jones, James Smith)
Geology	(John Doe)

(b)

Figure 7. Shown are the index storage structures under (a) the indexed access method and (b) the inverted access method for the student record file in Figures 10 and 11 on Page 23.

(Continued from Page 19)

full understanding of inverted DBMS. The first of these is the distinction between indexed access and inverted access, both of which exemplify the general access method of inversion. In both cases, indexes are established apart from actual data and organized on the basis of given keys.

The indexed access methods is perhaps more familiar than inverted access because Isam (a member of the class) has had wide application. Indexed access becomes complicated beyond Isam, however, when allowance is made for duplicate keys or when the order of the indexed file is not that of the index itself.

This latter case occurs when the indexed field is *not* the primary key of the target file, and this is properly known as indexed random.

The distinctive feature of indexed access as used in DBMS (whether indexed sequential or indexed random) is that an index record is stored for every indexed record, regardless of whether other records have an identical value for the indexed field.

This is not the case for the inverted access method. Under this method, a key value is generally stored once and only once within the index, and associated with it are the addresses of all like-valued records. This distinction is illustrated in Figure 7.

The result of the inverted access technique is a more streamlined and compact index, in particular where the percentage of like-valued records is relatively high. Because inverted DBMS depend heavily on the efficiency of indexes (conservation of storage space is one relevant consideration), they tend to use this method rather than the indexed alternative.

In the process, however, the advantage of using the index as a data base in its own right (often possible under the indexed access method) is lost. In addition, indexes under the inverted access method tend to be relatively difficult to manage because the pointer arrays associated with each index value are of variable length. Much of the attention in inverted DBMS therefore centers on the construction of indexes.

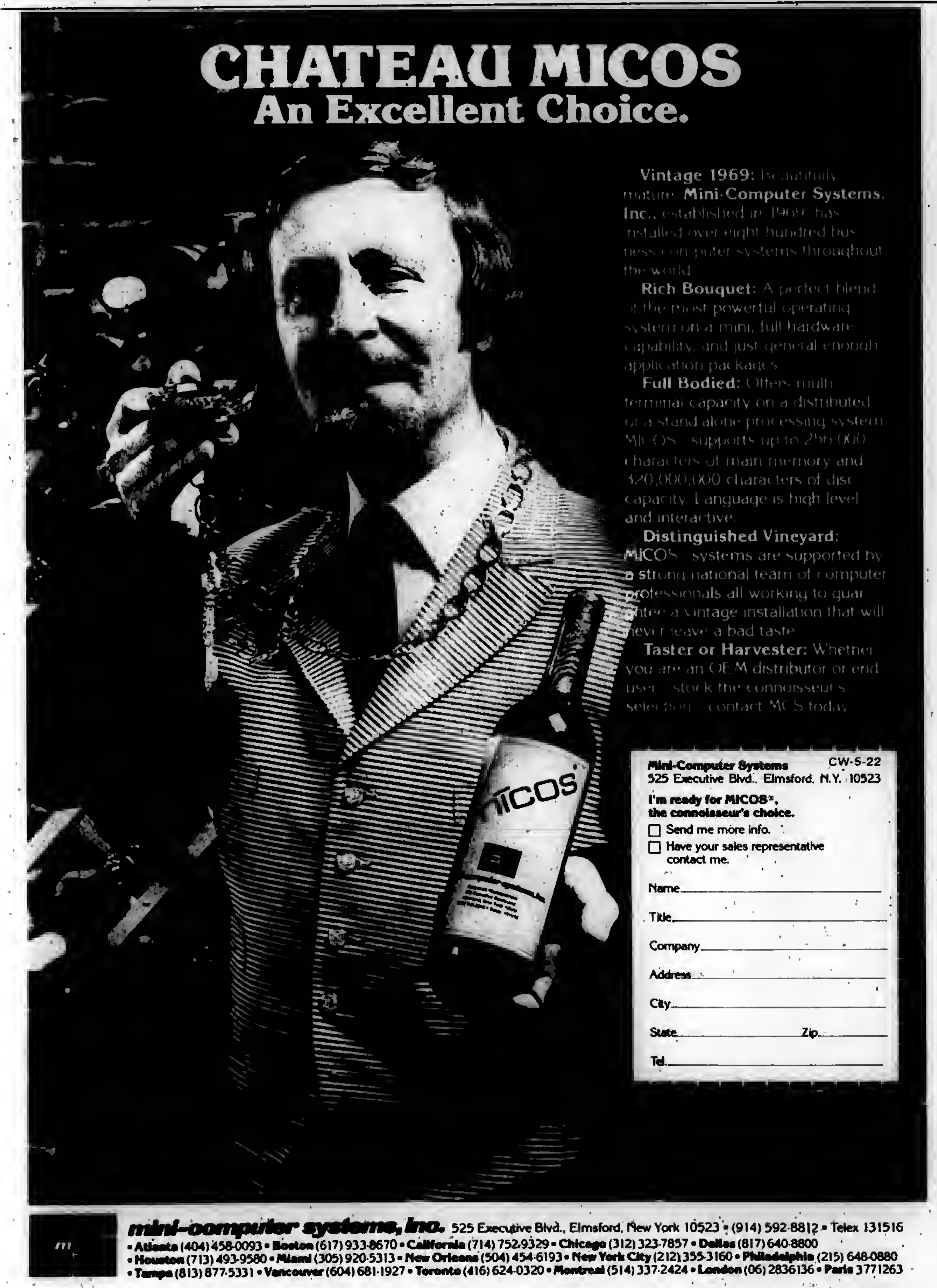
A second issue essential to understanding inverted DBMS is the distinction between partial and full inversion. Partial inversion, as the name suggests, means that only a small proportion of fields within a data base record are inverted. In a typical application, this might be 10% to 25% of all data elements, corresponding to those items most frequently used in queries or straightforward access.

A basic consideration in data base design under systems of this type is thus the frequency of item usage. In addition, it must be determined whether given items yield discriminating indexes; for example, a sex data item yields a poor index since only two data values are possible.

By way of contrast, full inversion means that *every* data element in a data base record is inverted. This makes possible a significant innovation at the storage structure level: since the data value of every data element in a record resides somewhere else in the data base (namely, in an index), the record itself *need not be stored.*

In its place, a pointer array surrogate is stored so that the record can be reconstituted if its retrieval is required.

Under this strategy, it is to be expected that the overhead of reconstituting records from surrogates will become prohibitive as the number of re-



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trieved records increases. Since many applications focus on producing sequential reports of various types, the full inversion approach is less prevalent than partial inversion among the major systems in the inverted class.

Inverted DBMS

Inverted DBMS have several advantages as well as disadvantages relative to physically linked DBMS. To summarize, the advantages are:

- The DDL is simple (structural specifications are limited basically to the designation of fields for inversion).
- Changes in data structures have less impact on application programming; also, there are fewer rules to follow in changing structures.
- Support for new linkage (relation) between existing files is easier to establish.
- Data storage is "purer" since physical support for the data structure is not contained within the data itself.
- Reorganization of data base files is less complex since files are not physically interrelated; unloading and reloading is not as often required for making structural changes.
- Ad hoc searching is strongly supported since indexes rather than data base records themselves may be examined by the DBMS.
- Programming in inverted DBMS is less involved since navigational access is not so much a factor (query languages in inverted DBMS are strong largely for this reason).

On the other hand, the disadvantages are:

- The indexes required in inverted DBMS represent significant overhead, especially where many fields are inverted.
- The overhead for update activity tends to be higher since changes to appropriate indexes are required for each update action.
- The overhead for known repetitive reporting tasks tends to be higher in inverted DBMS; in physically linked DBMS, such tasks are typically supported by direct pointers, particularly where interfile relation is involved.
- Indexes in inverted DBMS are in a sense "redundant" since data values are identical to those stored in data base records; significant storage space is required for indexes.

Although these points appear to be clear-cut, it is nonetheless difficult, if not impossible, to determine which of the systems — physically linked or inverted DBMS — is better for given tasks because this is largely system- and application-dependent. It is, however, accurate to characterize inverted DBMS as especially strong for ad hoc retrieval, in particular by query language facilities.

For this reason, systems of this type have been used more commonly in information storage and retrieval applications than physically linked DBMS, which have traditionally been associated more with production-type data and their application.

By the same token, it has traditionally been contended that physically linked DBMS are more proficient in applications where the ratio of update processing to retrieval processing is high. (The presence of chains within the data themselves eliminates the need to update segregated indexes.) However, the issue is more complex than this would indicate, and the point is not at all conceded by vendors of inverted DBMS..

These vendors (which include independents on IBM hardware) tend to be aggressive about performance and have successfully encroached upon the traditional territory of physically linked DBMS with numerous implementations. Thus traditional lines, whether fact or fancy, have blurred in recent times.

A dimension important to the success of inverted DBMS is the evolution of interfile relation capabilities within a number of systems.[7] There are several ways in which such a relation can be established. One way is by user request at runtime, which requires simply the specification of the data base files to be related and of the field on which the relation is to occur. The DBMS can then present the user with concatenated records by matching corresponding indexes.

A similar method, but one that removes the relational specification from the user, is to designate the relation of data base files within the user's subschema. The user then requests a given record type and receives, in fact, a record concatenated from several other record occurrences.

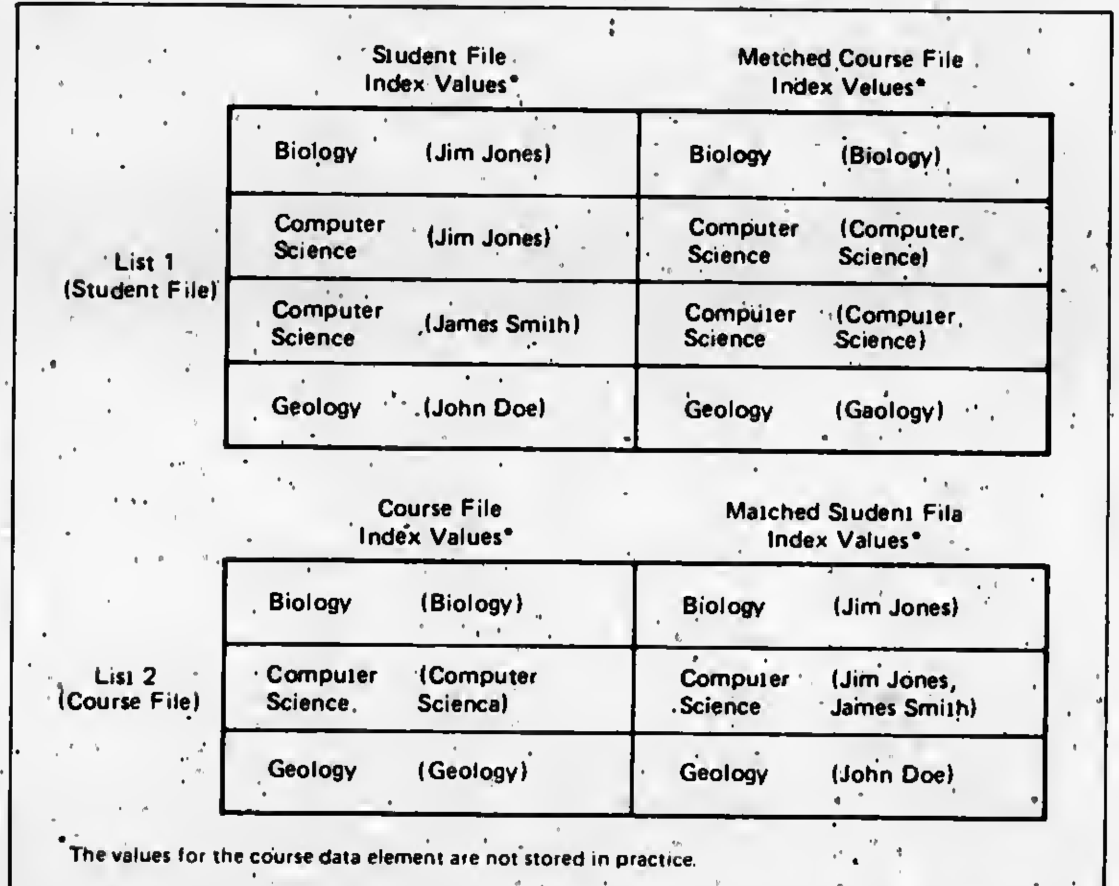
These two methods of relating files rely on the runtime matching of indexes. It is possible, however, to match up indexes *before* the request is issued in order to reduce the number of operations necessary at execution time and thus improve performance for retrieval.

In Software AG's Adabas, for example, two matched lists are kept, in addition to the regular indexes, for each related field. One of the matched lists "belongs" to each of the two data base files so that the other file may be directly accessed on the basis of matched values.

This strategy, which is illustrated in Figure 8, is especially effective for improving performance when the related field is not one for which values have previously been entered by the user in his query specification. Consistent with the keynote in inverted DBMS, the effect of this strategy is to avoid access to the data itself in order to satisfy criteria.

It is interesting to note that interfile relations established by this strategy approach physical linkage between

(Continued on Page 22)



	Student File Index Values*	Metched Course File Index Velues*
List 1 (Student File)	Biology (Jim Jones)	Biology (Biology)
	Computer Science (Jim Jones)	Computer Science (Computer Science)
	Computer Science (James Smith)	Computer Science (Computer Science)
	Geology (John Doe)	Geology (Gaology)

	Course File Index Values*	Matched Student Fila Index Values*
List 2 (Course File)	Biology (Biology)	Biology (Jim Jones)
	Computer Science (Computer Scienca)	Computer Science (Jim Jones, James Smith)
	Geology (Geology)	Geology (John Doe)

*The values for the course data element are not stored in practice.

Figure 8. In this illustration of the interfile relation (coupling) of Software AG's Adabas, the two matched lists shown result from the merging of the indexes for the school data base presented in Figure 11 on Page 23. The two files are related on the basis of the course data element.

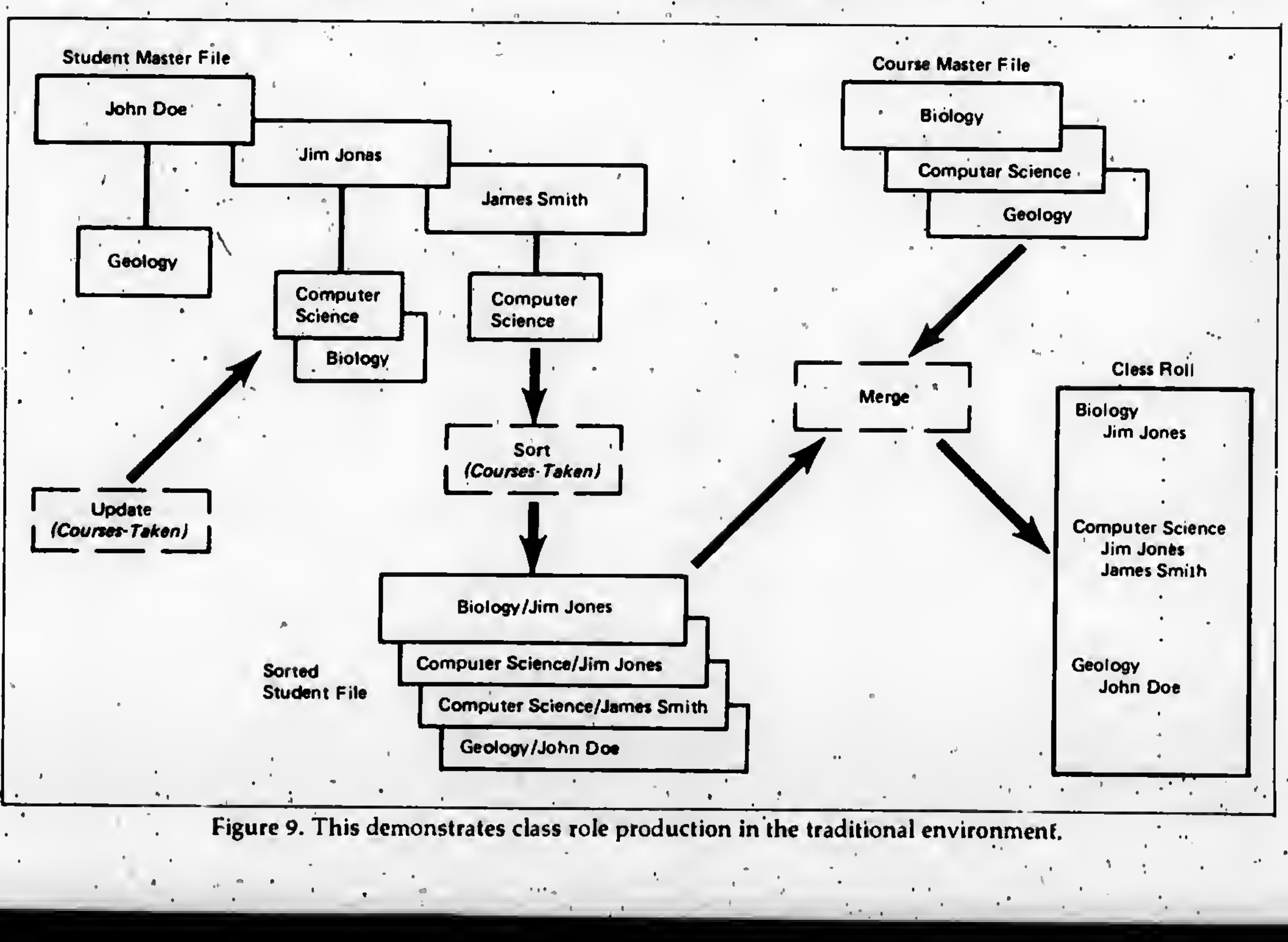


Figure 9. This demonstrates class role production in the traditional environment.

(Continued from Page 21)

the files, even though the relation remains external to the files themselves. Actual retrieval of records, however, is still basically effected by inversion, which remains the distinguishing characteristic of the system.

Data management systems — sometimes labeled report writers, although they surpass the capability suggested by that name — represent a significant counterpart to DBMS software. The total number of DMS users is comparable, in fact, to that of DBMS users.

An interesting development within the past several years has been the creation of interfaces to link the major DMS packages with DBMS systems, with the implication that DMS and DBMS can coexist within the same applications environment. From this it can be concluded that DMS serve to enhance the retrieval capability from DBMS-managed files.

In our earlier review of inversion-type systems, we noted that the differentiation between inverted DBMS and inverted DMS is rather ill-defined. This is not true for the distinction between physically linked DBMS and file-pass DMS.

The common denominator among file-pass DMS is the ability to create multiple reports (in different sequences) from a single pass of an input master file. This normally requires, of course, a sort for each sequence, although in a typical implementation, record surrogates (that is, temporary indexes) are sorted rather than the records themselves.

By contrast, a DBMS (whether physically linked or inverted) establishes a means of achieving a given report sequence *directly* — that is, by means of an ordered set or index maintained during data *storage*.

In essence, a DMS automates a more traditional method of processing; it is possible, for example, to visualize a DMS following much the same pattern for producing class roles, as Figure 8 illustrates. There are, however, significant potentials offered by the DMS. For instance, during the single pass of the file, other reports — bus schedules, homeroom lists and so forth — might be generated.

The distinction between physically linked (or inverted) DBMS and file-pass DMS is significant in that the requirements of the latter for file-pass and record sorting generally render them much less effective than DBMS in on-line and multiple update tasks. In one sense, record sorting in a file-pass DMS is made necessary by a lack of data structuring and amounts to the introduction (if temporary) of data redundancy into the system.

In general, DMS allow the continuation of traditional master file schemes, with their tendency toward data redundancy and inconsistency. Since the DMS environment is largely nonintegrated, DMS are often correctly designated file management systems.

Both file-pass and inverted DMS do, however, exhibit significant degrees of data independence. Like DBMS, DMS often suport an independent DDL (that is, a DDL apart from application programming), frequently in conjunction with data dictionary facilities. This DDL tends to be restrictive, of course: file-pass DMS usually support only sequential and index-sequential files.

Perhaps the most noteworthy feature of DMS, one particularly conducive to improving application productivity. is the provision of high-level user inter-

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face languages, which in many cases eliminates the need for cumbersome Cobol programming. An immediate result of this is a greater responsiveness to ad hoc requirements — an area in which DBMS are often significantly wanting.

DMS of the file-pass sort exhibit an additional capability: the ability to relate multiple files. Again, however, this capability is restricted in comparison with DBMS.

For DMS, a related file is often labeled "coordinate"[8] and is normally indexed sequential in organization. A key from the master file (or from another appropriate source) serves as a means of entry into the coordinate file *at run time* via its primary index. Many files may be "related" in this manner.

In summary, it may be said that DMS automate and enhance the activity normally associated with master file processing, although they do not achieve the integration of data and associated benefits available in DBMS. Nonetheless, they are viable alternatives in many environments and may in fact not be as distant from the mainstream of data base evolution, as is often thought.

Notes

[1] This requires the generation of pseudo data base descriptions, called logical DBD, using a simple subset of the regular DDL. Logical DBD follow paths established in the physical DBD.

[2] In the hierarchical data structure in Figure 2, two record types are shown effecting linkage between student and course records. In practice, one or the other of these can be "virtual," that is, not actually stored. It should be noted that the *courses taught* set in Figure 4 cannot be directly implemented in Cincom's Total, even though that DBMS is classified as a network system. Distinctions like the one between hierarchical and network data structures are often subtle but nonetheless significant in implementing data models. The major feature distinguishing network from hierarchical data structures is the view that the programmer "sees." Hierarchical views are supposedly easier for the programmer to use, although under existing DBMS the point is debatable.

[3] Navigational access is a term suggested by Charles W. Bachman, winner of the 1973 Association for Computing Machinery's Turing Award and principal architect of I-D-S, prototype for the Codasyl model. Navigational access in the hierarchical model is referred to as "tree traversal access."

[4] The pointer types shown for IMS/VS may be mutually exclusive in some cases. Not all options are given. The Codasyl pointer options are taken from the 1971 Codasyl Data Base Task Group Report, on which most current Codasyl DBMS are based. The access functions for the Codasyl model are taken from the 1976 Codasyl Cobol JOD and do not include all possible variations.

[5] These systems are sometimes characterized as relational, although they do not implement the relational model in full. The relational model itself is an addtional problem for the classification in Figure 6.

[6] Secondary indexing an IMS/VS is of this type. As mentioned previously, file level support in a DBMS is often provided by the operating system. This means, for example, that in index file in IMS/VS may itself be managed by Isam or Vsam, with the implication that the index is itself indexed. The result is a pyramiding access structure that improves overall performance. In this discussion, "index" refers to the data base index rather than to any lower-level index.

[7] Such capabilities include "coupling" in Adabas, "connection" in Inquire, "link" in System 2000 and "join" in DMS-170. A good deal of variation exists in the nature of these various implementations, as well as in their complexity. Interfile relation is an important, but not the sole, ingredient in distinguishing between inverted DBMS and inverted DMS.

[8] This corresponds to "indexed coordinate" files in Informatic's Mark IV.

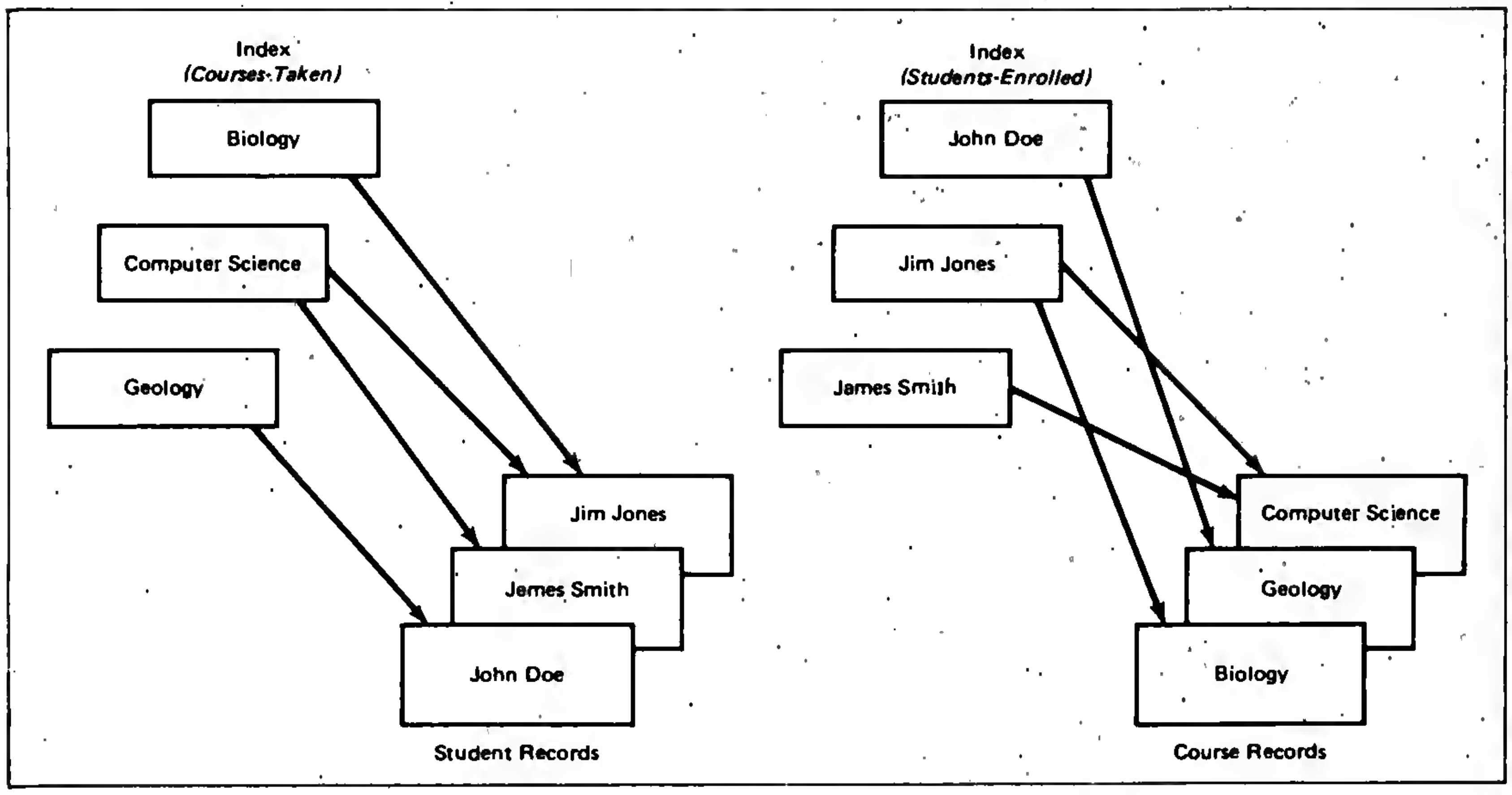


Figure 10. This is an inverted structure for the school data base.

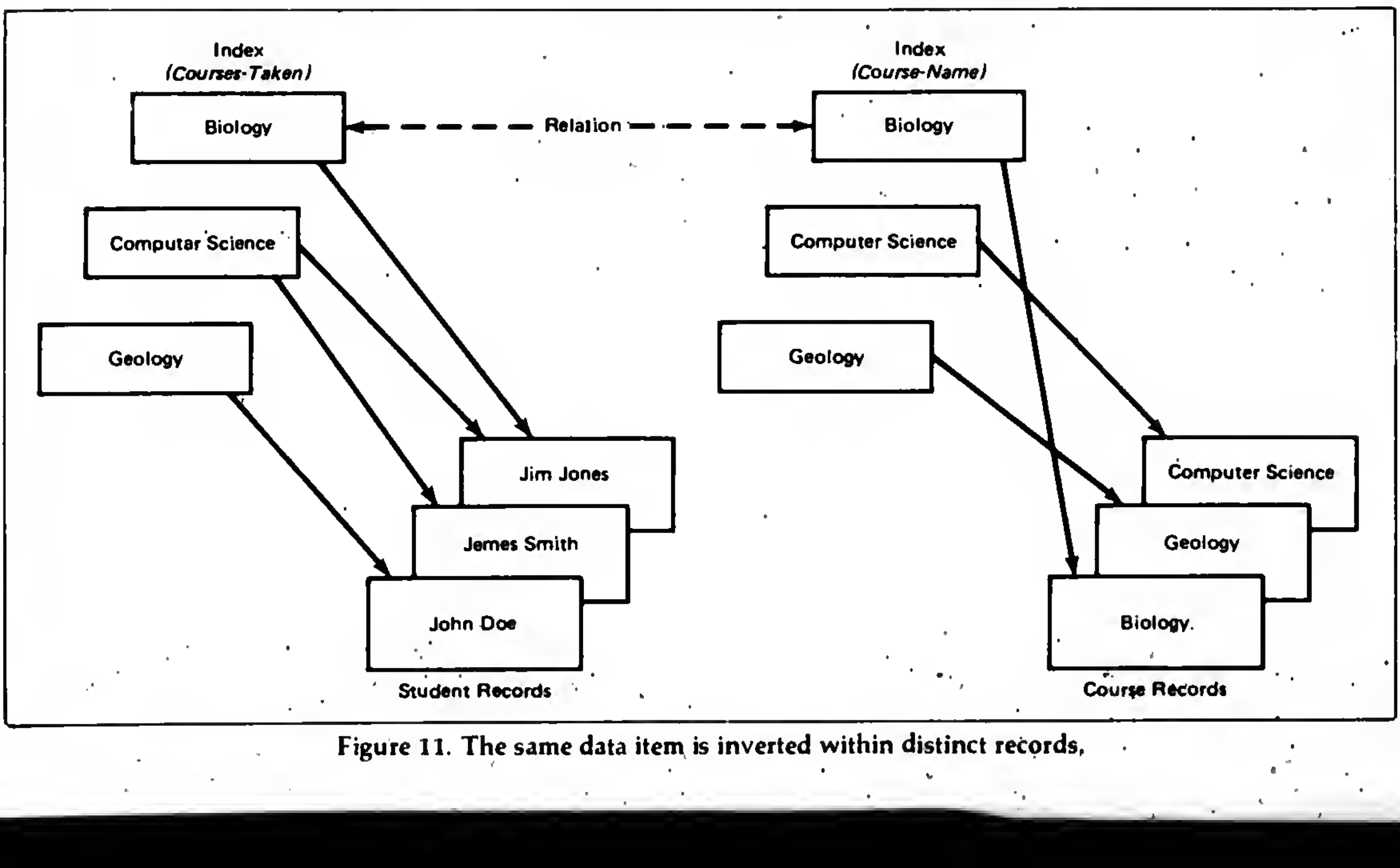
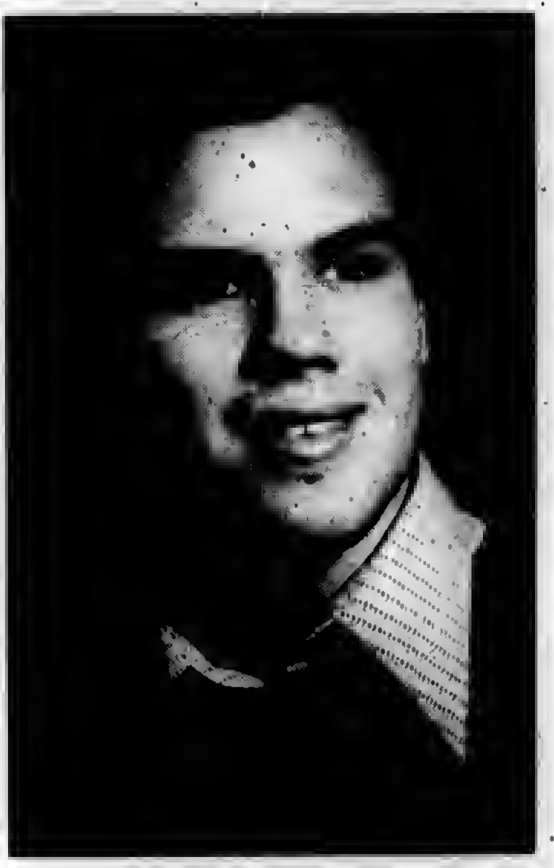


Figure 11. The same data item is inverted within distinct records,



Ronald G. Ross is senior staff consultant for data base systems at Performance Development Corp. in Princeton, N.J. He is the author of many articles and monographs on topics that range from data base administration to trends in data base management systems packages. Typical are "DBMS," An Overview of Data Base Technology from Government Data Systems *and "The Data Base Administrator: What Is His Place?" from the* Journal of Systems Management.

Ross, who is 27, graduated from Rice University with honors and holds an M.S. degree from the Illinois Institute of Technology.

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Editorial

A Sad State of Confusion

A recent report by faculty members at Southwest Texas State University's Department of Accounting and Computer Science concluded that most university computer science programs are not producing graduates with the expertise needed in the commercial DP environment [CW, May 8]. The report was based on a survey of DP employers.

Most computer science programs do not intend to produce DP experts. While many computer science students do graduate with DP skills and most computer science graduates — at the bachelor degree level — do seek DP jobs, DP is not computer science any more than carpentry is architecture.

There is considerable confusion on this point. The confusion prevails because most people do not understand the distinction between science and applied technology.

This confusion is dominant in the computer industry as well as in general society. It seems to be shared by those responsible for juxtaposing accounting with computer science in a university department title.

Computer science is normally taught by computer scientists — people concerned with the limits of what machines can do, the limits of what the human mind can do and the limits of what their budgets can do.

As scientists, these faculty members tend to see themselves following in the tradition of Galileo, Pasteur and Einstein or — closer to home — Turing and von Neumann. They often have little experience with the demands of commercial DP employment. If they have any personal experience with private industry, it tends not to be as applications programmers.

Computer science departments did not exist when many of these faculty members were students. Their degrees were generally earned in such disciplines as mathematics, psychology, electrical engineering and philosophy.

Accordingly, the better computer science programs emphasize theory and purport to be the gateway to a fairyland of colloquia, literature searches, and everlasting glory among the relatively obscure.

Many graduates of university computer science programs are willing and able to perform well in applied DP positions, but employers are mistaken if they assume only such graduates are qualified to take these jobs.

Thousands of experienced programmers in this country demonstrate every day it is possible to acquire applied DP skills without attending universities at all. However, there is a crying need for more applied DP training at professional institutes and trade schools or within such disciplines as business administration and applied engineering..

In many ways it is unfair to criticize computer science programs for not being applied DP. There is a need and a place for computer science as well — it is just that computer science should not be confused with business DP.

Instead of criticizing already good computer science programs, business and other concerned people should lobby for better — but different — programs that teach DP as part of a more general discipline such as business, medicine, law or even liberal arts.

'Pss-s-t, Buddy . . . get 'em while they're hot!'

Letters to the Editor

Responsibility for Training Really Lies With Businesses

I am frankly surprised that Computer*world* bothered to print such a self-evident and self-serving article as "DP Graduates Lack Business Savvy: Survey" [CW, May 8].

Computer science is not, has never been intended by most universities to be and probably should not be the same as data processing. Many colleges and universities are aware of this disparity and have provided curricula in information systems management or courses in data processing in their business curricula for just this reason.

Universities are not in business solely to produce graduates for entry into business. They produce graduates with strong general backgrounds in many subjects. Over a four-year period in a computer science B.S.-producing curriculum, a student will only spend the equivalent of a year in computer science courses.

A computer science graduate should be eminently qualified to be of use to any business. Businesses should be aware, however, that education does not stop with the awarding of a degree, nor does the hiring of an employee with a bachelor's degree relieve them of all responsibility for training.

Employers should be willing to train employees either in business (computer science grads) or data processing (business grads). The responsibility is with the business, not the schools.

Lawrence A. Ruh
Silver Spring, Md.

Eavesdropping Possible

The recent article on the installation of CRTs in Los Angeles police squad cars [CW, May 8] again pointed out the need for security training for everyone involved with data processing.

The article quoted Sgt. David Wiltrout, who said it would be impossible for criminals to eavesdrop on police calls "since you can't eavesdrop on digital transmissions."

I suggest that if Wiltrout contacts one of the many DP security consultants in the Los Angeles area, he will find out digital eavesdropping is possible and quite probable.

W. Socha
Phoenix, Ariz.

Guide Lists Used Prices

The article about insurance coverage for computers [CW, May 8] was misleading in at least one important respect. The article stated: "Because of the volatility of computer technology, no standard publication exists that lists prices of used computer equipment."

Since 1970 we have published the "Computer Price Guide," which contains current asking prices for most IBM computers and peripherals.

Svend E. Hartman
President
Computer Merchants, Inc.
Chappaqua, N.Y.

Neither Rain Nor Snow. .

Maybe the bad weather, new location and "lengthening shadow of NCC" affected the attendance and exhibits at Mini/Micro 78, but one major problem that was overlooked in your article [CW, May 1] was the late mailing of the promotional material.

The first I heard of Mini/Micro 78 was when the preview program arrived in my mail on April 19, when the show was half over.

It would appear (based on a mid-March date shown for the list of exhibitors) that the copy hadn't even gone to the typesetters when the show was only four weeks away, leaving only half the normal time required for bulk mail to be delivered in most areas. I would guess many copies are still in the mail.

As for me, I probably would have attended had I known about it a week or so in advance. It was a lot closer than Anaheim.

R. O. Schildknecht
Saddle Brook, N.J.

Data Past

Five Years Ago
May 23, 1973

WASHINGTON, D.C. — With tales of Watergate and other Republican political sabotage tactics rampant during the late stages of the 1972 Presidential campaign, officials in the McGovern for President campaign feared tampering with the vote-counting process itself, especially in computerized vote systems. The campaign committee set up a special section to deal with possible frauds and hired a consultant to give seminars on how to uncover vote tampering.

Eight Years Ago
May 27, 1970

FRESNO, Calif. — The Control Data Corp. 3150 system at the Fresno State College computer center here exploded when three Molotov cocktails thrown by protesting Mexican-American and black students hit the core memory. The attack followed a recommendation by an administrator that eight of 12 ethnic studies faculty members not be rehired.

— — —

NEW YORK — Honeywell Information Systems, Inc. and General Electric Co. announced a merger that would combine the computer operations of both into a Honeywell subsidiary to continue service of GE equipment and continue "development and support of the current product lines."

Suing for Workmen's Compensation

Programmer Claims Breakdown Job-Related

By Jack Stone
Special to CW

Work pressures in the typical information systems department are always troublesome, sometimes perverse and occasionally unbearable. As a result, many systems people dream about transferring to (what they perceive to be) a cozy job in academia.

But they may find a fool's paradise. I'm going to relate the tragic and pathetic story of a programmer who, after years of faithful service to a university research team, suffered a severe mental breakdown.

But this is not just a routine case of a DPer whose illness was related to the pressures of the job. This story is different because the programmer is currently petitioning the workmen's compensation board in her state to make the employer — a famous university — responsible for the illness on the grounds that scientific programming as an occupation inherently presents serious hazards to one's health.

In her petition she noted the university-provided group health insurance does not cover mental illness. But, she claimed her other sickness was incurred directly as a result of the job, she has suffered permanent disabilities which prevent her from continuing to function in her chosen profession and the university is responsible for payment of medical bills associated with the illness plus added compensation for the disability.

Regular Pattern

The story began more than 25 years ago, when the woman started working for the university as a mathematical assistant in an organization conducting basic research in the military and medical areas. When computing equipment was introduced, she naturally gravitated into Fortran and PL/I programming and continued to provide assistance to the scientists on the project.

This assistance followed a regular pattern. The researcher provided a complex formula or algorithm to the programmer, who coded it and checked it out with test data.

After checkout, the researcher supplied live data; the programmer ran the job and returned the results for study and analysis.

The physical environment at the university was about what you'd expect — comfortable surroundings, lots of machine time, good library. The job paid rather well and there were many fringe benefits.

Also, there was no bureaucracy to contend with and the programmer had warm feelings of independence. Indeed, she had a private office to shut out external noise and allow maximum concentration on the task at hand.

Over the years, the algorithms became more complex as the researchers advanced in their endeavors. Some of the programming tasks took weeks or months to complete, and several took a year or more.

The Human Connection

During these periods, the programmer worked alone in the office, usually seeing or talking to no one. After all, the scientists completely specified the program to be written, they certainly had the expertise to know what they were doing, and there simply wasn't a need for the programmer to communicate with the other team members.

Unfortunately, there was not a common understanding of who the team players were. She identified with the team, but was treated as a low-level clerk. She rarely was told the goals of the project, the progress toward those goals or even when the project was completed. Her contribution sometimes went unacknowledged when a project was written up in a scientific journal.

So she became more and more isolated in her office, with the door closed. Year after year, she completed one program after another, never really feeling a firm sense of participation or accomplishment.

One time, she struggled with a particularly difficult assignment for more than two years. After the code was completed, the project was dropped without a single production run. She was never told why.

In recent years, as is well known, external funding sources for universities have been limited. So tasks for the programmer became sporadic. No matter to her supervisor; he told her to stay in her office and wait for an assignment.

The doctor's report to the workmen's compensation board said that the programmer was totally disabled, having suffered an occupationally disabling psychiatric illness, that the forced isolation led to her disillusionment and loss of control over her environment, that the lack of acknowledgment led to intense frustration and feelings of abandonment — and that programming of this type is inherently an occupational hazard.

An Open Letter to FCC Chairman Wiley

The following is an open letter to Charles P. Ferris, chairman of the Federal Communications Commission (FCC), written after a federal appeals court let stand a ruling ordering AT&T to provide local interconnection facilities to MCI Telecommunications, Inc.'s Execunet service [CW, May 15].

Dear Mr. Chairman,

Yesterday your counsel, Mr. Armstrong, told me — as he told the U.S. Court of Appeals for the District of Columbia — that the Federal Communications Commission was appealing to the U.S. Supreme Court to permit AT&T to stop the pioneering MCI Telecommunications Corp. from using FCC-authorized telecommunications facilities.

He did point out, however, that he had not received instructions concerning the matter from the FCC, but said the final decision to appeal would be made within a day or so.

Quite a rush, when you consider the appeals court's decision was only published the day before.

Indeed, I think the question is being decided without the commission realizing that the real issue is whether the FCC is, and has been for years, victimizing MCI and other pioneers. A look at the records seems to indicate that this is the effect of the commission's actions in this case.

The Taylor Report
By Alan Taylor CDP

If so, and the FCC is being unfair, then the sooner something is done to stop it the better, as I think you will agree. So don't be precipitate in appealing the ruling. Let AT&T do that if it so desires, but don't let the FCC become its front man.

Of course, if you read the appellate court's order in detail, you may see why AT&T would like the commission to run interference for it with the Supreme Court. There is that little matter of AT&T going to the appellate court with the claim that Execunet would directly and inevitably lead to severe competition — and then reversing that claim the moment the Supreme Court lets the appellate court's decision stand. That's walking both sides of the street, an instance of impropriety that courts dislike. But that is AT&T's concern, not the FCC's.

After all, the history of the case gives the FCC enough to worry about without taking into account AT&T's propriety problems. There are a number of items on record concerning the commission's improprieties that are a more immediate concern.

One of these concerns, for instance, is the apparent collaboration of the FCC and AT&T in 1975 — and the way it was swept under the rug in 1976-77.

Apparently, commission members got together with AT&T representatives ex parte and then, without holding a hearing or even disclosing the details of AT&T's arguments concerning the lawfulness of Execunet. Now that wasn't very fair was it?

Then when the commission was to investigate "if any prohibited contacts had occurred," The FCC claimed the get-togethers were OK because AT&T delayed formally telling the FCC about its complaints until after the get-togethers. Apparently that makes it OK — but it still raises the question of FCC unfairness and the power to victimize.

Then, along with this switch in the FCC's position, there is the question of how the FCC (or its lawyers) can claim that somehow the FCC had actually given AT&T a monopoly in a ruling (on specialized carriers), even though it never said so at the time [CW, Jan. 30]. The court was very polite in its comments on the record, which stated that the opposite had happened.

After the specialized carrier decision, the commission acted differently than it would have if it had really intended to allow the monopoly. Apparently, the court thought a decent hint to the commission to stop playing with the records would be enough — but now we can see hints aren't enough.

I could go on, but by now the situation is plain. As the latest court opinion clearly states: "MCI has met with almost continuous resistance by AT&T in its efforts to provide communications services. We had thought that this process finally culminated in our Execunet decision upholding MCI's authority to offer Execunet pending further rulings by the commission. Now, however, we are faced with a new effort by AT&T, with the approval of the commission, to arrest the development of Execunet service . . ."

Whatever the courts may say, what is at stake is the commission's reputation.

The FCC's promise to the public back in 1970 was that "where a carrier has monopoly control over essential facilities we [the Commission] will not condone any policy or practice whereby such carrier would discriminate in favor of an affiliated carrier or show favoritism among competitors."

This should go for the commission itself, for the records indicate that by permitting AT&T to continually frustrate the marketing efforts of MCI through denying local interconnection facilities, the commission is itself a party to a discriminatory practice.

Continued "knee-jerk" appeals to the Supreme Court before carefully reading the appellate court's opinion and learning the lessons in it would confirm the "unfair to MCI" cry of the courts — and should not happen without full review and consideration of the implications.

I should be happy to hear from you on this matter.

Very truly yours,
Alan Taylor

P.S. I am one person who, with just a two-person business, would like Execunet to save me 30% on phone calls.

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Letters to the Editor

Column on DP Recruiters Hit as 'Ambiguous'

As president of Massachusetts Professional Placement Consultants, an organization of 27 recruiting agencies which adhere to a very strict code of ethics, it appalled me that a publication the caliber of *Computerworld* would print such an ambiguous, unresearched and uninformed piece of journalism as that which appeared April 24 under the heading "Readers See Some Dangers in Headhunting."

To suggest there are no abuses in the recruiting field would be incorrect, but it is also incorrect to say abuses are prevalent.

By printing this article, you did a grave injustice to recruiting firms and the personnel field in general.

David J. Melville
Wellesley, Mass.

Void in Third World

We certainly appreciate your expanded international coverage, as in articles such as "Emerging Nations Must Stretch DP Dollars" [CW, April 17].

We at Omci have been engaged in migrating DP systems to Third World countries for the past four years. We have experienced firsthand the frustrations discussed at the recent Intergovernmental Bureau for Informatics symposium.

However, we are concerned that one chronic source of these frustrations is being overshadowed by the current attack by less-than-developed countries on the business practices of IBM.

Success in informatics is directly dependent upon access to the DP technology infrastructure that has evolved in the industrialized countries. It is largely missing in the emerging ones.

In our experience, it is frequently incorrectly assumed that the computer manufacturer is the source of this broad support base. Manufacturers certainly contribute to this misconception through simplistic and unenlightened international marketing techniques.

However, since the DP infrastructure is missing in less-than-developed countries, unless it is separately provided for, computers there are destined to inefficient and ineffective use — regardless of IBM's business practices.

Implementors of DP systems in those areas would be well advised to retain the services of technical assistance contractors to compensate for this critical void.

W.D. Howard
Westlake Village, Calif.

'Software First' Approach

We agree that the software approach taken by Automatic Data Processing, Inc., Keydata Corp. and National CSS, Inc. is refreshing, as stated in *Computerworld*'s April 17 editorial. But they are far from the first companies to approach system design from a software point of view.

Prime Computer, Inc. has used a "software first" approach since it was founded in 1972. Our Primos operating system was designed before our first central processors were offered, and Prime Computer still follows that design philosophy.

We also agree that extolling the capabilities of software over the horsepower of hardware is refreshing. Again, stressing our system's functionality has been Prime's approach for some six years.

Prime Computer's success and the level of our users' satisfaction proves that "software first" works. Fortunately, as more companies — both service organizations and manufacturers — take this approach, the user wins. And that's the way it ought to be.

Gabriel A. d'Annunzio
Director,
Corporate Communications
Prime Computer, Inc.
Wellesley Hills, Mass.

Query on Abacus

With respect to K.C. Toh's article on a "hexadecimal abacus" [CW, May 1], I wonder if he could be enticed to describe the "Chinese abacus" further. I own several abaci and two books on how to use them, but they all have four counters below the bar and one counter above it.

As a hex buff of sorts, I always used "F" for X'15.' Is that a peculiarity of the Chinese abacus?

If so, I recommend a multiprocessing mode using two of my type of abaci. The bottom four counters of each abacus can be used to represent a "nybble," and the upper counter on each can be used for parity.

William B. Adams
Bethesda, Md

Mini Clarification

In reference to the article "Mini Proves Indispensable to Parts Distributor" [CW, April 10], I would like to point out that the original contract for implementation of Century's mini system was signed directly with Bonaventure Design & Programming Ltd.

Upon the resignation of a key member of the Minicomputer Division and the subsequent close of that division, Century then consulted with OKA Computer Systems Ltd., which completed the installation.

C. Randy Silkey
OKA Computer Systems, Ltd.
Montreal, Canada

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Gordon Cochrane
Manager, Information Services
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Omar Alvarado, Director
Teleinformatica de Mexico

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Book on DP Crime Sure to Be a Best-Seller

By Joe Rigo
Special to CW

The computer industry is about to have its first best-seller in the popular book market. It is Computer Capers by Thomas Whiteside. It is about computer crime.

The book establishes Whiteside as the Bennett Cerf of the computer industry. He has collected every computer crime war story and anecdote from the last 15 years and he lays them out, one after the other.

The result is an essential reference source for anyone who may ever have to give an after-dinner talk about computer security.

The text originally appeared as two articles in *The New Yorker* magazine. That means it is extremely well written. It is also enormously entertaining. No knowledge of computers is required. Even a manager can understand it.

The one failing of the book is that it repeatedly portrays computer users as a bunch of patsies waiting to be ripped off by some bright-eyed technician.

This is because Whiteside is a professional journalist from outside the industry. He had to depend on interviews for his information. His sources told him a lot about the limitations of hardware and operating systems. They neglected to tell him about Tim Miller.

Tim and I used to work for one of the large New York banks. I was project manger on development of a pension payment system. Tim was the project's senior systems analyst.

Our job was to implement a system that would be similar to a payroll operation. The bank was the agent for several large companies. It sent monthly pension checks to the companies' retired employees. The whole thing involved several million dollars worth of checks each month.

Tim's main task was to design the input data edit programs and the processing controls. He had to make sure that all input transactions were valid and that all of the control totals were in proper balance before, during and after processing.

Our user representative was a Brooklyn native named Brian Ardizone. Brian was a normal Brooklyn boy. That means half of his childhood friends entered the priesthood. The other half were in the Mafia.

Reader Commentary

Together, Brian and I would try to figure out how to break through Tim's checks and balances. I knew the computer system, and Brian knew the user operation. We concocted some dandy schemes, hut every one of them eventually ran into one of Tim's alarm bells.

Periodically, Jim Lawler would come by from the auditing department to check on progress. He would talk with Tim ahout our system's interaction with other computer systems and with the clerical staff.

Tim would make a few more scratches on his yellow pad, and another door would slam on my plans to get rich quick.

Tim wasn't heing nasty. He was just doing his job. He didn't even realize I was plotting to hecome a chapter in Whiteside's book.

Crime and Punishment

Tim's system was not perfect, of course. There was no question that we could get our hands on some large chunks of the bank's money. The problem was in getting away with it.

At best we would have had a couple of weeks after cashing the checks before the loss would be discovered. That was somewhat better than the odds for most people who routinely handle other peoples' money as part of their daily work. All in all, though, the opportunities were not very attractive.

So eventually I gave up, admitted defeat and went back into the documentation business. Tim had triumphed again.

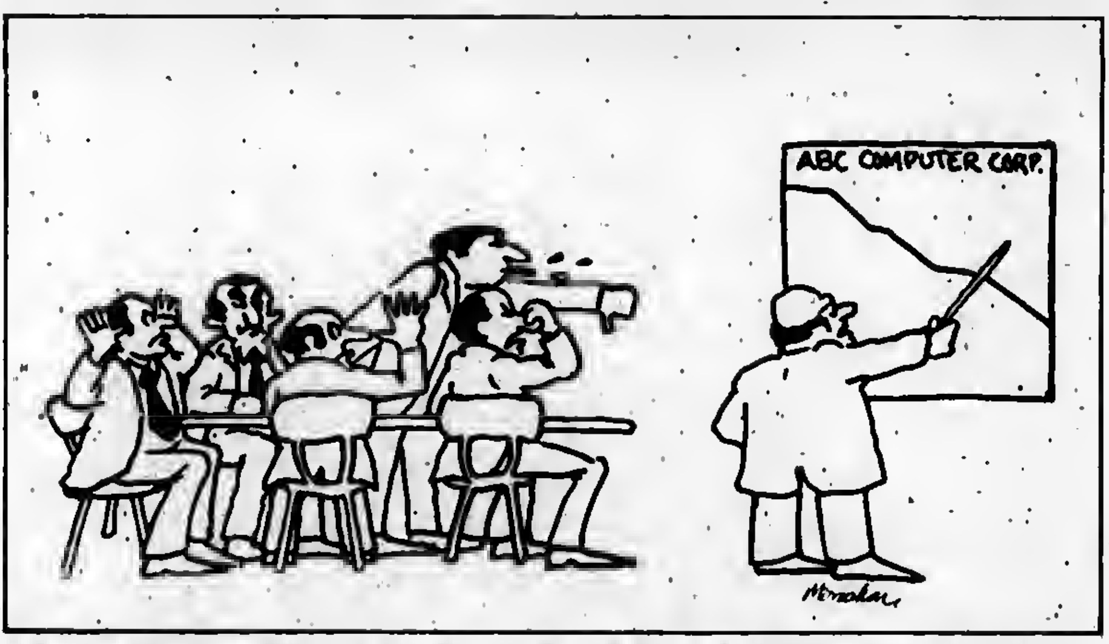
By way of postscript, I ran into Bryan on the street a few weeks ago. He had left the bank and opened two hi-fi equipment stores in lower Manhattan: one for poor people and one for rich people.

The poor people walk up one flight to a place called "The Graveyard" and shop among plain iron racks. The rich people go across the street to "Linear Sound," where they sit on plush sofas and sip coffee while salesmen scurry about.

I asked Bryan how a normal Brooklyn hoy could afford to stock up on such elaborate furnishings and so much expensive equipment.

"I got a bank loan," he said.

Rigo is president of Sysdoc, Inc. in New York City.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Manager Recalls Gains

360/65, Packages Make Great Team

By **Don Leavitt**
CW Staff

MORRISTOWN, N.J. — That a product — hardware or software — is "not invented here" or not offered by IBM has often been used as an argument against its acquisition for a system based on an IBM CPU.

At the Mennen Co. here, however, quite the opposite is true. The data center has an impressive collection of items from many vendors and the outgoing manager couldn't be more pleased with the way things are working.

The company now has an IBM 360/65 and a 1403-N1 line printer, but just about everything else — except some unique applications written in-house — has been brought in from outside sources, according to Lou Orleman.

The 1M byte of main memory for the 65, for example, came from Computer Investors Group; the eight spindles of "3330-type" disk came from Itel Corp.; the tape drive subsystem from California Computer Products, Inc.; and the communications controller from Memorex Corp.

Eclectic Software

But it was in his collection of software that Orleman seemed most pleased as he summed up what he had accomplished in nearly six years as the man in charge of the center.

The operating system now, for instance, is Itel's BCM DOS/VS, and Orleman is as satisfied with it on the 360/65 as he was with Extended DOS (Edos) from The Computer Software Co. on the 360/50 he had between mid-1974 and the end of 1976.

He had six-partition support under Edos and that was fine, but with the growth in workload from Mennen and 10 outside users he needed the eight partitions he is actively using under the Itel environment.

While Orleman had Edos, he also acquired the Display Operator Console Support (Docs) package from CFS, Inc. He said his operators would be lost without this utility, which substitutes a CRT for the console typewriter, but spools most of the system messages to disk.

The need to support some 3,500 tapes led the company to Epat from SDI about four years ago, he recalled, and the cost of sorting — in space and throughput — brought on the acquisition of CA Sort from Computer Associates, Inc. in 1975.

The center has been a long-time installation of The Librarian from Applied Data Research, Inc. for its disk-based source statement maintenance chores. For a year or so, Orleman has also had Flee-Flim from Goal Systems, Inc. to speed up the link edit and library functions.

Principally to support its outside users — who have remote batch work coming into the center — Mennen acquired the Westinghouse teleprocessing monitor (Westi) two and a half years ago. Another Westinghouse product, the Disk Utilities, and the Dynam/D disk space management package from Computer Associates are also part of the company's collection of outside software, to optimize its use of the disk resources.

Orleman commented that the catalog support function of Dynam/D saved the center from several serious problems and that the package, as most of the others, was a "really good investment."

Stronger words such as "fantastic" surfaced as the manager talked about DYL-260 from Dylakor Software Systems, Inc. Acquired about three years ago, this extended report writer is used in Mennen's production environment "40 to 50 times a day" for regular scheduled work, one-time reports and utility jobs, he said.

Shop Mainly Cobol

The shop has pretty much standardized on Cobol since 1972 and now uses IBM's ANS Cobol compiler for much of its internal programming. The mainframer's RPG-II is also in use at Mennen and so is SIM14 from Dearborn, to provide an operational base for the one or two programs left over from IBM 1401 days.

Asked how he or his people went about evaluating software, the manager said in most cases the absolute need for a package's capabilities to keep the center functioning made the acquisition self-justifying. Although there are competitors for some of the products now, many were unique when Mennen went to the market, so the "choice" was easy, he said.

'Total 8' Has Query Option

CINCINNATI — Version 8 of the Total data base management system from Cincom Systems, Inc. is said to strengthen the system's performance, portability and on-line orientation. An optional query facility, T-Ask, has also been introduced to emphasize the concern for on-line work.

Total performs the functions of data base maintenance, updating, retrieval and checking for data integrity at the host language level. It includes a data definition language to provide special users with the means of building the data base and a data manipulation language through which programmers communicate with the base or bases.

Described as the "engine which will drive the Cincom software of the future," Version 8 provides full I/O overlap or multithreading, blocked logging, IBM Vsam support and extended element list processing.

MVS support and "re-architected" Environ/1, CICS and Intercomm interfaces are also part of the update, a spokesman said.

Code-directed and data-directed access to Total's data bases, additional user exits and internally accumulated statistics for tuning the system are also built into Version 8, he added.

Unlike previous releases, Version 8 is a consolidated product for both IBM DOS/VS and OS/VS environments. Although there are slight variations in the code, both user communities are provided with batch and multitasking modes of operation, the spokesman asserted.

T-Ask is an on-line information processing system designed for use in conjunction with a Total data base. T-Ask's main purpose, according to Cincom, is to provide non-DP users with a facility with which they quickly and easily retrieve information about their business environment.

The subsystem has three modes of operation: maintenance, query and catalog.

Total Version 8 for DOS/VS costs $41,000 or $1,025/mo under lease; for OS/VS, it costs $52,000 or $1,300/mo. DOS/VS Task costs $19,00 or $475/mo while the OS/VS implementation costs $21,000 or $525/mo.

There is an installation charge of $2,000 for Version 8 for all existing clients, Cincom noted from 2300 Montana Ave., Cincinnati, Ohio 45211.

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Course Teaches Data Base

WASHINGTON, D.C. — A three-day seminar on data base and file management systems will be held in Boston in mid-June and repeated in San Francisco and the Chicago area this summer. Sponsored by the Institute for Science and Public affairs (Ispa), "Data Base Design 78" will present basic data base concepts; and an overview of recent attempts at standards for data base management systems (DBMS).

Also set for coverage are relatively advanced data base concepts, such as search structure implementation; conversion analysis techniques; data base security; management views of corporate data bases; and case histories.

The seminar will be directed by George Schussel, vice-president of the Information Systems and Services Group of American Mutual Insurance Companies, and by Michael O'Connell, software development manager for the Business Products Group of Digital Equipment Corp.

The seminar will be held in Boston June 13-15 at the Lenox Hotel, in San Francisco June 19-21 at the Jack Tar Hotel and in the Chicago area July 24-26 at the Holiday Inn-O'Hare/Kennedy.

Registration fees, including the cost of workbooks and meeting materials, are $495 for an individual and $425 per person for groups, Ispa said from P.O. Box 31, Benjamin Franklin Station, Washington, D.C. 20044.

Users Rate CDC as Tops In Network Service Study

By **Don Leavitt**
CW Staff

DELRAN, N.J. — In a survey that brought nearly 700 evaluations of time-sharing and remote computing operations, the services of Control Data Corp. were rated higher in overall performance by their users than were services of competing firms.

The survey, conducted by Datapro Research Corp., showed users of all the more popular services regarded them well. CDC was at that top of the list, with a rating of 3.5 out of 4.0, but 17 other services — including all of the so-called "Big 8" — earned ratings of at least 3.0.

Even when the users were rating the services on specific capabilities, they were quite positive. Most of the detailed scores on such things as response time and uptime, especially for the Big 8, were 3.0 or better.

These ratings take on more significance in the light of several other questions Datapro's researchers asked, all of which tended to show the survey respondents were knowledgeable in both DP and the use of remote services.

According to the report of the survey in Datapro's "All About Timesharing and Remote Computing Facilities," more than half the respondents were in organizations with "extensive" in-house computing facilities.

In answer to a direct question, 65% of the users noted they had been utilizing the service being rated at least two years and better than one out of every four users had been on the particular service five years or more.

Although 32 different services received at least three sets of ratings, and therefore a place on the comparative charts Datapro included in its report, eight services were distinctly ahead of all the others in numbers of ratings received.

They each received at least 28 sets of ratings — General Electric won the "popularity poll" with 104 sets — and as a group they accounted for more than half of all the ratings. Of the Big 8, United Computing Systems ranked second at 3.4 while National Comshare, CSS tied for third at 3.3.

At the top of this list of "Non-Big 8" services, ADP Network Services (once Cyphernetics) each earned 3.3 for overall performance along with On-Line Systems and University Computing Co.

The 41-page report is available for $12 per copy from Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

Package Gives Finance Reports

WOODBURY, N.Y. — A financial statements package now available form the Data Systems Division of Philips Business Systems, Inc. is said to provide users of the company's Visual I system with the software to produce profit-and-loss (P&L) statements, balance sheets and column reports (or spread sheets).

Source material for each of these reports comes from a format master file. In addition to providing the basic raw content of the reports, the file also controls the printing layout including such items as page headings, line spacing and totals descriptions.

The P&L report tracks cost centers for both current period and year-to-date, compared in terms of percentage variances with the previous year and the budget forecast.

A year-end transfer program, described as "a key module of the package," clears P&L accounts to zero and sets up new general ledger master and general ledger budgets master files for the upcoming fiscal year.

The software costs $500 and can be ordered from the Data Systems Division, Philips Business Systems, 175 Froehlich Farm Blvd., Woodbury, N.Y. 11797.

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If you've decided to install a 370/138 or 370/148, call Greyhound. If you've already placed an order for a 370/138 or 370/148, call Greyhound. If you have one of these computers installed, be sure and call Greyhound.

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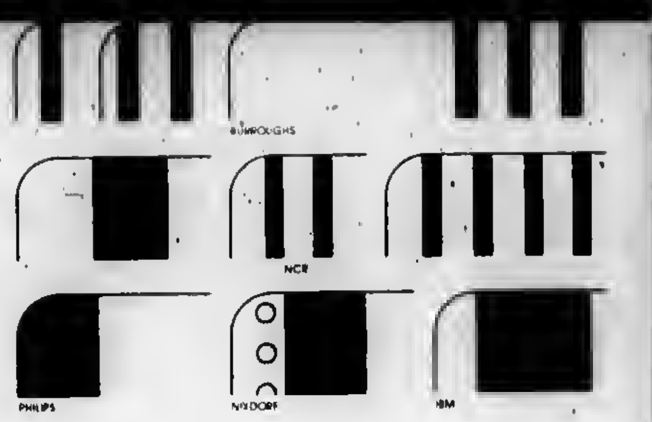

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'Management IV' Supports Human Resource Reporting

CANOGA PARK, Calif. — The Management IV/Human Resources System introduced recently by Informatics is said to simplify complying with and reporting on the host of government regulations pertaining to employment practices.

The package fully satisfies all government regulations regarding both data collection and reporting for Equal Employment Opportunity (EEO), the Occupational Safety and Health Administration (OSHA), the Employee Retirement Income Security Act (Erisa) and Affirmative Action programs, a spokesman claimed.

Within a user's organization, Management IV will provide personnel managers with all relevant information regarding individual employees, groups of employees, overall company employment profiles and skills inventory operations, he continued.

The package is said to encompass all standard personnel functions such as salary administration and attendance history, and to provide for regular communications with employees.

Derived from Informatics' Mark IV file management system, the retrieval mechanism of Management IV allows managers to produce analyses and complex reports. These could be developed for one-time needs or for regular production processing because the procedures can be stored for reuse.

Modular in design so users can build the system to meet their needs, the complete Management IV/Human Resource package is available for $30,000 from Informatics at 21050 Vanowen St., Canoga Park, Calif. 91304.

'Mars' Helps Townships

KING OF PRUSSIA, Pa. — Written in Basic for use on a range of minicomputers, the on-line Municipal Accounting and Reporting System (Mars) from Quad Data Associates, Inc. (QDA) includes general ledger, tax collection, accounts payable, budget, payroll and water or sewer service billing modules.

The package was developed in such a way that it can support single or multiple townships, he said, adding that use of data base management logic permits efficient use of storage through elimination of redundant data; a built-in report generator eases the system's interfacing with non-DP personnel.

Mars contains three levels of security — modular, functional and data. Control is established through access codes, passwords and on-line editing, QDA said.

The vendor is ready to support Mars installations on Digital Equipment Corp. or Data General Corp. minis, including DG units operating under a Micos environment from Mini-Computer Systems, and plans to support others later.

The entire Mars package is available for $16,500, but the ledger module can be acquired for $5,000; the payroll logic for $4,000; tax collections, $3,500; accounts payable and budget, $3,000; and the water or sewer billing for $2,000.

QDA is at Suite 116, 1000 Valley Forge Circle, King of Prussia, Pa. 19406.

Pascal Ready For DG Users

COLUMBIA, Md. — Users interested in working with the Pascal language now have another compiler to consider. Developed and marketed by Rhintek, Inc., this one runs on the Data General Corp. family of minicomputers under RDOS. The compiler will compile itself in a mapped Nova or Eclipse or an unmapped Nova with 32K bytes of memory, according to a spokesman.

The language is said to incorporate the best features of several languages, including the data structuring capabilities of Cobol, the block structured organization of Algol and the compact arithmetic expression of PL/I.

"Growth in Use of Pascal Called Revolutionary" [CW, April 24] took note of the broad interest in the language; Oregon Minicomputer Software, Inc.'s Digital compiler for the Digital Equipment Corp. PDP-11 [CW, May 15] seemed to confirm the movement.

Rhintek's compiler for the DG minis comes with source code, binary code and demonstration programs. It costs $975 and is available through P.O. Box 220, Columbia, Md. 21045.

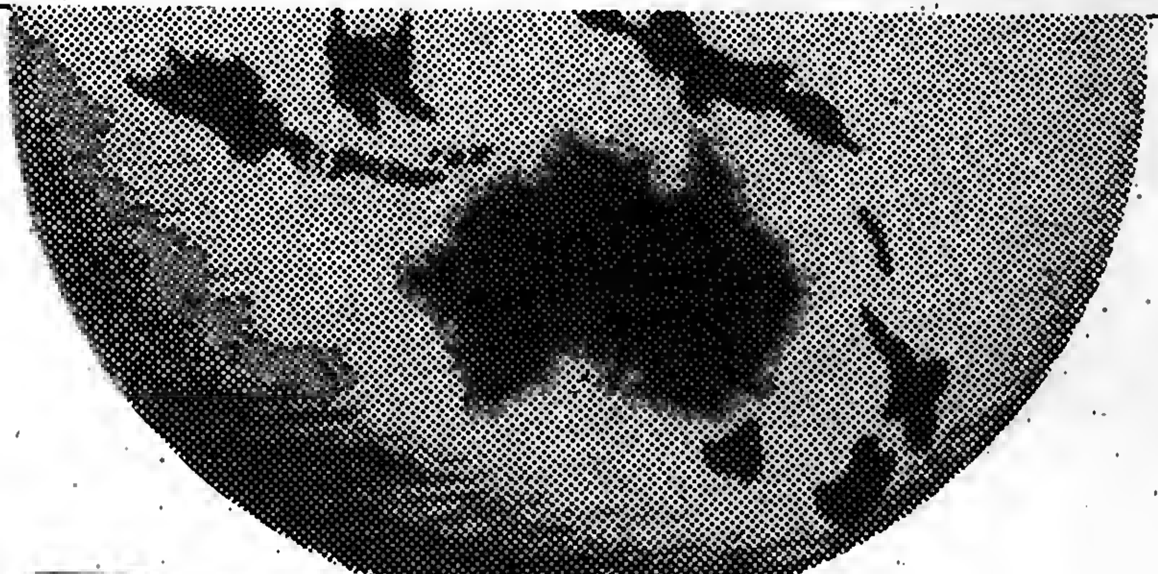
'Supertab' Models Built on DEC Mini

CINCINNATI — Supertab 2.0 from Structural Dynamics Research Corp. (SDRC) is an interactive finite element modeling system designed to run on Digital Equipment Corp. PDP-11/34s under either RT-11 or RSX-11.

Supertab provides the capability to create, display and edit finite element models using a Tektronix, Inc. 4010 series CRT terminal and Tektronix digitizing graphic tablet. It works with both two-and three-dimensional models, he added.

A single-user system requires a 64K PDP-11/34A under RT-11 with appropriate peripherals; a multiuser system would need a 256K PDP-11/34A. Both also require Fortran support.

Supertab 2.0 costs $20,000 or $1,000/mo for a minimum three months, SDRC said from 5729 Dragon Way, Cincinnati, Ohio 45227.



Now Computerworld can take you down under

As of July, the world will have a new *Computerworld*. *Australasian Computerworld* will become the newsweekly for the computer communities of Australia, New Zealand, New Guinea, Phillipines, Thailand, Indonesia, Singapore and other Pacific Ocean countries.

Taken together, these countries comprise a large and grnwing EDP market, ranking approximately 9th in the world in value of general purpose computer systems, according to figures from International Data Corporation — the world's leading EDP market research firm. And they are major importers of US-made computer products. Australia alone, according to US Commerce Department figures, will be spending over $400 million on US computer equipment by 1980

As our wholly owned sister publication, *Australasian Computerworld* will maintain the same format and excellent editorial content that has made *Computerworld* so successful in America. And it will be read by the key EDP buying influences throughout its area

We invite you to become a charter advertiser in *Australasian Computerworld*, and we'll be glad to give you more details Just give us a call or send in the coupon. And don't forget our other international sister publications We'll be happy to give you information on any of them, as well. Here's the list of all our computer publications.

COUNTRY	WORLD RANK (by value of computers)	PUBLICATION[S]
U.S.	1	*Computerworld*
JAPAN	2	*Shukan Computer*
GERMANY	3	*Computerwoche*
UNITED KINGDOM	4	*Computer Management*
FRANCE	5	*Zero-Un Informatique*
ITALY	8	*EDP Notizie* *Sistemi E Automazione*
AUSTRALIA	9	*Australasian Computerworld*
BRAZIL	17	*Data News*

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'Systemacs' Enforces Development Standards

VALLEY FORGE, Pa. — "More than a manual," the Systemacs package provides a logical series of software development tools that enforce standards across the board — for user, analyst, programmer and operator, according to its vendor, Management and Computer Services, Inc. (Macs).

The software support package provides a structured methodology for the implementation of complete information systems through the full software life cycle, a spokesman said, noting that requirements, analysis, specifications, programming and maintenance efforts are all supported.

Systemacs is made up of three "phases" that can be acquired and used separately. In the systems analysis phase, it provides a manual approach to interviewing, specifications, economic evaluation and scheduling.

The foundation of the system development effort is a "Statement of Requirements," a written understanding with the user of what is wanted and what will be provided.

A prototype report generator program is provided as part of Systemacs to prepare sample report pages for the statement, he added.

The package's job specification phase supports development at a logical job level, rather than encompassing an entire system of focusing in too closely on a single program. The specifications provided are said to be accurate, complete and unambiguous, easy to change and organized in such a way that each report value, for example, can be traced back to its source.

As the third phase, Systemacs' Standard Program provides an application-independent logical framework that can be copied from the installation's source statement library and then completed with user-written logic developed on specialized coding forms.

The entire package, with software that runs on IBM 360 and 370 hardware and manual support that has no equipment limitation, costs $30,000, Macs said from 790 Valley Forge Plaza, Valley Forge, Pa. 19482.

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CICS/VS
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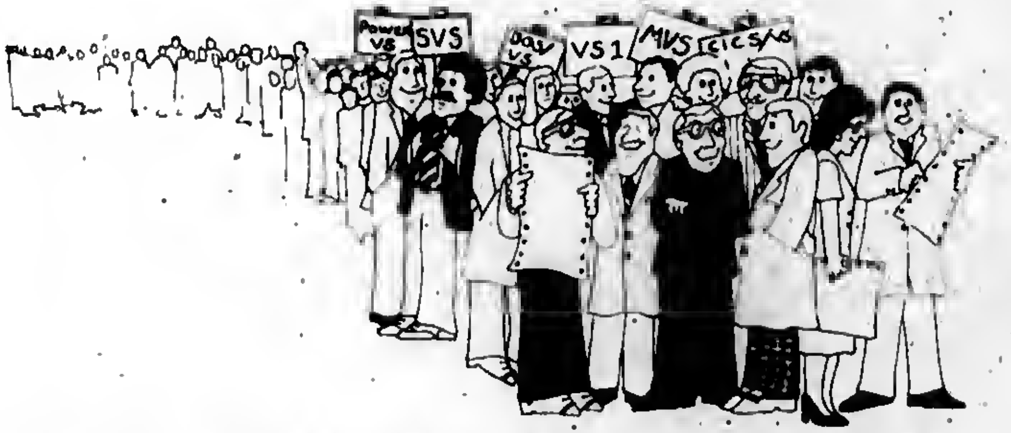

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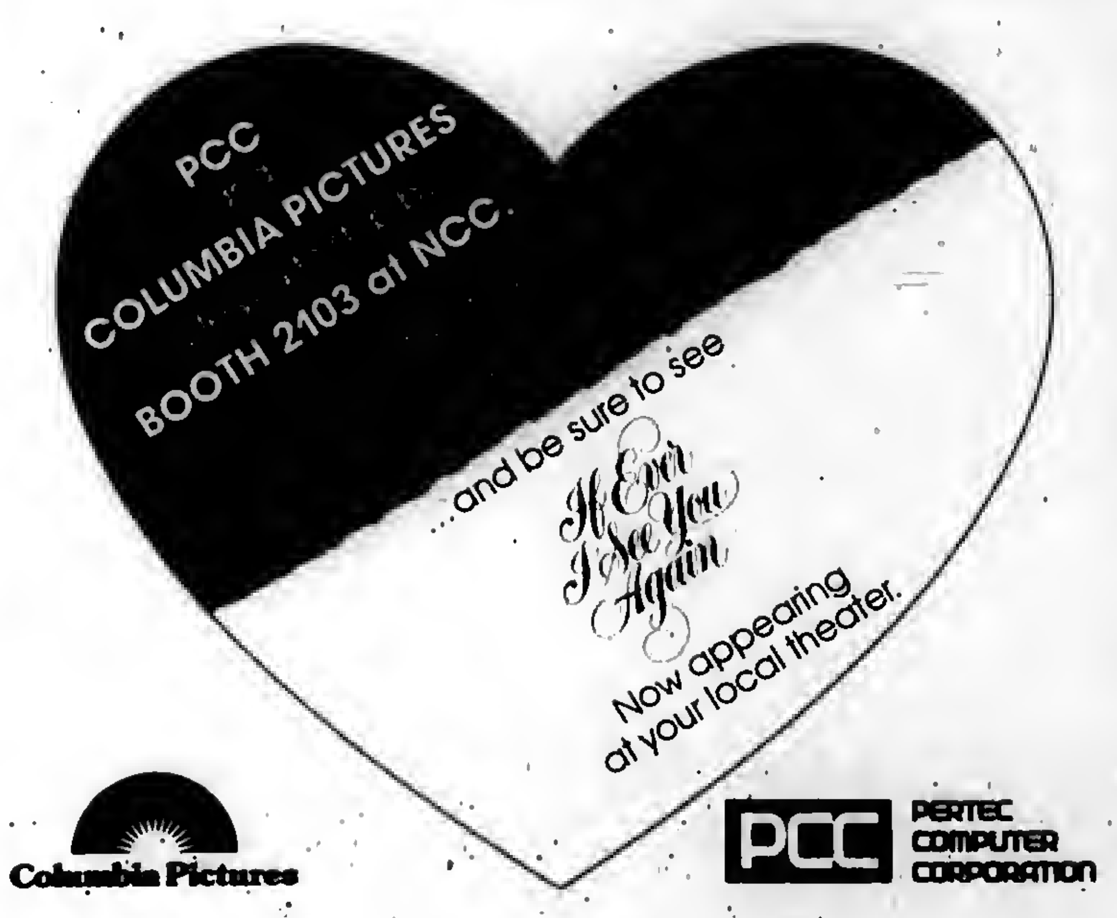


IRS, SEC Reports Produced

ANDOVER, Mass. — Described as complete enough to satisfy the latest Internal Revenue Service (IRS) and Securities and Exchange Commission (SEC) reporting regulations, a fixed asset accounting system is now available from Software International.

In addition to meeting the reporting requirements, the package is said to provide audit trails reflecting all asset dollar activity and physical movement. Support for multiple-company processing enables each entity to set its own procedures, processing cycles, fiscal year and organizational structure, a spokesman said.

Parameter-driven report options allow each user organization to vary the content of system output without program modification. Reports can be created from more than 35 master file fields, with summarization on up to seven totals on any report, he continued.

The system includes an Asset Depreciation Range (ADR) module to simplify tax accounting under the SEC's rules. Asset additions and retirements for both corporate and tax books can be entered with a single input transaction, he said, adding that a single code is provided for defining the depreciation controls on both books, to minimize input even further.

ADR assets are grouped, while individual asset detail is retained for corporate accounting. ADR reports produce information required on IRS Form 4832 covering additions, depreciation, repair allowance and retirements, the spokesman asserted.

The modular software functions under IBM DOS or OS environments.

The package costs $19,500 for DOS installations or $21,500 for OS sites. The vendor is at Elm Square, Andover, Mass. 01810.

Bidding Eased For Builders

ALEXANDRIA, Va. — A Construction Estimate and Bid (CEB) system developed by Technical Construction, Inc. here is now available as an Installed User Program (IUP) from IBM's General Systems Division for use on its System/32 minicomputer.

CEB is said to accept dimensions of components taken from bid specifications and plans; calculate the quantity and type of materials needed and their cost; allow a human estimator to alter the set prices and add data about intangibles, desired markup and performance bond costs; and present all the accumulated information in a form of a proposed bid.

The system supports 26 predefined formulas for the calculation of various links, areas, volumes and quantities; the formulas are applicable to both rectilinear and circular structures.

Once a bid is accepted, CEB produces a file that can be used as input to IBM's Construction Management and Accounting System (CMAS) to provide data for project control when building actually starts, the spokesman noted.

Written in RPG II, the IUP — which has no long-term support from IBM — costs $150/mo for 12 months.

Managers Meet Planned in L.A.

CHICAGO — A three-day seminar on "Project Management for Computer Systems" will be presented in Los Angeles late this week under the sponsorship of the University of Chicago.

The California session will be held Wednesday to Friday, May 17-19. Taught by Michael H. Marcus, president of C.I.S. Systems, Inc., the course will also be given in Houston, Texas, in early August and in New York late in October, according to the university.

The concepts and skills detailed in the seminar will be illustrated by specific examples and case studies. A variety of teaching methods, including a workbook, will be utilized to make points during the presentation and to serve as reference material later, a spokesman said.

Registration fee is $495 per person plus $65 per company. More information is available from the Registrar's Office, P.O. Box 2409, Grand Central Station, New York, N.Y. 10017.

Logic Extended In $75 'Mailout'

PORTLAND, Ore. — The Mailout mailing list processor software from the Center for the Study of the Future now sorts on Zip Code or address/title. It also merges or extracts subfiles based on codes stored with the address, a spokesman noted.

Written in commercial or Microsoft Basic and supplied on CP/M-type diskettes, the package also prints labels or envelopes in one or more columns and processes letters against mailing lists.

The software costs $75 from the center at 4110 N.E. Alameda, Portland Ore. 97212.

International Securities Shown on Net's Data Base

WALTHAM, Mass. — An international securities data base said to cover more than 14,000 securities in 22 countries is now available through the remote computing service of Interactive Data Corp.

Known in North America as Exshare, the data base is compiled by Extel Computing Ltd. of London and by Reuters Ltd.

Exshare provides daily updates on 67 data items for more than 5,000 securities quoted in the UK and 9,000 securities quoted in continental Europe, Asia, South America and Africa, spokesman said, noting this is the firm's second offering of its type.

Last year the firm introduced an overseas financial data base called Exstat, which features data on more than 2,000 foreign companies.

"Together, Exshare and Exstat provide powerful analytical tools for diversifying investments, evaluating potential mergers and acquisitions outside the U.S. and investigating credit worthiness," he claimed.

Exshare covers equities, fixed-dividend capital securities, preferential capital, loan stocks, debentures, unit trusts, insurance and property bonds, Eurobonds, offshore and overseas funds, government stocks and convertible debentures.

It also contains certain indices of stock traded in the UK.

The data items provided by Exshare are said to include daily prices, splits and dividends, interest payments and schedules, capitalization, earnings, fiscal year-end dates and redemption features. Users can access securities prices for the currency in which they are traded or in terms of U.S. dollars or pounds sterling, the spokesman noted.

Historial information extends back to Sept. 1, 1972 for UK securities and to Jan. 3, 1977 for all others, he said, adding most of the data is adjusted for capitalization changes to permit consistent analysis of historial security prices on the major world markets.

Interactive Data is at 486 Token Pond Road, Waltham, Mass. 02154.

Net Extends 'Fiscal' Usage

FAIRFIELD, N.J. — Available as a package for use on Digital Equipment Corp. Decsystem-10s or 20s or as a service on the Rapidata remote computing network, the latest release of Fiscal is said to be a complete redesign of the financial modeling software.

Fiscal is intended to be a totally integrated system for organizing, manipulating, analyzing and reporting financial information.

The flexibility of the system provides both the experienced and the naive computer user with the opportunity to prodce timely and correct solutions to their business requirements. Fiscal will handle a broader range of analytic financial applications than any other financial language, Rapidata claimed.

Typical Fiscal applications are said to include five-year forecasts, one-year operating plans, corporate models and support for budget preparation. Performance analysis, capital budgeting, capital investment analysis and financial consolidations are also handled with the system, the spokesman noted.

With this release of Fiscal, all of Rapidata's major products — Probe for time series analysis and X2C for data base management and reporting, as well as Fiscal — now have a common integrated data base access.

Fiscal is accessible on the Rapidten time-sharing service at Rapidata's standard rates and is also available under license for in-house installation at costs ranging from $20,000 to $100,000 depending on the amount of custom work and support required, Rapidata said from 20 New Dutch Lane, Fairfield, N.J. 07006.

'TPG' Eases System/3 Work

BAYSHORE, N.Y. — The Telecommunication Program Generator (TPG) package from Granat Data Corp. is said to generate error-free Display Function Facility (DFF) and RPG-II source programs for the IBM System/3 user working with IBM's Communications Control Program. (CCP).

Input to TPG is coded on standard RPG-II file description and input specifications sheets. The generated code should enable any user to inquire into, update or update and add records to any indexed master file, a spokesman said.

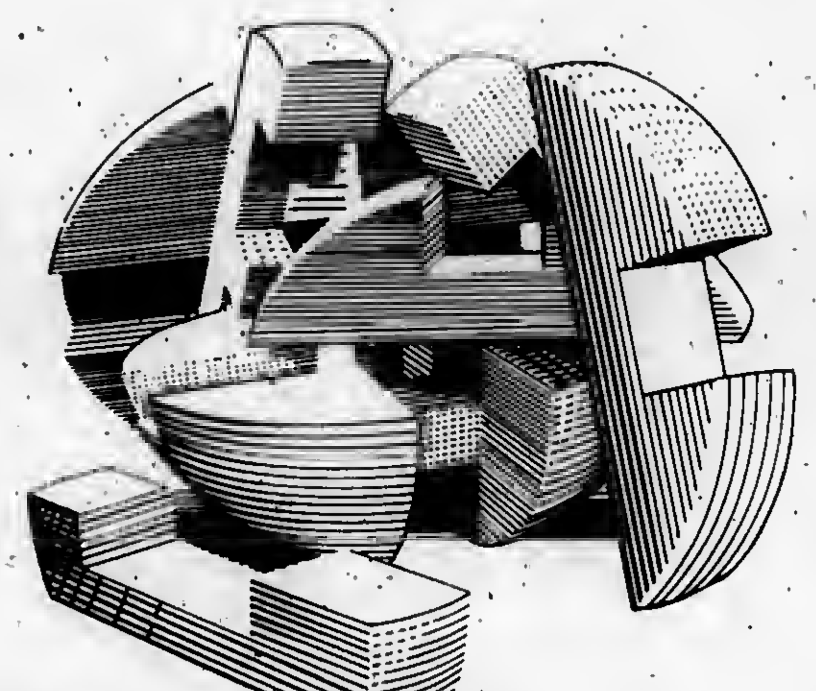
The package also supports field protection and 15-position field descriptions. New line options, numeric field editing and user-designated program names are also provided through TPG, he added.

The Granat package alerts the terminal operator as to what function is taking place during each generated program's execution.

TPG also generates the code needed to create an audit file for each master file maintained by the system.

Standard DFF terminal keying conventions apply to the programs created by TPG, the spokesman noted.

TPG is written in RPG-II, runs in batch mode on all properly configured System/3s, requires 20K to 25K bytes (without overlays) and costs $300. Granat is at 1456 Peters Blvd., Bayshore, N.Y. 11708.



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The 32-bit VAX-11/780 teams up with our new RK07 disk subsystem to give you twice the disk capacity. Fifty-six million bytes of on-line disk storage. Plus twice the memory: 256K bytes of error correcting MOS memory. And with it comes Digital's fully supported VAX/VMS software, fast floating point arithmetic, and all the other great VAX performance features.

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Picking an RJE Vendor — Part 1

Services Different From Network to Network

By Richard J. Poje
Special to CW

Many organizations today use commercial remote batch processing services to supplement their in-house DP, and some have replaced their computers entirely with these services.

Flexibility, ease of use, rapid turnaround and cost reductions are the most frequently cited reasons for purchasing remote batch services, but there are almost as many justifications as there are users, and user satisfaction — the degree to which expectations have been met — varies considerably from customer to customer and from vendor to vendor.

DP managers looking to purchase remote batch services for the first time or to replace an unsatisfactory vendor will considerably improve their chances of future satisfaction if they clearly define their requirements beforehand and follow some common-sense guidelines in evaluating potential vendors.

Remote batch processing — or remote job entry (RJE) — is often considered a commodity service, indistinguishable from vendor to vendor save for pricing. Vendor selection is, therefore, often based on cost alone or, at best, on some combination of factors with cost predominating.

This is not to say the cost of RJE is unimportant. Quite the contrary, since the containment of burgeoning DP budgets is one of the remote computing industry's strongest selling points.

What is more significant, however, is that RJE is far from being a commodity; it is a service that varies substantially from vendor to vendor and one that must be carefully evalutaed in terms of each potential customer's individual requirements.

When the widget factory down the block decides to absorb excess computer time with RJE sales — an increasingly common phenomenon — its prices may be 30% to 40% below prevailing market rates. A bargain — until the factory shuts down for its two-week summer vacation and forgets to notify you.

Likewise, a customer using one of the large national services to ease itself through an in-house peak load situation may find it is paying needlessly for the vendor's investment in hardware, software and telecommunications. In short, cost is only one of many factors to be weighed and evaluated in selecting an RJE vendor.

Reporting and Control

Loss of control at any one of several levels is a serious concern, especially to new RJE users, and potential vendors' control systems should be scrutinized carefully. Administrative control systems are particularly important, since in most cases user management is physically isolated from DP operations and is unable to directly control the use of RJE resources.

In such an environment, management must rely on the RJE vendor to produce timely reports of resource usage and billings.

Data should be broken down on a project-by-project basis; it should clearly identify where resources are being used within a project or system and, where appropriate, by whom. This latter consideration become critical when RJE is used for systems development, since many programmers may be working on a single project or project component and submitting jobs at RJE workstations.

The availability and quality of administrative control systems is a key indicator of the vendor's commitment to the remote computing services business. They are expensive to develop and therefore are not frequently found among the marginal vendors.

On the other hand, vendors who have made the investment tend to enjoy much higher levels of customer satisfaction, and customers themselves have come to rely on administrative control systems both for budget management and as a measure of DP productivity.

Physical, Data Security

Physical security and data security are also extremely important control-oriented issues. If at all possible, the customer should visit a potential vendor's facility and get a first-hand picture of the physical security systems in force.

Most vendors will be happy to provide a guided tour and will be eager to describe the systems and procedures they have implemented to protect themsleves and their customers from environmental problems, fire, theft and malicious mischief.

Vendors who do not limit access to their computer facilities should be immediately suspect, as should those who lack formal backup/recovery procdures and disaster planning or who have not adequately protected themselves via alarm systems and offsite data storage against fire, theft and other similar problems.

Data security is somewhat more difficult to evaluate, but no less critical than physical security. As a general rule, computer manufacturers have done less than an adequate job — until very recently at least — of incorporating data security features into their hardware and operating system software.

Many RJE vendors rely solely on the manufacturers' data security and, as a result, can offer their customers little real protection, regardless of their claims.

Other vendors, including the major national suppliers and a number of high-quality regional houses, have either made extensive modifications to the manufacturers' data security features or have scrapped them entirely and developed their own. The most advanced systems employ hierarchial password protection integrated with the administrative control system, and many use some form of encoding or encryption to further frustrate attempts at unauthorized access.

Data security systems should also protect against accidental loss or damage, since head crashes, tape drive problems and transmission errors are far more likely to occur than are thievery and mischief. Permanently mounted on-line storage media such as IBM 3350s have gained broad and rapid market acceptance because of their impressive price/performance ratios, but they have also created some problems along the way.

When used in an RJE environment, their contents must be frequently dumped to an off-line medium such as tape, a costly and time-consuming process some vendors have labeled a "user responsibility."

In general, the more sophisticated vendors will assume this responsibility themselves and will have formal systems and procedures for restoring all forms of damaged data, regardless of the cause or damage, within a very short time — an hour or less — and with minimal loss of information.

There are more aspects of a vendor's operation the potential user should evaluate before making a decision. In his next article, Poje — president of Chicago-based Phoenix-Hecht, Inc. — will suggest how to examine a vendor's performance track record, support services and applications software libraries.

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Micropolis Disk Systems Gain Isam File Support

VAN NUYS, Calif. — Supporting indexed sequential access method files on Micropolis floppy disk subsystems, the Magsam package enables users to create and access records through user-defined keys, according to the vendor, Micro Applications Group (MAG).

With the facility, records can be retrieved randomly by key, sequentially by key, sequentially in physical (chronological) order or randomly by relative record number. Records can be created randomly or sequentially by key, a spokesman added.

Because Magsam records are stored in standard Micropolis format, files are compatible with all Micropolis Basic features, including dynamic file allocation, and any independent vendor software, he claimed.

Magsam is distributed on a minifloppy in source format and costs $75 for a single site. Dealer and OEM arrangements are also avialble, MAG said from 7300 Caldus Ave., Van Nuys, Calif. 91406.

Bank Credits Terminal Net With Improving Service

GARY, Ind. — Better customer service, more efficient operations and increased bank protection are being achieved with a terminal network system recently installed in the main and branch offices of Gary National Bank, here, according to Paul Kloth, vice-president of operations and cashier.

Operating with total resources of about $500 million, the banker operates 20 branch offices. With its retail orientation, Gary National serves a large number of accounts, including 55,000 checking, 56,500 regular savings, 13,000 time deposit, 8,000 savings certificate and 13,000 Christmas Club accounts, Kloth noted.

As a result, the bank handles a high volume of customer inquiries — about 110,000 a month. Forty thousand of these are direct phone inquiries, while the remainder are received by tellers in main and branch offices.

Previously, all of these inquiries were handled by central accounting personnel who used local communications terminals to contact the bank's computerized central information file. Customer phone inquiries were handled directly by the central accounting personnel; inquiries made at main or branch offices were phoned in by tellers.

With about 300 tellers in Gary National Bank's main and branch offices processing as many as 50 different transactions each, there was a real need for a time-saving tool.

Loren O. Ogborn, vice-president and manager of DP, directed installation of a terminal network system consisting of three IBM 3604 Model 3 terminals for the DP area of the main branch and 30 IBM 3604 Model 2s; 50 IBM 3606 terminals are in the process of being installed.

Each branch office will have one 3604 Model 2 and one to 10 Model 3606s for teller transactions. Branch offices are from two to 18 miles away.

The Model 2s have replaced 30 Model 1s. which were "limited on inquiry because they had no alphabetic keyboard," according to Nolan Dennington, supervisor of systems and programming.

Branch terminals transmit at 300- and 1,200 bit/sec, with the majority of main branch functions running at a speed of 300 bit/sec.

Utilizing IBM's Extended Telecommunications Access Method in conjunction with the Network Control Program (NCP), the terminals operate on-line with IBM's Customer Information Control System (CICS) on the bank's IBM 370/135. The system has a 3704 front-end processor.

IBM finance terminals are used in accounting department.

To process an inquiry, tellers enter their identification number and the customer account numbers in a terminal. For a checking account, the following data is displayed on the terminal screen: customer name, available balance, current balance, last deposit date, number of uncovered checks in a period and any stop payments.

If a customer wishes to cash a check, data shown on the screen is reviewed to ensure there are sufficient funds in the account, following which a "hold" for the check amount is entered. Stop payments are also entered in terminals at customer request.

The same basic data is displayed for savings accounts while "holds" are entered for withdrawals. For loan accounts, portfolio data is displayed on terminal screens, and for safe deposit accounts, customer names and addresses are shown.

"The terminal network system has unlimited capabilities for expansion in the future and we are currently experimenting with various other data entry and capture applications," Kloth said. "Overall, the terminal network system provides Gary National Bank with the capability of improving customer service while keeping costs down."

Datapac to Back 3270-Type CRTs

OTTAWA — A service designed to support IBM 3270-compatible CRT terminals on Datapac, the coast-to-coast Canadian packet-switched network, has been announced by The Computer Communications Group (CCG) of the TransCanada Telephone System.

The service, called Datapac 3303, will provide the first Datapac support for synchronous terminals, a spokesman noted. Rates for the service will be announced this summer; commercial service is expected by the end of 1978, he added.

Datapac 3033 will enable IBM 3270 terminals and emulators such as CCG's Vucom 2 terminal operating under the Binary Synchronous Communications (BSC) Line protocol to communicate with host computers via the Datapac network.

The Datapac 3303 services will be based on the Network Interface Machine (NIM) using Northern Telecom SL-10 line processors. These processors will poll the 3270 controllers on an on-line basis over multipoint facilities utilizing the standard 3270 BSC line protocol. At the other end, host computers will access the network via Datapac 3000 (Snap) service. A Datapac Modified Emulation Program software package from Cambridge Telecommunications of Bedford, Mass., will be available for host support.

CCG is at 160 Elgin St., Ottawa, Ont. K1G 3J4, Canada.

Paradyne Gives 360, 370 Users Entry-Level Communications

LARGO, Fla. — Paradyne Corp. has introduced a remote I/O system for first-time data communications users. The Low-Cost PIX (LCP) allows the IBM 360 and 370 users to implement an entry-level telecommunications system that can support both CPU-to-CPU links and remote I/O operations at low cost, according to a spokesman.

The LCP is a means of extending the multiplexer channel interface of an IBM 360 or 370 mainframe to remote locations without mainframe-resident communications software such as Btam, Qtam or RJE, he explained. LCP essentially replaces the modems, communications controllers and synchronous line adapters normally required to support telecommunications applications.

The LCP consists of a control unit attached to the byte multiplexer channel of the mainframe, either half-duplex or full-duplex line modules which allow CPU-to-CPU links and remote control units that can support Paradyne and/or IBM card readers, reader/punches and line printers at speeds of 250 to 1,100 card/min or line/min.

The system can utilize either digital network links or voice-grade lines and can support data transfer rates from 4,800- to 19.2 kbit/sec, depending upon the system and telecommunications line configuration, Paradyne said.

Prices for the LCP begin at $465/mo on a five-year lease. Purchase is $19,900 and maintenance is $380/mo.

Paradyne is at 8550 Ulmerton Road, Largo, Fla. 33541.

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In-House Terminal Speeds Client Payments

MIAMI — A computer terminal system designed to speed customer payment processing is helping Jordan Marsh/Florida improve its cash flow while reducing the cost of handling charge account remittances.

The Miami-based division of Allied Stores Corp. has installed an IBM 3762 payment transaction processor to handle payment processing, which formerly had been handled by a local bank on a service basis.

The 3762, which is said to process up to 1,400 bills an hour, has substantially reduced the cost of payment processing, according to Gardner Wright, assistant controller of Jordan Marsh/Florida.

"By using our own in-house processing facilities," he said, "we now have complete control of incoming funds, and we can reduce our compensating balance in the bank."

The 3762 has turned what used to be a multistep process into an efficient one-step operation, Wright claimed.

Previously, payment checks received by the bank were encoded and endorsed and the accompanying payment stubs sent to Jordan Marsh, then totaled and transmitted to a computer in New England, where Allied Stores Corp. maintains customer records for many of its divisions.

Processing Operation

Now, to process a payment, the operator inserts the bill stub into the terminal, which optically scans the document's preprinted information, Wright explained. As this information is scanned and edited, the operator keys in the check amount and inserts the check into the terminal, which automatically reconciles bill and check data and encodes the check with magnetic ink characters for later processing at a bank.

If the bill and check amounts do not match, the terminal's keyboard automatically locks and a signal light appears. The operator must take appropriate action before the transaction can continue, Wright noted.

The terminal then endorses the checks, prints audit trail data on both documents, sends them to separate stackers and prints a journal tape. Deposit slips are printed and added to groups of checks as they are separated for deposit.

Transaction records are placed on a disk file in the system's IBM 3791 controller, then transferred to an IBM 370/138 and, finally, along with financial and other management data, are transmitted to the New England data center at the close of the business day.

"We process an average of 6,000 statements a day, and we can do in five days work that required six days for the bank to do," Wright said. "When necessary, we've handled as many as 12,000 in a day, and the 3762 has the capacity to take care of increased seasonal volumes."

The 3762 also offers the potential to improve customer service, Wright said.

"The 3762 allows us to respond to a customer's complaint quickly, by means of audit trail information — account number, the date the payment was processed and the amount remitted, for example — that was printed on the back of the check when we processed it." If the check was misplaced or accidentally destroyed, the customer's bank, which had microfilmed both sides of the check, can furnish audit trail information, he said.

"We feel we now have the ability to solve customer problems more quickly because we have the means to better identify the problem," Wright said.

The 3762, which can also be used as a data entry device, is used by Jordan Marsh to handle both mail payments as well as those received over the counter.

Bell 103, 202 Gain 27 Modems From Novation

TARZANA, Calif. — Novation, Inc. has introduced its 4000 series of 27 integrated acoustic and direct Bell-103- and 202-compatible modems.

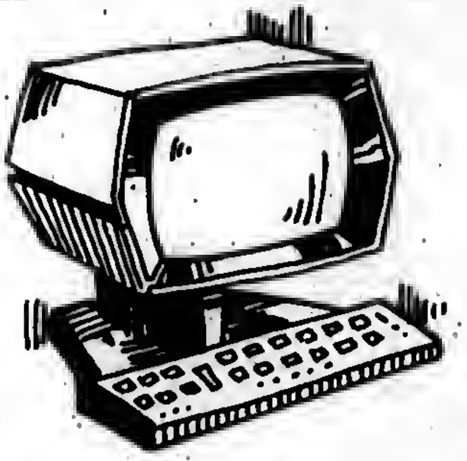
Transmission rates of the series range from 300- to 1,200 bit/sec, according to a company spokesman.

Acoustic models, both Bell- and CCITT-compatible, have been developed to interface with the Teletype Corp. Model 43, Digital Equipment Corp. Model LA36 and Texas Instruments, Inc. Model 733 terminals, the spokesman said.

The modems have the capability for direct connection to a telephone line; Novation's power pack plugs directly into wall sockets, according to the firm.

Novation has also developed a modular rack which accommodates up to 16 direct connect modems in a standard 19-in. rack.

Prices for the units range from $185 to $595. Novation is located at 18664 Oxnard St., Tarzana, Calif. 91356.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INFORMER

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May 22, 1978

DUE TO OVERWHELMING PRESSURE:

COMPLETE DISCLOSURE OF PROJECT X IMMINENT

Dumb Terminal To Make Special NCC Appearance Page 10

* * *

Soviets Protest Deployment of Project X Devices Page 15

* * *

Top Aide Confesses— "I've Known About Project X for Months" Page 21

* * *

Ballistic Printer Reportedly Changing The Printer Industry Page 25

* * *

World Leaders Call for Disclosure Of Project X Page 29

* * *

Movie Rights to Project X Sold Page 35

Top-ranking officer Lee Falco, cornered by reporters. Falco refused to acknowledge Project X rumors. INFORMER PHOTO

Due to last week's daring commando raid on Lear Siegler HQ, pressure is mounting for complete public disclosure of the ultra-secret Project X.

Public outcry and heavy governmental influence is beginning to make itself felt at the highest levels of LSI HQ's staff. Lee Falco, a top-ranking officer on Project X, refused to confirm rumors of an impending, full disclosure, but was unable to completely rule out such a development. When questioned directly concerning the declassification of the project, Falco said only, "Any such development has yet to be decided on, and I personally have heard of no decision being made either way..." When asked about last week's raid and its implications, however, Falco refused comment.

It seems clear to the INFORMER, nonetheless, that LSI's hush-hush Project X will soon go public, doubtless with built-in safeguards to protect certain technological breakthroughs developed by its staff of wizard-scientists. Initially begun as a way to ensure LSI's total mastery of this year's NCC (National Computer Conference), Project X has continued to be a mystery-shrouded undertaking fanatically protected by platoons of internal LSI guardsmen.

Just this morning, our gallant field operative escaped from LSI HQ and made his way to the INFORMER Building with information regarding yet another incredible device.

Exhausted and emotionally drained, he told us in hushed tones of Project X's new VDP-1000, a complete small data system. Amazed, we learned the VDP-1000 includes a Dumb Terminal,™ a Model 310 Ballistic™ Printer, a 16-bit CPU, 16-bit words of dynamic RAM and a cartridge or floppy disk. Our agent then lapsed into a shaken silence that affected everyone in the room for several minutes.

Other INFORMER sources have stated they are onto something so huge, however, that it could blow

(Please turn to page 5, column 2.)

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NCR Has Another Checkout Unit

DAYTON, Ohio — NCR Corp. has introduced a modular terminal, the NCR 2552, for its checkout systems that are used in the food and mass merchandising industries. The terminal supplements the NCR 255 terminal, which will continue to be available.

The NCR 2552 terminal uses the same 64K-maximum in-store NCR 726 minicomputer and software programs as the NCR 255; the two can be intermixed in the same store, according to a spokesman.

The NCR 2552 is comprised of separate components, including electronics module, power supply, keyboard/display/cash drawer, customer display and up to three printers, the spokesman said. The various modules can be grouped together or placed at separate locations at the checkstand.

The terminal can be provided with receipt, journal and slip printers which, according to the firm, are compact in size and use dot matrix characters.

Prices for the NCR 2552 terminal, including keyboard/display/electronics module, cash drawer and three printers, begin at $3,445.

Register Bows

NCR also recently introduced a stand-alone electronic cash register which provides basic sales-recording and cash-control functions as well as automatic tax computation and change calculation.

The NCR 2115 has two printing stations, a minimum of 400 hours of memory protection against electrical outages and the ability to store ronning totals in such categories as sales by department, net sales, taxes, cash-in-drawer, void, refund, charge, received-on-account and paid out, the spokesman claimed.

The 2115, at a price of $995, will succeed certain models of the NCR 210 series, which until now was NCR's lowest-priced cash register family, NCR said.

MSI Handheld Terminal Offers Segmented Memory

COSTA MESA, Calif. — A handheld data entry terminal with a segmented memory has been introduced by MSI Data Corp. According to the firm, the MSI/88 represents the next step in MSI's family of CMOS solid-state terminals.

In addition to a segmented memory, the MSI/88 features a programmable accumulator and memory capacity ranging from 24,000 to 48,000 characters, a spokesman noted.

Other features of the MSI/88 are a 16-digit LED display and bar code wand-scanning capability for the Universl Product Code and the MSI code.

Scans Codes

In addition, MSI will soon provide the capability for the MSI/88 to scan the Codabar code and the European Article Numbering (EAN) system, the European equivalent of the Universal Product Code.

Segmentation of the MSI/88's memory permits it to be divided into as many as nine separate parts of varying sizes. Each part can be treated independently of the others for as long as the user desires, the firm claimed.

Data transmission, editing, erasure or searching can be accomplished on a segment basis by means of a selection, or "page," key.

The MSI/88's programmable accumulator provides users with audit control of data entered into the terminal. The accumulator is usable in such applications as accounts receivable and payroll processing, collection of inventory data or scheduling and compiling departmental financial totals, the spokesman said.

Prices for the MSI/88 will range from $1,895 for the 24,000-character memory configuration, with volume pricing available.

Deliveries will begin in the fourth quarter, MSI said from 340 Fischer Ave., Costa Mesa, Calif. 92626.

IDS Extends Minitech Line

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has introduced its Model 8965 controller and power module for its Series 8900 Minitech communications switches.

Located at a remote site, the Model 8965 receives switching information from the Model 8935 selector, the firm said.

The Model 8965 controller and power modole is installed in the leftmost slot of a Model 8903 cage assembly to provide remote control for as many as eight Series 8900 A,B switching modules (16 channels). Each Model 8965 in a remote control system has a unique address used by the Model 8935 for cage selection, a company spokesman said.

Status Data

Encoded switching information and A,B status interrogation sent from the central site is decoded and passed to the appropriate channel. Status information is extracted from the modoles, encoded and sent back to the central site for display.

LEDs monitor 12 key EIA signals appearing at the Monitor in front panel connector. A lamp test poshbutton is also provided to light all LEDs in the entire 16-channel system for test purposes, the spokesman said.

The Model 8965 costs $1,000 from IDS at 100 Nashua St., Providence, R.I. 02904.

Concentrator Gets Greater Capacity

CHATSWORTH, Calif. — Micom Systems, Inc.'s Micro 800 data concentrator is now available in 12- and 16-channel configorations as well as 4- and 8-channel models, the company recently announced.

The Micro 800 was designed to permit several terminals, typically Teletype-compatible terminals operating at 300-, 1,200-, 2,400- or 4,800 bit/sec, to share one telephone line "to minimize line and modem costs," according to a Micom spokesman.

The Micro 800 costs $2,100 for a 4-channel unit, $3,000 for an 8-channel unit and $5,200 for a 16-channel unit.

Micom is located at 9551 Irondale Ave., Chatsworth, Calif. 91311.

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DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

DMS Tees Up Online System Fast for Karsten

Karsten Manufacturing makes professional quality golf clubs, highly custom-configured to the physique and style of each golfer. Such individualized service has made online order entry the company's most complicated computer application. A clerk enters extensive and detailed orders by touching a light pen to the screen of an IBM 3277 Display Station, using one or more of 20 different display formats.

Yet the order entry system was written and installed in the company's System/370 in six weeks. William Gingerich, data processing manager for the Phoenix-based manufacturer of golf balls and clubs, attributes this to the use of Display Management System (DMS).

An IBM program product, DMS converts information from a fill-in-the-blanks form directly into executable programs. It generates and displays user-defined screen formats, processes terminal transactions, and accesses an existing data base or one newly defined under DMS. Screen formats can be revised and new ones added quickly and easily, without reprogramming.

"DMS gets a screen up in a few days," says application programmer Catherine Boyd. "I specify a format by making entries on a preprinted form. As soon as this is keyed into DMS, the screen is available at the 3277. It's equally simple to program the flow from one screen to the next within a transaction–from order entry to credit check, for example."

"We make heavy use of the 'browse' functions in DMS," adds Gingerich. "Order clerks identify a customer account by entering a partial name, a zip code, or the name of the pro shop through which the clubs were ordered.

"Applications involving data-base inquiry are particularly easy to write with DMS," he continues. "In less than a day we wrote a program that makes inquiries against our payroll file."

The company was launched by Karsten Solheim, an engineer, after he developed the "Ping" putter, a golf club famous for its accuracy. Not much more than a decade old today, Karsten Manufacturing acquired its first System/370, a Model 125, in October 1974 and its present Model 138 in May 1977.

"Inventory management is a challenge in this business," notes Louis Solheim, Karsten's son and vice president of the company. "There are many variables in a wood club: swing weight, face orientation, shaft style, model and type, for example. Since it takes two months to process a wood through manufacturing, we need close control to have the required heads available."

"The inventory control system," adds Gingerich, "was written by one person in three or four weeks. DMS makes implementing an online system, using multiple screen displays, at least as easy as writing a simple batch application."

Marine Biologist Chick Gaddy on Coper's Island, east of Charleston, South Carolina.

Preserving the Heritage of the Palmetto State

In a program to preserve its irreplaceable natural resources, the state of South Carolina has collected data on more than 400 sites, ranging from the breeding grounds of the rare loggerhead sea turtle to stands of timber more than 400 years old.

"In South Carolina, we are very proud of the beauty and heritage of our state," says Dr. Wayne Beam of the Wildlife and Marine Resources Department, "and we want to preserve it for future generations. Now we can make recommendations on land use permitting development compatible with conservation of natural resources.

"The value of the program is in rapid pinpointing of needed information," Beam continues. "We generate hundreds of thousands of characters of new data each month in our field survey work. There is no way to handle a state-wide assessment like this and have it do anything but sit in the files unless it is automated."

Areas surveyed contain rare or endangered species of plants or wildlife, unique and outstanding natural features, historical sites and buildings. Complete information for each location is entered into an IBM System/370 at the University of South Carolina. The goal is to provide the data that planners need to assess the impact of future development.

Accumulated details on animals of special ecological significance include all their feeding and habitat requirements, their geographical distribution, the environmental limits they tolerate and their breeding and nursery areas.

The program is called Heritage Trust and was developed in collaboration with The Nature Conservancy, a privately funded organization based in Arlington, Virginia, which is working with other states on similar programs.

Beam adds: "By doing keyword searches we can quickly compile a list of all locations where the gopher tortoise has been sighted, or other such extracts. And using the computer we can do analytical work—correlating such factors as size and fecundity, to help improve commercial fish harvests.

"We recognize that we are a growing and developing state and must make the most effective use of our land from an economic as well as an ecological standpoint. The computer will give us the capability to compare sites, assess their relative importance and decide which areas contain unique values that should be preserved."

DP Dialogue is designed to provide you with useful information about data processing applications, concepts and techniques. For more information about IBM products or services, contact your local IBM branch office, or write Editor, DP Dialogue, IBM Data Processing Division, White Plains, N.Y. 10604.

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Programmable System

Motorola Boards Make Up CRT

PHOENIX — Motorola Microsystems has expanded its line of microcomputer boards to configure the modularized Multifunction Programmable Terminal System. The system is intended to raise the level of componentry available to computer system manufacturers for the production of their products, according to a company spokesman.

Named Exor 68, the system offers a choice of building blocks with which to configure CRT-oriented equipment. It consists of three separate groups of matched macrocomponents from which a user can choose to give his system its desired capabilities, the spokesman said.

The three groups include a basic CRT unit, a variety of keyboard options and a group of microcomputer subassembly boards.

The CRT unit consists of a video monitor with up to 1,920 characters, 24 lines and a 12-in. screen. In the basic system, internal character generators produce 128 different characters, including 96 upper/lower case Ascii characters, 24 lower-case Greek characters, two upper-case Greek characters (omega and sigma) and six special characters.

The system can be supplied with other generators to meet a customer's specific requirements, according to the firm.

Built-in electronics permits operation with RS-232C transmission and with 20/60 mA current-loop equipment, the firm said.

Switches also permit the selection of word length, transmission rate, communications mode and modem control, the spokesman claimed.

Other features include blinking inverted cursor, audible alarm and optional compatible motherboards for expanding system capabilities with up to eight additional micromodules or Exorciser boards.

The basic CRT unit with its built-in electronics is available separately for end applications requiring no keyboard entries.

Motorola is offering six keyboard arrangements as optional extras. A keyboard can be connected to a CRT with optional-length cables, the spokesman said.

Micromodules are available ranging from relatively simple partial computers — for example, microprocessor modules, memory modules or interface modules — to complete single-board microcomputers, the firm said. All are compatible with the Exor 68 system and can be installed within the terminal card cage through an 8-card motherboard that is an optional offering with the system.

The cost of the system varies in accordance with the desired options. A typical configuration including a CRT unit with extended communications and display features, keyboards and cable assembly sells for approximately $2,600.

Motorola Microsystems is located at 3102 N. 56th St., Phoenix, Ariz. 85018.

Managers Set Meeting

PORT CHESTER, N.Y. — The second annual Communications Managers Association (CMA) conference and exhibition is scheduled for Oct. 17-19 at the Rye Town Hilton Inn here. The theme of this year's conference will be "Telecommunications Challenges/Opportunities — 1978."

Participation in the conference is open to anyone with communications responsibility for a company, but not employed by a common carrier, equipment supplier or communications consultants, according to a spokesman.

Fees are $50 for CMA members and $75 for nonmembers. Further information is available from Charles Schweis, Ciba-Geigy Corp., 444 Saw Mill River Road, Ardsley, N.Y. 10502.

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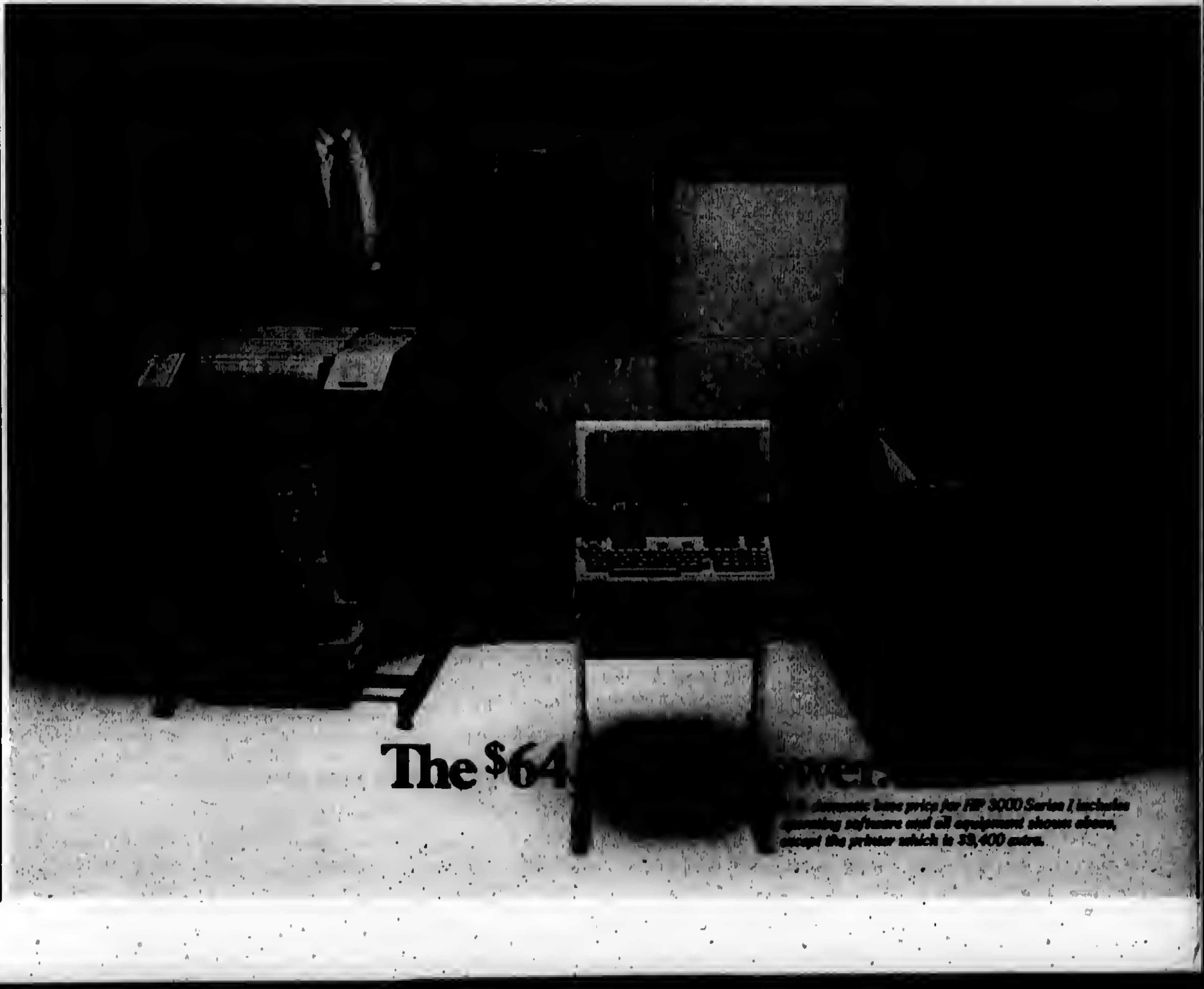

domestic base price for HP 3000 Series I includes operating software and all equipment shown above, except the printer which is $3,400 extra.

Adcu Plans June Seminar

LANCASTER, Pa. — The Association of Data Communications Users (Adcu), Inc. will hold a seminar and its third annual national meeting June 26-28 here.

Keynote speaker for the event will be Bill E. Brice, who was the lead attorney in the 1968 Carterfone decision.

Sessions to be held include "Industry Status and Forecast," "Specialized Common Carrier Status and Forecast," and "Common Carrier Line Impairments, Monitoring and Trouble Reporting."

The business meeting, to be held Aug. 28, and other member-related activities are restricted to members only.

For further information, contact Harvey Hershkowitz, vice-president, Chase Manhattan Bank, 1 New York Plaza, New York, N.Y. 10019.

Dynabyte Offers Dumb Terminal

PALO ALTO, Calif. — Dynabyte, Inc. has introduced the Naked Terminal, an S-100 microprocessor module that functions with a keyboard and CRT monitor.

The terminal displays 80 characters on 24 lines using both upper- and lower-case characters in a 5 by 7 dot matrix font, the company said.

Half-duplex, full-duplex and a block mode that allows editing before transmission are features of the terminal. Editing is aided by an addressable cursor.

Switch-selectable features include black-on-white or white-on-black, blinking or nonblinking underline cursor and variable transmission rates, according to a spokesman.

Software Unnecessary

No software is required, Dynabyte claimed. The terminal can be configured by dip switch to drop into an existing system, replacing the serial I/O card and stand-alone terminal without making any changes to software, the spokesman added.

The terminal contains a microprocessor and its own memory, software drivers and internal bus. It will not take up any of the 64K memory space on an S-100 bus, the firm said.

The unit is assembled, socketed, tested and burned in and carries a one-year warranty, the firm said.

The Naked Terminal sells for $350; a connector kit is available for $15.

Dynabyte is located at 4020 Fabian, Palo Alto, Calif. 94303.

Bell Will Use Lightwaves

CHICAGO — The Bell System reportedly will have its first lightwave communications link in regular service by the end of 1980.

The decision to proceed with regular service was based to a large degree on the success of the lightwave system that has been in operation in Chicago during the past year, a spokesman said.

The Chicago lightwave system runs about 1.5 miles under downtown streets and carries voice, data and video communications on pulses of light transmitted through hair-thin glass fibers. The evaluation has been under the direction of Bell Telephone Laboratories and AT&T, with Illinois Bell Telephone Co. and Western Electric Corp. also participating.

The adaptability of lightwave technology to a variety of customer needs had been demonstrated by the Chicago system in the handling of voice, data and video signals, AT&T said.

The evaluation has also proven the value of a "systems" approach to lightwave communications, in which individual components — lasers, LEDs, fibers, detectors, connectors and terminal gear — are developed, fabricated and installed as integrated elements for maximum performance and cost-effectiveness, a spokesman said.

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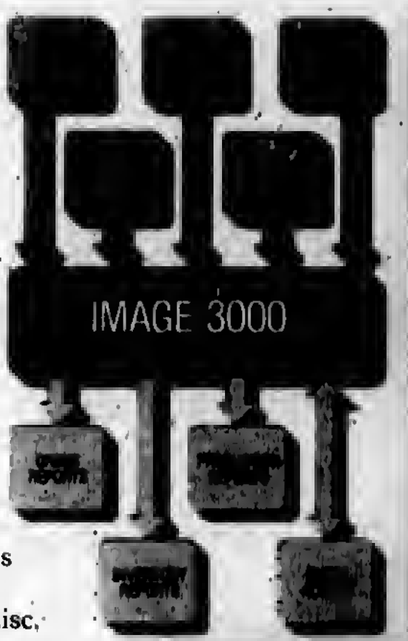

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Univac Makes 90/80-4 Head of Family

By Frank Vaughan
CW Staff

BLUE BELL, Pa. — Univac has introduced a top-end model for its 90/80 product line that reportedly offers 35% more performance than the 90/80-3, previously the largest model in the 90/80 family.

The virtual system, known are the 90/80-4, also offers approximately 117% of the performance of the IBM 3031 processor, Univac claimed.

The 90/80-4 is a follow-on product to the 90/80-2 and 90/80-3, according to the firm, and users seeking an upgrade from one of those models do not require a CPU swap-out or changes in peripherals. The 90/80-4 uses Univac's VS/9 operating system and is compatible with the firm's 90/60 and 90/70 product line.

The system's CPU architecture is common with that of earlier models in the series, and its physical requirements for floor space, heat dissipation, power and air conditioning are the same as the smaller models, according to a spokesman.

Two of the most significant features of the system are the main storage capacity — which can range up to 8M bytes, double that of the 90/80-3 — and the addition of a 32K-byte buffer storage (cache memory).

The main storage is expandable from 2M bytes to 8M bytes in 2M-byte increments packaged in twin Semiconductor Storage Modules (SSM), the firm said.

The 32K-byte buffer storage is equally divided for handling instruction and operand data. To make the most efficient use of the buffer storage, the 90/80-4 has two-way memory interleaving, Univac said.

Univac 90/80-4

For fetches where data is not stored in the buffer, interleaved requests by the Storage Interface Facility (SIF) to both SSMs allow loading of 16 bytes of information at one time into the buffer, it claimed.

The system comes with five I/O channels consisting of four block multiplexers and one byte multiplexer; it is expandable to a maximum of eight channels, the firm said. The full configuration can be either six block and two byte multiplexer channels or seven block and one byte channel.

The CPU has two sets of 16 registers and four floating-point registers. The average insruction execution time is in to 400 nsec to 500 nsec range, while a basic machine cycle takes 98 nsec, according to the spokesman.

The system has a read access time of 280 nsec for 8 bytes from main memory, he said, noting the maximum transfer rate is 16M byte/sec.

The firm's VS/9 operating system handles batch, interactive and communications environments and uses the Data Base Management System 90 (DMS 90) and Information Management System 90 (IMS 90). Languages supplied include Cobol, Fortran, Assembly, RPG, RPG-II and APL.

A 90/80-4 processor "group" with 2M bytes of main storage sells for $1,256,000 with a monthly maintenance fee of $3,300. Short-term lease prices are $32,535/mo while a five year lease price is $24,400/mo, the firm said.

An additional 2M bytes of storage sells for $319,300 with a monthly maintenance fee of

(Continued on Page 48)

Record Crowd Views Micrographics '78

By Tim Scannell
CW Staff

BOSTON — The National Micrographics Association (NMA) exposition, Micrographics '78, which took place here recently, opened amid a steady rainfall and closed with record-breaking attendance figures.

More than 133 exhibits filled the four-acre John B. Hynes Veterans Auditorium, offering the enthusiastic visitors a wide selection of products to view as well as a look at the current status and future trends of micrographics. Approximately 4,000 people attended the event on opening day, registration officials said.

Every booth on the show floor attracted healthy numbers of visitors from industrial, chemical, federal and state government organizations. Interest in the various vendor displays was sparked by such give aways as plastic bags bearing company logos, buttons, badges and adhesive patches. Several of the major vendors staged contests which offered cameras and all-expenses paid trips as prizes.

The 3M Co. presented a "magic of Microfilm" show hosted by a magician who performed various feats of legerdemain while Bell & Howell, not to be outdone, attracted crowds with a mindreading demonstration.

One of the most popular aspects of the exposition was the series of sessions based on the theme of the conference, "Building Information Bridges." The 23 seminars featured approximately 95 speakers on such topics as competing system technologies, equipment analysis and system design, micropublishing, in-house vs. external services and future market and production trends.

CW at NMA

Computer output microfilm (Com) and micrographics applications were discussed in relation to banking and finance, engineering systems, health and medicine, insurance and retail/wholesale operations.

Because the annual NMA show is the prime marketing forum for the micrographics industry, according to a spokesman, several products were unveiled.

Datagraphix, Inc. introduced its on-line Autocom II, an intelligent microfiche recorder that incorporates a 32K-byte microcomputer system and was designed to interface with the IBM 360 Model 25 and up, the 370 line and 30 series of processors. The unit can reportedly process data into titled and indexed microfiche at speeds up to 12,000 line/min.

Fuji Photo Film USA, Inc. introduced the Laser COM system, which uses a laser beam to convert data signals to microimages and record them on metal evaporated film. The system has 155K bytes of random-access memory; its average throughput is 8,000 to

(Continued on Page 48)

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On-Line Film Processing Seen in Future COM Units

By Tim Scannell
CW Staff

BOSTON — Computer output microfilm (Com) systems of the future will be smaller, use less energy and incorporate on-line film-processing methods, Larry D. Brown, a manager with Synergraphics, said at Micrographics '78 recently.

The use of minicomputers with COM units, while not a new idea, will increase as time goes on to the point where micrographic systems will be considered as peripherals rather than systems assisted by a minicomputer, Brown predicted at the exposition sponsored by the National Micrographics Association (NMA).

Eventually, "smart" systems — those containing their own CPU — will dominate the industry, resulting in an increased use of distributed micrographic processing, Brown said. Unformatted magnetic tapes created at one site will therefore be able to be processed at a remote station, relieving the host computer of the controlling function, he added.

Brown's projections were echoed by David T. Bogue, director of technical services for the Zytron Corp., who shared the stage during the session. Bogue noted that in 1970, 85% of the COM units in use were designed to function in an off-line capacity, according to figures supplied by NMA. This figure was raised to 95% in 1977.

Of all the alphanumeric COM units installed in 1977, NMA figures showed, only 4% were configured as strictly on-line equipment.

CW at NMA

Computer-controlled COM systems have several advantages over those not controlled by a computer, Brown stated. Smart COMs can accept numerous input formats, they do not require altered magnetic tape, the output parameters are easily changed and intelligent units are not restricted to specific tape block structures, he said.

"Dumb" units, on the other hand, are simple to operate, less complex because they do not involve microprocessors or integral computers and less expensive, Brown said.

COM systems using nonintegral or separate development systems will eventually be replaced by those using integral development processes, Bogue said. Firms familiar with computerized micrographics and the "wet processing" it usually involves are showing an increased interest in machines that process the film internally and deliver a dry or semidry product both because of the time saved and the chance to check recorded data immediately.

Univac Caps 90/80 Line

(Continued from Page 47)

$800. Short-term rental costs $8,270/mo and long-term lease costs $6,200/mo.

A 90/80-3 to 90/80-4 upgrade costs $236,900 with a monthly maintenance fee of $600. The short-term lease price is $6,135/mo while the long-term rate is $4,600/mo.

Typical System

A typical system with the 90/80-4 processor "group," 2M bytes of main storage, a 1,000 card/min reader, 250 card/min punch, two 2,000 line/min printers, dual channel tape control, four 780K-byte tapes, four 470K-byte tapes, dual-access disk control, four 307M-byte disks, four 200M-byte disk and communications control with 40 lines sells for $2,577,456 with a monthly maintenance fee of $9,435.

The short-term rental fee for this configuration is $75,834/mo while the long-term lease costs $56,939.

The first customer shipments are expected to begin in January, Univac said. The vendor can be reached at P.O. Box 500, Blue Bell, Pa. 19422.

Record Crowd At NMA Show

(Continued from Page 47)

9,000 page/hour, a spokesman stated.

Many products in the area of intelligent control systems were also shown, including a console from the Access Corp. that is microprocessor-based and constructed to interface with the firm's document storage and retrieval systems.

Other Interests

The majority of the people at the conference and on the exhibit floor were basically interested in microfilm storage and microfiche systems, but if the size of the crowds was any indication, COM and computer-assisted retrieval products and sessions were readily accepted.

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Merits of CRT, Laser COM Devices Debated

By Tim Scannell
CW Staff

BOSTON — Representatives of four manufacturers of computer output microfilm (COM) equipment discussed the merits of the two major recording techniques — CRT and laser — in a "semidebate" here last week at Micrographics '78, sponsored by the National Micrographics Association (NMA).

Although the speakers' viewpoints differed slightly from a technical standpoint, all four ultimately agreed the laser has succeeded in expanding the world of information processing, but it will not replace the CRT as a printing medium.

The function of a COM system, Terry Anderson of Datagraphix, Inc. explained, is to receive input signals and transfer them to film "with adequate resolution and competitive speed." The system will incorporate some flexibility and reliability and will achieve a certain cost effectiveness, he added. The basic difference between CRT-type systems and laser-based machines lies in the amount of power needed to drive the unit and the resulting force of the light output.

The laser, when considered in this respect, Anderson said, is not a magical device, but simply a means of "deflecting a light source to produce multiple output beams."

The advantages of a CRT-based unit include simplicity, because there are no moving parts; lower cost; easy maintenance; full addressability on the screen; variety of beam shapes (raster, stroke and shaped); and field-proven technology. Although speed and resolution are also good, CRT units are outpaced by the laser, in these respects, he added.

A disadvantage of CRT systems is the limited light output resulting from the lack of concentration in the beam, Anderson stated.

The laser, because of its high energy output, produces a sharper image and functions at a higher speed, Anderson said, but there are many disadvantages associated with the technology. Laser systems are complex, they involve moving parts — and therefore careful maintenance — and they print in dot matrix characters only, he noted. In addition, because of the high output of energy, laser systems are subject to special government safety regulations.

CW at NMA

Edward Ince from the Eastman Kodak Co. stressed that COM should be treated as a management tool and system objectives should include a high-quality output, high-speed recording, quick job turnaround, reliability and low cost.

A successful configuration, Ince stated, would most likely be on-line to the CPU and exist within the compter room. It would also incorporate a front-end intelligence and an in-line, immediate film processing system that is completely dry.

Kodak chose a helium-neon-type laser in it's Comstar series for size, cost and safety considerations, Ince added. The firm also developed a high-speed, high-resolution film to makeup for the low power output of that particular type of laser.

3M Co.'s Art Kutchera stated that the future of COM technological developments, either toward CRT-type systems or laser generation, will depend upon what types of film are developed. The laser will dominate the market only if the power output of the CRT fails to meet the needs and restrictions of the film, he said.

(Continued on Page 53)

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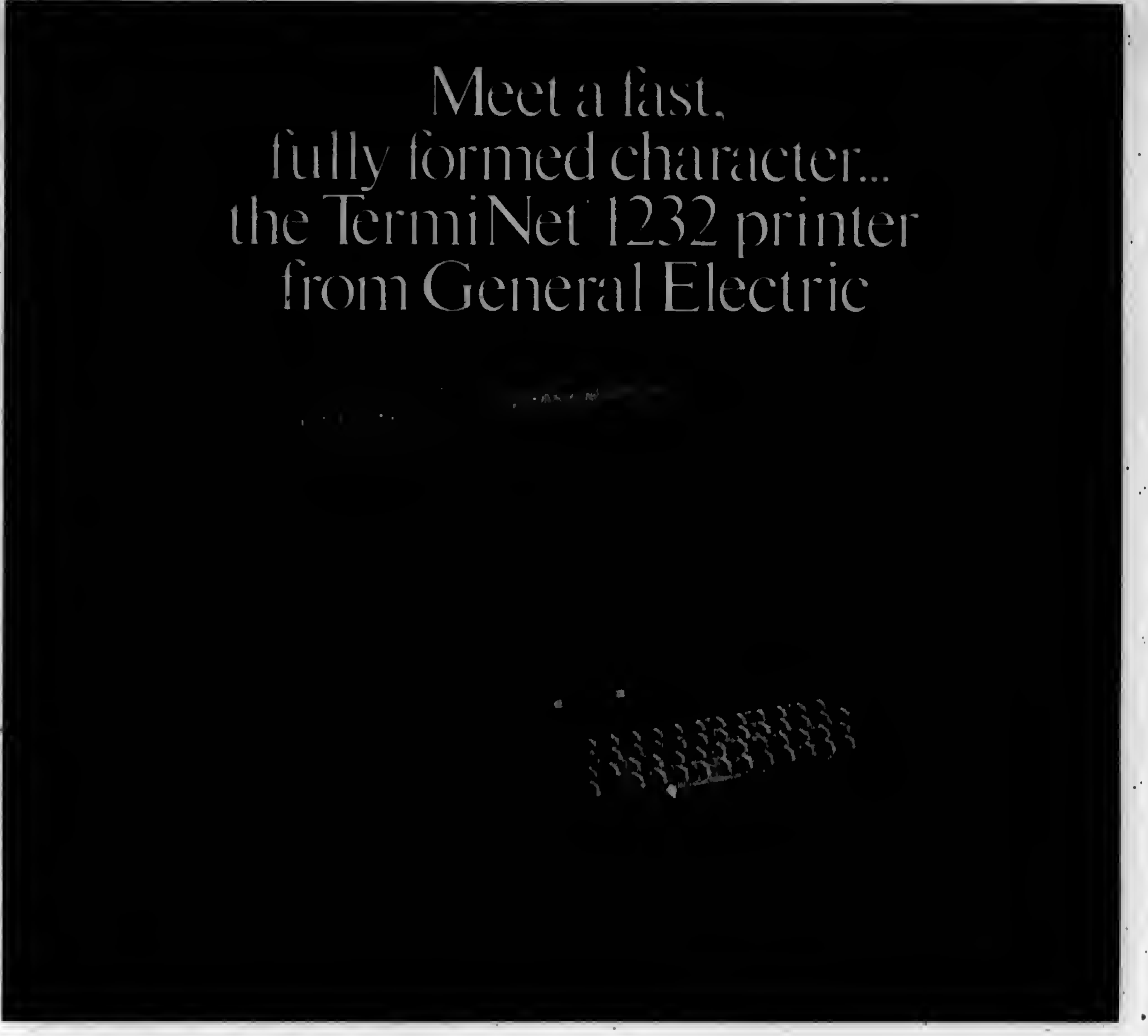

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GENERAL ELECTRIC

Understanding of DP as Office Aid Lacking

By Tim Scannell
CW Staff

BOSTON — Nearly 70% of those people holding top management positions either don't understand the significance of computerized assistance in the office or they are not satisfied with the systems they already have, according to O.H. Davison, Jr., president of the Zytron Corp.

Changes are occurring so rapidly in the development of new office procedures and communications techniques that people feel threatened by this "future shock" — and subsequently deny the potential proposed interoffice communications methods, Davison said at Micrographics '78, sponsored by the National Micrographics Association (NMA).

Service companies, Davison pointed out, have three distinct duties to their customers. First, they have the responsibility to explore and present new technologies that develop throughout the industry. Second, they must exhibit a "sensitivity to people" and the behavioral problems that might erupt.

Time Consideration

A service firm's third — and perhaps most important — duty is demonstrating a concern for the time involved in converting from paper to micrographic systems from a customers' standpoint. In other words, Davison said, a service company that undertakes the job of revamping an office's communications procedures should be prepared to "work against the clock all the time."

Two particular items will play an integral part in the development of the office of the future: the microcomputer chip and fiber optics, Davison said. Revolutions in the development of the chip will eventually result in "the displacement of the large-scale computer," he predicted.

The continued use of fiber optics in communications will bring "significant" strides in global communications and the evolution of "high-speed, digital, broadband satellite communications by the year 1980," he added.

Davison highlighted two factors that, because of their negative overtones, necessitate the development and utilization of computer-assisted retreival techniques and computer-controlled micrographics. One is the rapid inflation and resulting cost spiral; the second is government's and industry's insistence on companies and individuals keeping accurate records for an extended period of time. Corporations, Davison said, can no longer afford to finance or properly maintain a "sea of paper."

CW
At NMA

Future Possibility

Davison illustrated his point by postulating a mythical company in a typical boardroom discussion. The boardroom in this case, however, was called a "communications room," and the "discussion" was interspersed with various charts and figures provided by a computer-controlled micrographics unit.

The officials of the mythical company were able to pinpoint and solve the problem of a drop in sales by comparing information provided by the system.

Through a specialized litigation retrieval system, the company could avoid a costly lawsuit by presenting as evidence a letter stored within the computer-controlled system and called up when needed, Davison theorized.

Finally, Davison stressed the importance of choosing the right vendor to "avoid the impact of technology that is carelessly planned by someone else." Drawing on the theme of the conference exhibition — "Building Information Bridges" — he said it is vital that service companies and vendors "build bridges of understanding to the people" who are uneasy about having information and records stored "out of sight" in a computer.

Book Has Details On Data Entry

SANTA ANA, Calif. — A handbook for data entry supervisors and DP managers that is said to answer daily questions about managing a data entry operation is available from *Data Entry Digest*.

The 275-page guide includes sections on operator selection, training techniques, compensation plans, management techniques, supervisory skills and productivity techniques.

Also covered are selection of key-to-disk systems and terminals, how to get more out of a key-to-disk system, distributed processing, user interviews and a review of new equipment.

Material in the "Data Entry Problem Solver" has, in many cases, been provided by users, helping to keep the information practical rather than theoretical, according to a spokesman.

The handbook costs $86 from *Data Entry Digest*, 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

Correction

The Rocky Mountain Bank Note Co. has only one plant that uses the Mohawk Data Sciences Corp. key-to-disk system that was described in the Special Report on source data entry [CW, April 24].

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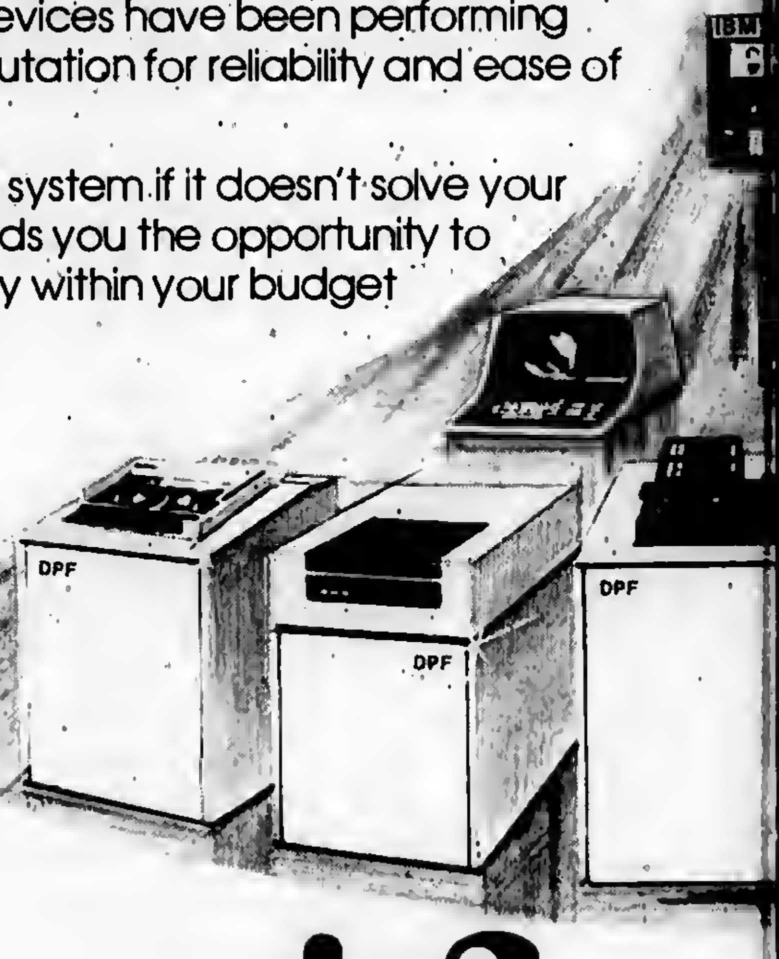

To Save Time, Money

COM Systems Described as Programming Tool

By Tim Scannell
CW Staff

BOSTON — When choosing a computer output microfilm (COM) system, a great deal of consideration should be given to the programming staff because a good programmer, in the course of his work, "can turn out a tremendous amount of paper," according to Anne P. Faass, a member of TRW corp.'s Defense and Space Systems Group.

COM units and their relative benefits can be used by a programmer as tools," Faass said, speaking before a group at the National Micrographics Association's (NMA) Micrographics '78 conference here recently. Compiler listings, control reports and system documentation can all be transferred to microfiche, resulting in both time and cost savings as well as increased organization.

CW At NMA

TRW first considered the merits of COM in 1969, Faass explained, but had to postpone conversion when "the bottom fell out of the space industry in 1970." The company reconsidered computerized micrographics again in 1973 and, after evaluating the expense, the time-saving benefits and the legality of "reduced" data, it came away with positive reactions, Faass said.

The first aspect that was considered, Faass said, was the cost trade-offs. Since the specialized hardware itself couldn't be compared with existing peripherals, the company considered how much money would be saved on the use of computer paper — an item that, although vital, is "controllable," Faass stated.

TRW then carefully evaluated the equipment that was available at the time. This included contacting the various vendors, who demonstrated their products, and visiting installations already using COM systems, Faass continued. The net result was that the company decided to obtain an off-line configuration because "it wasn't feasible, at the time, to put the unit online."

Standards Established

Internally, the corporation had to establish certain standards to ensure that all of the micrographic output would be of the same format. This included adhering to a standard size (48X — 6 in. by 4 in.), having a vertical-type pagination, reserving a certain line on the film for the grid number and another for the index and maintaining a standard title format.

COM software was also considered and because of the obvious complexities, it was decided to standardize the parameters as much as possible, Faass stated. Programs were written so that a programmer need only input the report number, name, index location and data location to access a file. TRW also prepared its own manuals based on its particular applications and instructions from the vendor manuals which, Faass added, were much too complex.

A separate time-sharing option added to the COM system allows programmers to input tests via terminals. A programmer wishing to run a test enters a parameter and receives either a validation or an error message. If the parameters are validated, the programmer submits his job, which is entered in a batch mode, and picks up the completed fiche at a central location within two to three hours, Faass explained.

Besides using COM for programming purposes, TRW also uses micrographics in both the payroll and accounts-payable departments, Faass said. Payroll data is recorded on a weekly basis and each clerk has his own set of recorded data. Should an employee inquire about a lost paycheck or error in his check, the fiche is readily available, Faass noted.

Vendor and billing records are placed on fiche as well, but on a biweekly basis, Faass said.

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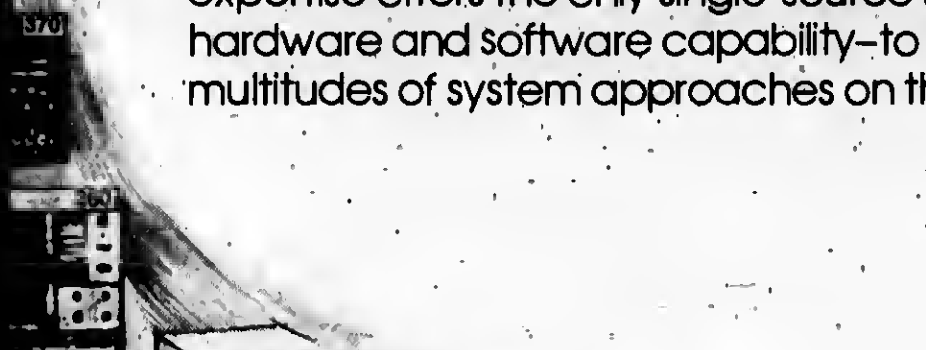

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COM Methods Debated at Meet

(Continued from Page 51)

This point was reiterated by Rolf Kahle of the Quantor Corp., who remarked that debating the merits of CRT and laser systems is "of a secondary nature." The COM unit itself, Kahle stated, should be treated as a "blackbox," and a manager's concern should be over the data input and output as well as the cost benefits.

An ideal COM system would provide multiple fonts, flexible character generation, electronic forms overlay, a wide range of films and, of course, a low cost. This type of system can virtually be built today, using a CRT and a dry silver-type film, Kahle said.

Image quality is limited to the type of film used and "it doesn't matter what type of image generator is used — laser or CRT." The laser, therefore, should be treated as just another type of non-impact printer and not the revolution it might be perceived by some to be, Kahle stated.

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Mini Bits

Standard Logic Floppy Compatible With Novas

SANTA ANA, Calif. — Standard Logic, Inc. has introduced a self-contained floppy disk system that is reportedly hardware-, software- and media-compatible with Data General Corp.'s Nova series.

The FD-8200T comes in single- or dual-drive configurations and with single- or dual-sided drive mechanisms, Standard Logic officials said.

An expansion chassis allows users to implement as many as four single-sided drive units per controller, the company spokesmen added.

Available in rack-mount or tabletop assemblies, all FD-8200Ts reportedly come with power supply, I/O cables and enclosure with LED status display.

In a dual-drive configuration, the floppy disk system costs $3,500 from Standard Logic's General Logic, Inc. subsidiary at 2215 S. Standard Ave., Santa Ana, Calif. 92707.

Series/1 Tape System Described

ANAHEIM, Calif. — A color brochure from Datum, Inc.'s Peripheral Products Division describes Datum's 5191/Series/1 magnetic tape system.

Entitled "Tape Systems for IBM Series/1," the brochure also outlines the firm's Universal User's Adapter, which reportedly allows the Series/Model 3 or 5 to perform functions like initial program load, parity generation and detection of I/O bus during controller operations, and poll sequencing and propagation.

The booklet, which further discusses computer interfacing techniques and software capabilities, is available from Datum at 1363 S. State College Blvd., Anaheim, Calif. 92806.

Philips Has Visual I Brochures

WOODBURY, N.Y. — A set of four 4-page brochures describing the Philips Business Systems Visual I is available from the company's Data Systems Division.

The free color literature describes the level-entry small business system itself and three of its basic accounting functions: invoicing, accounts payable and inventory management, Philips said.

Besides discussing the system's CPU and Software, the brochures describe its display and input unit.

Philips Business Systems' Data Systems Division is located at 175 Froehlich Farm Blvd., Woodbury, N.Y. 11797.

System 34 Additions Yield Magazine, Added Drives

By Jeffry Beeler
CW Staff

ATLANTA — IBM has introduced two enhancements to its System 34.

One of the enhancements consists of two disk drive units that reportedly boost by almost fivefold the maximum disk storage capacity available to System 34 users. The other addition — a diskette magazine drive — replaces the Diskette 1 or Diskette 2D units previously announced for the IBM system.

The two additional disk drive units are said to come in single- and dual-spindle versions that store 63.9M bytes and 128.4M bytes, respectively. The System 34's largest previous disk drive unit held 27.1M bytes, an IBM spokesman said.

Both models also access data in an average of 27 msec and transfer more than 1M byte/sec, compared to 38 msec and 889 byte/sec for their largest System 34 predecessor, he added.

IBM declined to identify the two drive units' recording technology or to specify their recording density, the number of recording tracks and the number of sector/track — information it called proprietary. But the company did reveal that the products record 256 byte/sector with 180K byte/logical cylinder and 9-msec cylinder-to-cylinder access.

IBM System 34 Diskette Magazine

The diskette magazine drive, meanwhile, reportedly incorporates five slots that are supported as part of a sequential save/-restore device.

Two of the slots hold a magazine, which in turn contains up to 10 diskettes, the IBM spokesman explained. The three remaining slots store individual diskettes, he added.

In operation, the magazine drive unit begins writing on the first diskette in the first magazine and then repeats the process with each succeeding recording medium until it exhausts the contents of both magazines, the

(Continued on Page 65)

DG 16-Bit, Single-Board CPU Mixes Mini, Micro Features

By Jeffry Beeler
CW Staff

WESTBORO, Mass. — Minicomputer capabilities and microcomputer packaging are reportedly combined in a 16-bit single-board computer introduced recently by Data General Corp.

MBC/1 provides an expansion path for users who seek upgrade their 8-bit single-board computers but have been unable to do so because of performance limitations or packaging constraints, a DG spokesman said.

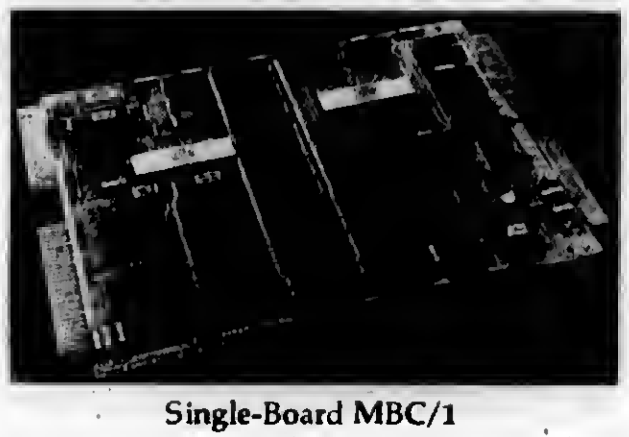
With the addition of asynchronous interface boards and random-access memory (RAM) boards, one 7.5-in. by 9.5-in. MBC/1 can support memory and peripheral attachments that otherwise would necessitate as many as five 8-bit single-board computers, he explained. The 16-bit unit thus reportedly suits applications in which users must minimize CPU chassis space.

Compatible with DG's Micronova product line as well as with its Nova 3 mini, the MBC/1 is said to incorporate a 16-bit Micronova 601 CPU, 2K-byte static RAM, sockets for up to 4K bytes of programmable read-only memory (Prom), an asynchronous communications interface and a 32-line digital I/O port.

The CPU comes with a hardware stack and frame pointer, 16-bit hardware mutliply/-divide, RAM refresh, direct memory access channel, real-time clock and 16-level priority interrupt, the spokesman said.

The asynchronous interface permits full-duplex communications at 110- to 9,600 bit/sec through either a 20 mA current loop

(Continued on Page 56)



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Double-Sided Floppies Join Micropolis Line

CANOGA PARK, Calif. — Micropolis Corp. has expanded its line of 5.25-in. floppy disk subsystems with what the company said are its first double-sided drive units.

With the announcement, the firm has reportedly extended its single-drive 1015 series subsystems from two to four members. Previously consisting only of single-sided models with 35 or 77 track/surface, the 1015 family now boasts two additional members, both with double-sided storage capability, a Micropolis spokesman said.

At the same time, the company has introduced a double-sided version of its Model 1055 subsystem, a dual-drive product that previously was only available with one recording surface, the officials added.

Intended for large-volume OEMs that integrate floppy disk storage into their own system enclosures, the two unpackaged additions to the 1015 line are said to store 287K bytes and 630K bytes, compared with 143K bytes and 315K bytes for their single-sided predecessors.

The double-sided member of the 1055 family, meanwhile, holds more than 1.89M bytes, compared with 946K bytes for its single-sided counterpart, the spokesman said. Unlike the 1015 family members, both the single- and double-sided versions of the 1055 line are packaged subsystems for low-volume OEMs that add volume to their hardware through software and specialized services, the source explained.

Both additions to the 1015 family are said to offer hard sectoring with 16 sector/track, 256 byte/sector and 75-msec head load. They also transfer 250 bit/sec and access in 30-msec track-to-track with 10-msec settling, the spokesman said.

Optional Intelligent Controller

Moreover, an optional intelligent controller can expand the 1015 family's file space to 946K bytes, the officials added.

But Model III records 5,162 bit/in. and offers 35 recording tracks with 48 track/in., while Model IV records 5,248 bit/in. and offers 77 recording tracks with 100 track/in., the spokesman reported.

The latest member of the 1055 series, meanwhile, reportedly offers soft sectoring with 75-msec head load and 100-msec average rotational latency. It also accesses in 30 msec track-to-track with 10-msec settling, transfers 32K byte/sec in buffered mode and records 6,380 bit/in. with 77 tracks and 100 track/in., the firm added.

With an add-on module sharing a common controller, users can expand the double-sided 1055 subsystem's storage capacity to more than 3.78M bytes, Micropolis officials said. Moreover, users can daisy-chain up to four of the double-sided 1055s, each with an add-on module, to further boost file storage to more than 15M bytes, the officials added.

A 1015 Model III subsystem with 287K bytes of formatted storage and a 1015 Model IV with 946K bytes of formatted storage cost $330 and $396 respectively, in quantities of 500. The double-sided 1055 series subsystem with 1.89M bytes of formatted storage costs $1,796 in quantities of 50.

Micropolis is located at 7950 Deering Ave., Canoga Park, Calif. 91304.

DG Introduces 16-Bit Board

(Continued from Page 55)

or RS-232C line, the spokesman noted. Line speeds, data bits, stop bits and parity are reportedly jumper-selectable.

The digital I/O interface, meanwhile, provides 16 input lines, an equal number of output lines, data strobe and an external interrupt line, company officials said.

To these interfaces, users can attach an assortment of the firm's Dasher printers or display terminals to form dedicated control systems for applications in instrumentation, communications, data acquisition and industrial automation, DG sources explained. The MBC/1 also reportedly provides an extended memory bus that allows users to connect up to 64K bytes of add-on RAM or Prom.

By itself, moreover, the single-board can provide a data link between remote devices and any large DG CPU serving as a host processor in a distributed control network, the spokesman added.

Most customers for the MBC/1 will be either "sophisticated" end users or OEMs that will buy the product in quantities of 25 to 500, officials predicted.

Software for the single-board computer reportedly includes a multitasking support package that provides an emulator for program development under DG's Advanced Operating System, Disk Operating System and Real-Time Disk Operating System. The software package also includes a monitor for program execution on the MBC/1, spokesmen reported.

Options are said to include self-test diagnostics and an on-board console debug facility, both of which permit software development on larger DG minicomputer systems.

In quantities of one and 50, the MBC/1 costs $725 and $500, respectively, while the optional console debug and self-diagnostic capability sell for $90 each. DG is located at Route 9, Westboro, Mass. 01581.

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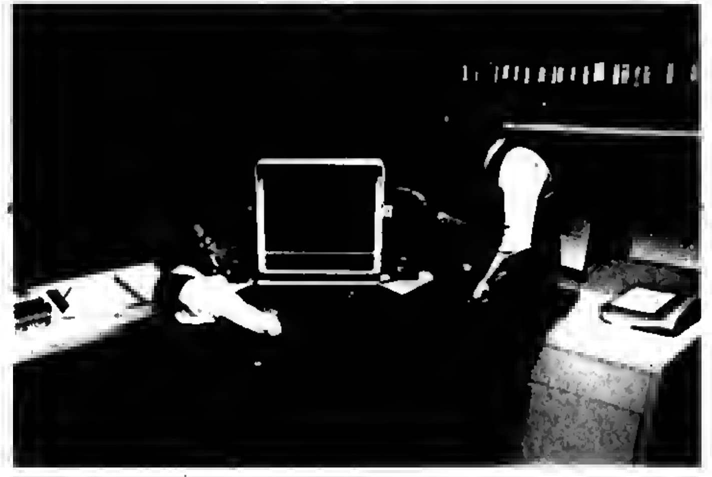

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EMPLOYMENT HISTORY (Please feel free to send us a resume or letter if you like.)

PRESENT EMPLOYER	Employment Dates
	From To
Description of Duties	Position

PREVIOUS EMPLOYER	Employment Dates
	From To
Description of Duties	Position

PREVIOUS EMPLOYER	Employment Dates
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Infoton 400

Multiplexer Board Saves Three I/O Interface Slots

MINNEAPOLIS — An I/O multiplexer board offered by Custom Systems, Inc. reportedly does the work of four controller interface boards in Data General Corp. Eclipse and Nova minicomputers and their replacements.

As a result, the 15-in. by 15-in. board saves three I/O slots that otherwise would be occupied in the chassis of those minicomputers, a Custom Systems official said. With the extra space, users can expand their systems' memory or reduce the size of their CPUs' chassis, the official explained.

Slot Saver II is said to hold all the control logic needed to connect Data General Corp. CPUs and systems that emulate them to the following peripherals and devices:

- Four serial asynchronous peripherals.
- A real-time clock.
- A CRT terminal or teletypewriter.
- A line printer.

The board's serial peripheral controller provides interface logic for console terminals with device code 10/11, the Custom Systems sources said. With the controller, transmissions from 110 bit/sec to 19,200 bit/sec and RS-232 or current loop interface are jumper-selectable, the spokesman added.

The controller also provides an asynchronous serial port for a second system console with device code 50/51, he added.

The programmable real-time clock controller, meanwhile, is said to provide frequencies of 10 Hz, 50- or 60 Hz, 100 Hz and 1,000 Hz.

Like the serial peripheral controller, the four-channel asynchronous multiplexer controller permits jumper-selectable transmissions of 110- to 19,200 bit/sec and current loop or RS-232 interfacing, the official said. Users can reportedly expand the controller to accept as many as 64 terminals.

The parallel line printer controller is said to come with a standard 20-ft cable and to interface models from Centronics Data Computer Corp., Data Products Corp., Printronix, Inc., General Electric Co., Control Data Corp. and others.

Options include a 19-in. RS-232 connector panel for six serial terminals and a modem controller for remote terminal support, the Custom Systems spokesman added.

Slot Saver II is reportedly compatible with instruction sets and operating systems for Data General-compatible peripherals. The peripheral drivers in the Assembler or Real-Time Disk Operating System need no modification to operate with the multiplexer board, the spokesman noted.

With cables, documentation and supporting software, the product costs $1,800 from Custom Systems, 2415 Annapolis Lane, Minneapolis, Minn. 55441.

Mini Selection, DDP Use Slated as Seminar Topics

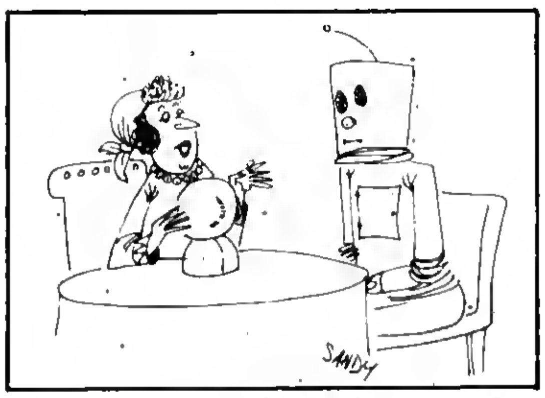
CHICAGO — "Minicomputers and Distributed Processing," a three-day seminar sponsored by the University of Chicago's Center for Continuing Education, will reportedly tell corporate managers how to evaluate minicomputer hardware and software and how to select systems that best meet their companies' business needs.

The seminar, scheduled to take place June 21-23 in San Francisco and July 19-21 in Washington, D.C., will also explain how minis can extend, replace and support central computing facilities, a conference organizer said.

Under the direction of seminar leader George R. Trimble Jr., president of T-Logic, Inc., the conference program will cover such topics as minicomputer architecture, peripherals, minicomputer software, microprocessors, distributed DP (DDP), communications support for distributed networks, applications-oriented systems, intelligent terminals and small business systems.

Tuition is $495 per attendee plus $65 per company.

Registration forms and additional information are available from the University of Chicago, Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.



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TC-16 Gets Drives, Controller

CUPERTINO, Calif. — Tandem Computers, Inc. has announced three dual-port disk drive subsystems and a dual-port disk controller for its TC-16 Nonstop system.

The three subsystems include the 200M-byte Model T16/4103, the 300M-byte Model T16/4104 and the 80M-byte T16/4105.

Equipped with voice-coil linear dc motors and on-track servo mechanisms, the disk drive units access in an average of 28 msec with an average latency of 8.35 msec, a company official said.

All three models provide TTL and ECL logic circuits, he added.

The models 4104 and 4105 transfer data at a speed of 1.2M byte/sec and use SMD technology to provide 240M bytes and 64M bytes of formatted storage, respectively, the spokesman noted.

The Model 4103, by contrast, transfers at 806K byte/-sec and uses IBM 3330 technology to record 160M bytes of formatted data on 3336-11-type disk packs, the company added.

The T16/3105 controller, meanwhile, is said to support mixed disk drive configurations and to provide dual-recording capabilities, which permit users to transfer buffered records to one or more disk drives without reusing an I/O channel.

Equipped with 4K logical record buffers between the I/O channels and the disk units, the controller also reads without I/O transfer — a capability that allows users to duplicate disk storage without using an I/O bus, the official explained.

Removable plugs in the three disk drive subsystems permit users to make logic address changes, he said.

The models 4103, 4104 and 4105 cost $24,500, $31,500 and $15,500, respectively. The 3105 controller sells for $10,500. Tandem Computers is located at 19333 Vallco Parkway, Cupertino, Calif. 95014.

AMU Seminar To Cover DDP

BOSTON — What is the state of the art in connected computer systems? What distributed data processing (DDP) products do hardware vendors offer and what are their DDP strategies?

The Association of Minicomputer Users (AMU) will try to answer these and similar questions at a three-day applications seminar entitled "Minicomputers in Distributed Computing."

Slated to take place here June 21-23, the seminar will be conducted by two AMU members who will supervise "interactive" sessions reviewing case histories of distributed networks and strategies.

The seminar's $365 registration fee ($420 for non-AMU members) covers the cost of seminar notes. Additional program and price information is available from the AMU at 215 Oak St., Natick, Mass. 01760.

Tester Works Off-Line

JESSUP, Md. — A magnetic tape drive maintenance aid introduced here recently by Digi-Data Corp. reportedly allows users to perform off-line troubleshooting without interrupting other system functions.

The DEMC-3 card exercises the logic circuitry of a formatter and as many as four 7- or 9-track transports, a spokesman explained.

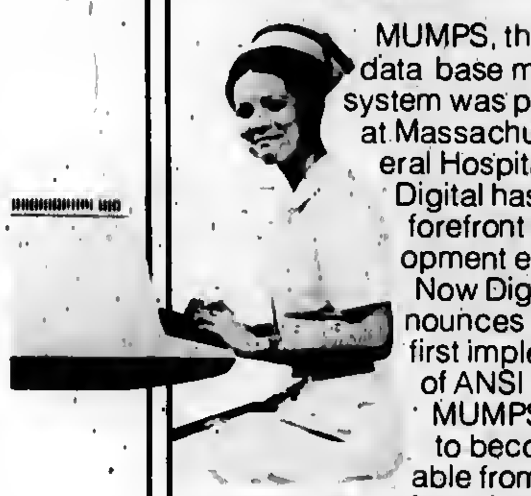
The unit accommodates all of the company's NRZI, phase-encoded and dual tape drive systems without customer I/O interfacing, the official added.

Selectable functions available with the DEMC-3 are said to permit forward or reverse reading and writing.

Priced at $400, the DEMC-3 is available from Digi-Data at 8580 Dorsey Run Road, Jessup, Md. 20794.

DIGITAL, MAY, 1978.

CATCHING THE ANSI STANDARD MUMPS.



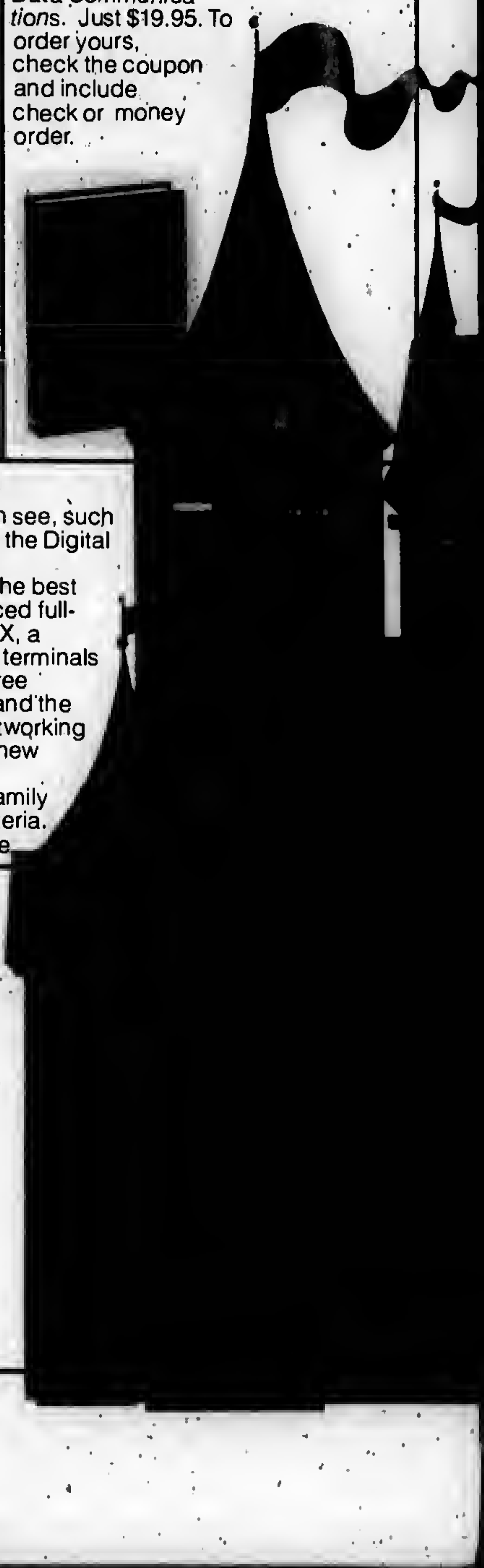
MUMPS, the interactive data base management system was pioneered at Massachusetts General Hospital in 1967. Digital has been in the forefront of its development ever since. Now Digital announces DSM-11, the first implementation of ANSI STANDARD MUMPS language to become available from a major computer manufacturer. Unique features of DSM-11 include journaling, spooling, distributed data base support, support for up to sixty-three jobs and eighty terminals, and data base capacity from 7.5 million to 1.4 billion bytes. To find out how to get MUMPS, check the coupon.

THE ULTIMATE DISTRIBUTED PROCESSING DEMONSTRATION. DECNET. LIVE AT NCC.

A 36-bit DECSYSTEM-2020 running the TOPS 20 operating system will be hooked up to a 32-bit VAX-11/780 running the VMS virtual memory system and these will be hooked up to a 16-bit PDP-11/34 running RSX-11. If you ever wanted concrete proof of DECnet's ability to link together different architectures, word lengths, and operating systems, come to Anaheim, June 5, and join the crowd in the West Hall. And if you want to read about why such acrobatic networking can be vitally important to you, check the coupon. (The secret is matching the computer to the job!)

TECHNICAL ASPECTS OF DATA COMMUNICATIONS NOW IN ITS THIRD PRINTING.

The Digital Press announces the third printing of *Technical Aspects of Data Communications*. Just $19.95. To order yours, check the coupon and include check or money order.



DIGITAL BRINGS ITS OWN TOMORROWLAND TO NCC AT ANAHEIM.

The National Computer Conference has never seen, and may never again see, such an array of major new products from a single company as will be on display at the Digital Booth June 5 through June 8.

In one corner, the VAX-11/780, rapidly becoming recognized as possibly the best FORTRAN machine ever made. In another, DECSYSTEM-2020, the lowest priced full-capability mainframe in the world. In a third, a PDP-11/70 running the new TRAX, a complete transaction processing system with specially designed block mode terminals that is easy on the user and easy on the pocketbook. And in the last corner, three computers, two of which are important new versions of established favorites, and the third participating in a dramatic demonstration of the new DECnet Phase II networking software. On the systems, the new RK07, the new RM02, and the dramatically new RL01 disk drives, new terminals, and a new tape drive.

And in the middle of the floor, for the first time ever, an entirely new Digital family of products as yet unannounced. Six of them. West Hall; on the way to the cafeteria. And if you can't make Anaheim, check the box. We'll send you a show package

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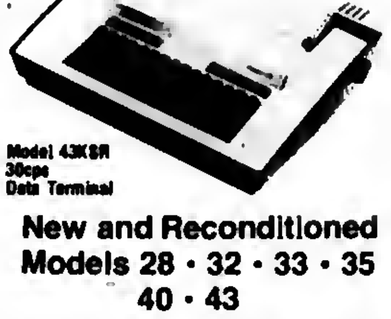

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Mini Boasts 20 Times Throughput of 1130

SAN DIEGO — Throughput roughly 20 times greater than that of the IBM 1130 reportedly characterizes a time-sharing minicomputer system introduced here recently by Digital Scientific Corp.

The Model 5020 is said to provide twice the throughput of the company's Meta 4/4000 series processors and to be software-compatible with that earlier line. A Digital Scientific official credited the 5020 with giving users of the Meta 4/4000 series an "avenue of growth into multiuser, multiterminal and multitasking systems."

Users can access all of the 5020's functions while running concurrent jobs and spool output onto attached disk subsystems, company officials said. In this way, the system creates "virtual peripherals" and speed throughput by as much as sixfold, they added.

The Model 5020 represents the first of a series of 16-bit computers Digital Scientific reportedly expects to announce during the coming months. Designated the Meta 4/5000 series, the upcoming systems will range from low-end minis aimed at OEMs to high-end processors comparable in performance to mid-range IBM 370s, company spokesmen said.

Available with 135 basic instructions, the first member of the Meta 4/5000 line provides multiprogramming control for up to 32 job streams including two concurrent card reader punches and 30 terminals, the officials said. This control is said to apply to interactive, batch and remote-batch time-sharing applications.

Peripherals accommodated by the system include standard IBM units like the 1403-N1 line printer, Digital Scientific said. Model 5020 also interfaces tape drives plus 2310, 2311- and 2314-type disk systems, the firm added.

For jobs requiring large storage capacity, the system reportedly accepts up to eight 165M-byte disk drive units.

Communications features available with the system include 4-, 8-, 12- and 16-line asynchronous adapters that transmit up to 19.2k bit/sec, company officials noted. The system also provides adapters for IBM's bisynchronous protocol, they said.

A minimum 5020 configuration reportedly includes 16K bytes of 500-nsec semiconductor or core memory expandable to 128K bytes.

A basic configuration with a 20M-byte disk unit, controller for up to seven additional disks, 600 line/min printer, CRT terminal and 600 card/min card reader costs $73,600. Digital Scientific is located at 11425 Sorrento Valley Road, San Diego, Calif. 92121.

System 34 Gets Drives, Magazine

(Continued from Page 55)

official said. In this way, the facility is said to write as many as 24M bytes without operator intervention.

IBM also said the magazine drive unit provides a diskette data transfer rate twice that of previous System 34 disk products.

For relatively small processing jobs, users can opt for the individual diskettes instead of the magazines, the IBM spokesman said. A System 34 drive unit can process two or three single-slot diskettes without operator intervention, he noted.

No programming changes or recompiling is necessary when users field-upgrade their existing System 34s to accept the magazine facility and the two additional disk drive units, the official added.

Depending on the System 34 configuration, purchase prices for the 63.9M-byte disk drive unit range from $36,900 to $51,180; rental prices, from $1,130/mo to $1,537/mo; and lease prices, from $1,028/mo to $1,398/mo. A 128.9M-byte storage unit sells for $45,470 to $59,750, rents for $1,410/mo to $1,817/mo and leases for $1,283/mo to $1,653/mo.

Although not sold as standalone modules, a tyical magazine facility adds $4,680 to a System 34 disk drive unit's purchase price. Deliveries of the latest System 34 enhancements are scheduled to begin next January from IBM's General Systems Division, which can be reached at Box C-1645, Atlanta, Ga. 30301.

IS THE $250,000 VAX A BETTER FORTRAN MACHINE THAN THE $9 MILLION CDC 7600?

The incredible performance of the VAX-11/780 minicomputer, in benchmark after benchmark, is making serious FORTRAN users wonder. The 7600 is faster, of course. But VAX speed is exceptional. 1050K Whetstone instructions single precision — 711K Whetstones double precision — fast enough for most 7600 users. And then… The difference in cost, and all that implies. Take throughput. If the 7600 is twelve times as fast, you can buy a dozen VAX's, get the same throughput, and save a cool $6 million! FORTRAN users who think speed but really need throughput take note.

And there is the matter of program size. VAX virtual memory, and a gigantic 32-bit address size, allow directly addressable programs 1,000 times larger than the 7600! FORTRAN users who think they need a 7600 for large programs also take note. Or take pencil and check box.

THREE SALES IN THE SUNSET.

Digital Sale days are drawing to a close. Have you placed your orders yet? Better hurry.

Memory Sale ends May 31. Spares Sale ends June 30. Logic Products Sale ends June 18.

For details contact your local Digital sales office. Quick.

NEW DECSYSTEM-2060-T JOINS ARPANET.

Introduced just three months ago, the new high end member of the DECSYSTEM-20 mainframe family has already landed a prestigious job in ARPANET and is successfully at work inside a lab at a major university in Boston. To find out why this mainframe is so instantly successful, check the coupon.

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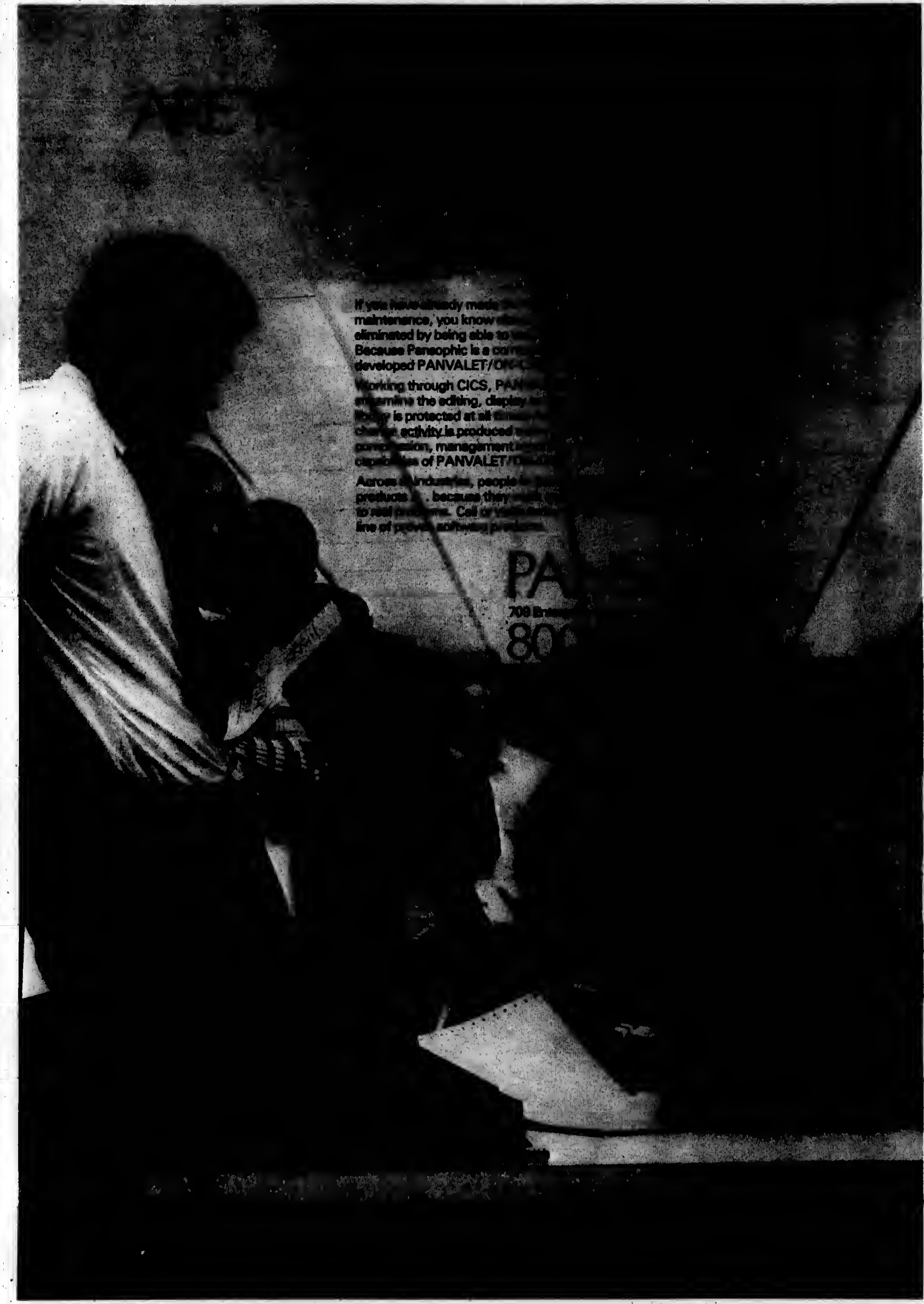

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Micro Chips

Floppy Controller Uses Motorola 6843 Chip

LAFAYETTE, Ind. — Wintek Corp. has introduced a floppy disk controller it said can interface to any full-size or minifloppy disk drive and support both hard- and soft-sectoring formats.

The controller incorporates the Motorola MCM 6843 floppy disk controller integrated circuit and includes the IBM 3740 or user programmable read/write format. It has automatic cyclic redundancy check (CRC) generation/checking and features programmable step and settling times, Wintek stated.

An assembled controller is priced at $199 from the firm at 902 N. 9th St., Lafayette, Ind. 47904.

Plessey Semiconductors Makes Four-Bit Data Latch Available

IRVINE, Calif. — Plessey Semiconductors has announced a 4-bit data latch incorporating nonvolatile semiconductor memory. The unit was designed as a replacement for latching relays, nonvolatile add-ons to counters, security code storage devices and similar systems.

The MN9102 quad latch uses MNOS memory elements to retain data on the unit's four inputs when power is removed from the circuit, according to a spokesman. When power is reapplied, the stored data is restored to the outputs.

The data is retained for a period of one year over temperature ranges from 0°C to 70°C, the spokesman claimed, adding the unit has an operational lifespan of a minimum of one million write cycles.

The latch is TTL/MOS-compatible and requires operating voltages of +5V and -12V, the firm said.

The MN9102 is available at a 100-piece price of $4.40 from the company at 1641 Kaiser Ave., Irvine, Calif. 92714.

Corrections

In the May 8 "Learner's Lexicon," IBM's Vtam should have been identified as the Virtual Telecommunications Access Method.

In "A Rather Foolish Situation" [CW, April 24], Benwill Publishing Corp. was incorrectly identified as Benwill Publishers, Inc. Further, the claims of International Personal Computer Shows, Inc. center on territory, not show ownership.

Also, last year's Midwest Computing Exposition was incorrectly described as "unsuccessful." The show, by any standards, has to be considered a success. Finally, CW was not endorsing a boycott of the Chicago shows this fall.

Voice Data Input Unit Operates With Apple II

LOS ALTOS, Calif. — Heuristics, Inc. has introduced a voice data input unit compatible with Apple Computer, Inc.'s Apple II microcomputer system.

The Speechlab Model 20A includes a high-fidelity microphone and a user manual with six demonstration programs written in Apple Basic, the firm said. The unit can operate with the Apple II peripheral procedures and user-written programs.

The program to run the unit is contained on an onboard programmable read-only memory (Prom), which is enabled and executed by the microcomputer's monitor program when speech input is desired, allowing that input to be incorporated into the user's present and future programs, a spokesman stated.

The Speechlab 20A features a 32-word vocabulary, the firm added.

The unit, with documentation, is priced at $189. An optional headset-mounted noise-canceling microphone for use in noisy environments and for applications that require the use of both hands is available for $85.

Speechlab Voice Input Unit

Further information can be obtained from the firm at 900 N. San Antonio road, Los Altos, Calif. 94022.

Gnat Micro Has Dual Floppies

SAN DIEGO, Calif. — A microcomputer system introduced by Gnat Computers, Inc. features dual floppy disk drives and 32K of random-access memory (RAM).

The Gnat-Pac System 9 has a disk capacity of 500K bytes optionally expandable to 1M byte, according to a spokesman. Hardware includes an 8080A MPU, a 16K read-only memory (ROM) board with 2K of programmable read-only memory (Prom), an 11-slot motherboard and power supply.

Card rack, radio frequency interchange filter and cabinet are also standard, the firm noted.

Software for the microcomputer includes a monitor; loader; disk operating system with assembler; editor; and dynamic debugger containing track, test and debug functions, the firm stated. Fortran, Basic and other languages are also offered as options.

The unit is priced at $5,500 with delivery in 60 days from Gnat Computers, Inc., Unit 6, 7985 Convoy Court, San Diego, Calif. 92111.

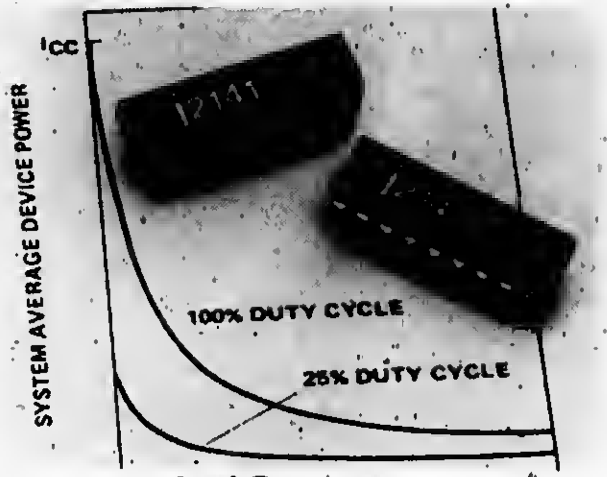
Intel Adds Low-Power RAMs

SANTA CLARA, Calif. — Intel Corp. has introduced a series of static random-access memories (RAM) that operate with 40mA of maximum supply current in main, cache, buffer and control store memory applications.

The 2141 family consists of seven RAMs, each available with four different speeds and three low-power selections, according to a spokesman. The units are also TTL-compatible on all inputs and outputs, he added.

The memories employ a chip select input for device selection, allowing either synchronous or asynchronous memory systems to be designed around them, the firm stated. An automatic power-down feature places the memory on standby power when the chip is deselected.

The units' maximum access times range from 120 nsec to 250 nsec, the spokesman said.



Intel Corp. 2141

Prices for members of the 2141 family start at $18.75 in quantities of 100 to 999. Intel is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

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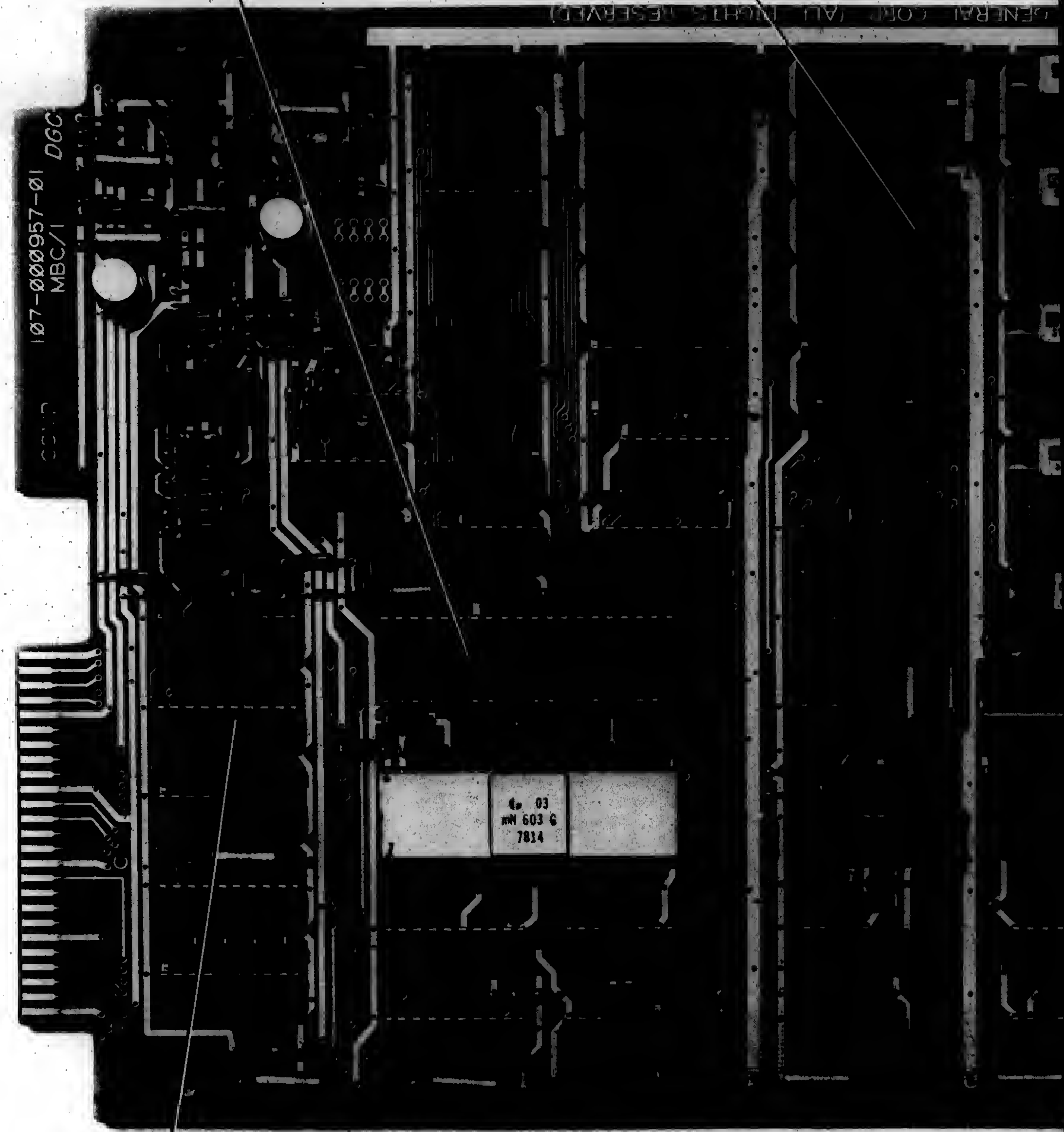

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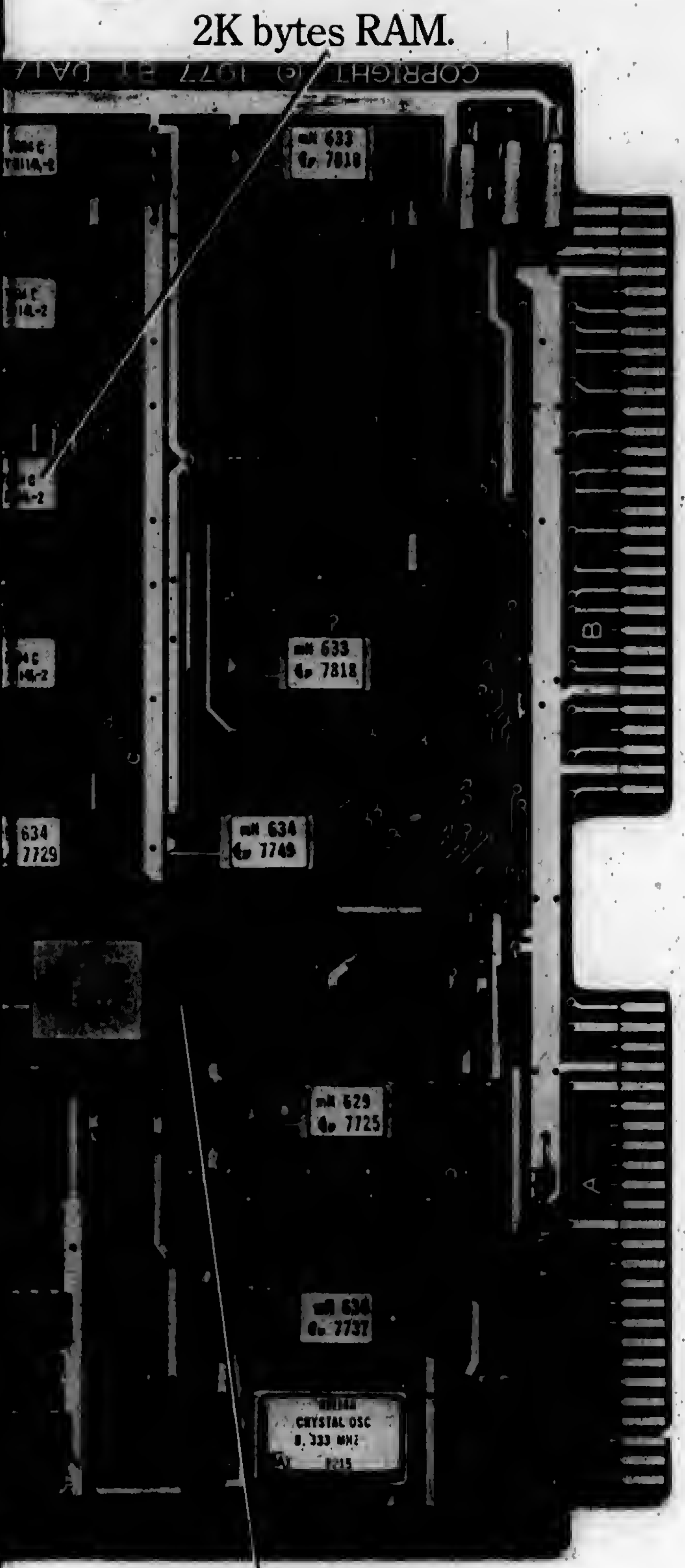

Introducing the Data General microNOVA Board Computer, MBC/1. The smallest, most functional 16-bit single board microcomputer you can buy. More power and capability in less space than any other. It's a full 16-bit processing unit. And it has multiply/divide, stack architecture, data channel (DMA) and 16-level priority interrupt, 2K bytes static RAM, sockets for up to 4K bytes of PROM. It also has async interface, 32-line digital I/O, optional console debug software and self-test diagnostics. All in a space of 7.5 x 9.5 inches.

It's all supported by our MBC/M real-time multi-tasking monitor and monitor emulator that lets you develop software under Data General's AOS, RDOS and DOS operating systems for execution on MBC/1.

To go along with all of this, there's a full array of compatible interfaces, design interface support, compatible software and excellent program development tools. If you want more board in less room, reserve a Data General MBC/1 microNOVA Board Computer. For more information, mail the coupon, call Data General or your nearest full service industrial distributor: Schweber or Wyle (Elmar/Liberty). Or call your local dealer.

*Single unit price. Quantity discounts available.

CW522

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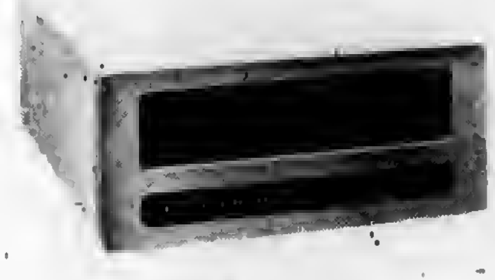
Data General

We make computers that make sense.

Pichler Numeric Display Addressable by Bus

LITTLETON, Mass. — Pichler Associates has introduced a bus-addressable digital panel display that it said is compatible with 8-bit and 16-bit microprocessor systems.

The DP08 has its address encoded in the bus connector to facilitate interchanging or replacement without internal adjustment or rewiring, the firm claimed.



Pichler DP08

Binary weighed, address select lines allow up to 32 of the peripheral interface adapter (PIA)-compatible displays to operate from the same 9-wire signal bus. Once addressed, the display accepts up to eight binary coded decimal (BCD)-encoded digits from the bus at a rate of 200k digit/sec, the firm said.

An optional integral address thumbwheel is available to aid in adress selection, the firm noted.

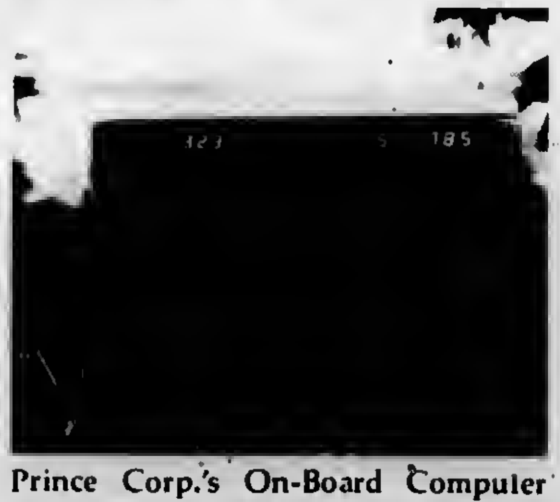
The display is priced from $215, the company said from 410 Great Road, Littleton, Mass. 01460.

Dashboard Micro System Shows Car and Road Data

HOLLAND, Mich. — A driver-operable automotive computer introduced by the Prince Corp. has five programmable memories and is capable of 24 different functions, the firm said.

The Prince On-Board Computer registers such data as miles to go, vehicle location, miles per gallon, and cost per mile via a speed and fuel flow transducers connected to the automobile, a spokesman explained.

The unit incorporates a microprocessor with 12,600 words of memory and a ribbon fiber optic lighting system for control panel illumination.



Prince Corp.'s On-Board Computer calculates road data using a microcomputer and speed/fuel flow transducers.

The device draws approximately 30mA of power and connects on or under the dashboard by an adjustable bracket. Twin LED displays provide a digital readout to six places.

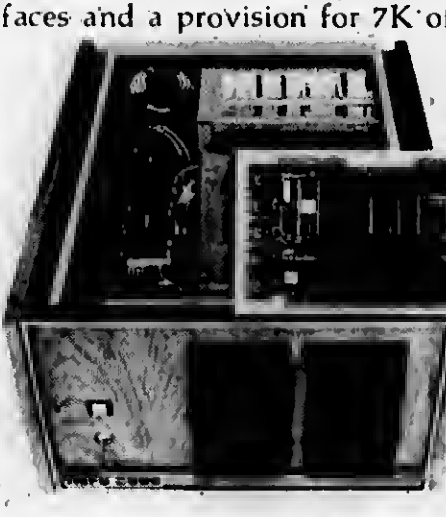
The automotive computer is priced at $400 from the firm at P.O. Box 6, Holland, Mich. 49423.

Floppy System Fits S-100 Units

CARSON, Calif. — Info 2000 Corp. has announced a floppy disk system for S-100 bus microcomputers that utilizes Persci, Inc. dual diskette drives and incorporates Digital Research, Inc.'s CP/M operating system.

The system, which accepts soft-sectored 8-in. flexible diskettes, is compatible with IBM 3740 format and has voice-coil positioning that provides seek times up to eight times faster than other drives using stepping motors, Info 2000 claimed.

The floppy system also uses the firm's Discomem controller board, which contains two RS-232 serial interfaces with software-selected data rates from 50 bit/sec to 19.2 K bit/sec, three 8-bit TTL-level parallel interfaces and a provision for 7K of erasable programmable read-only memory (Eprom) and 1K of random-access memory (RAM).



Info 2000 Corp. business system incorporates dual diskette drives, voice coil positioning and Digital Research, Inc.'s CP/M operating system.

The I/O facilities of the system enable the Discomem controller to be combined with two additional S-100 logic boards — an MPU and a 32K RAM board — to create a disk-based microcomputer system for business or scientific applications, the firm explained.

The cost of the system, including I/O facilities and CP/M software, is $2,600. Another model without I/O facilities is available for $2,450 the company said from 20630 S. Leapwood Ave., Carson, Calif. 90746.

ATTN: 3270 USERS

Here's a *tailor-made* system to fit the requirements of your job today. In addition, BRAEGEN's multi-tasking intelligent controller offers the flexibility you will require in the future. **Systems Programmers,** in particular, find the following features very valuable.

Both Local and Remote 3270 are available, of course,

PLUS . . . .

Local Job Entry. Line printers up to 1200 LPM with 1403 addresses and card readers with 2501 addresses can be placed next to any BRAEGEN CRT. These "hot" printers and readers are located in the users' areas up to 7,500 feet outside the computer room. Most popular uses are for programmer listings and accounting work. Users get the benefits of increased productivity because turnaround time is reduced to minutes.

PLUS . . . .

Address Switching. Any BRAEGEN CRT terminal provides as many addresses as required for Console, TSO, Applications, etc. Any CRT can have both Local and Remote addresses. This feature can reduce the number of CRT's required and will eliminate NCP, VTAM type software overhead requirements.

PLUS . . . .

Multiple Controller Interfaces. The BRAEGEN controller allows multiple channel and remote interfaces. Any CRT can access multiple local IBM CPU's or remote CPU's. Just 2-3 seconds to switch a CRT between CPU's or addresses.

PLUS . . . .

Fast Cursor, Programmable Keyboard, 7500′ Coax, Multiple Drops per Coax, Wide range of speeds in 3286/3288 compatible printers; from 45 cps to 1200 LPM, Offline Data Entry, and our Offline TSO Editor.

PLUS . . . .

Features others have promised for 1978-1979 are AVAILABLE NOW . . . Local Copy, 128 character set CRT, Typamatic keys, Home key, etc.

PLUS . . . .

Low Prices — 1, 2, 3 year leases available.

Customers throughout the U.S. are benefiting from these features now. For more information please write or call; The BRAEGEN Corporation, 20740 Valley Green Drive, Cupertino, California 95014. (408) 255-4200.

BRAEGEN

Shows Scheduled From Coast to Coast

Following is a listing of all the significant microcomputer shows whose management has notified *Computerworld* of the dates. The microcomputer show business is highly volatile, and hobbyists should contact show managers before making firm plans to attend.

June 5-8, Anaheim, Calif. — **National Computer Conference & Computer Festival.** Contact: Steve Miller, SRI International, 333 Ravenswood, Menlo Park, Calif. 94025.

June 23-25, Detroit — Macc **Computerfest '78.** Contact Jim Rarus, Semco, Box 9578, North End Station, Detroit, Mich. 48201.

Aug. 25-27, Philadelphia — **Personal Computing '78.** Contact John Dilks, Rt. 1, Box 242, Mays Landing, N.J. 08330.

Sept. 15-17, New York — **Second National Microcomputing Exposition and Conference.** Contact: H.A. Bruno & Associates, Inc., 78 E. 56th St., New York, N.Y. 10022.

Sept. 29-Oct. 1, Dallas — **International Microcomputer Exposition (IME).** Contact: IME, 413 Carillon Tower, 13601 Preston Road, Dallas, Texas 75240.

Oct. 5-8, Chicago — **Second Midwest Personal Computing Exposition.** Contact: Louise Garcia, 1435 Rio Rancho Drive, S.E., Rio Rancho, N.M. 87124.

Oct. 12-15, Chicago — **1978 Mid-America Personal Computer Show.** Contact: International Personal Computer Shows, Inc., P.O. Box 844, Greenwich, Conn. 06830.

Nov. 3-5, Los Angeles — **Third West Coast Computer Faire.** Contact: Jim Warren, The Computer Faire, P.O. Box 1579, Palo Alto, Calif. 94302.

'Programmer's Workbench'

Northwest Melds 8085A, Pascal

EUGENE, Ore. — Northwest Microcomputer Systems, Inc. has announced a "programmer's workbench" that reportedly combines the throughput of the 3 MHz Intel Corp. 8085A and the power of Pascal.

The 85/P system includes an 8085A. CPU, a Pascal 725 line/min compiler/interpreter and CP/M software supporting Basic, Cobol (available in July) and Fortran.

Also featured are direct memory access, two Shugart Associates floppy disk drives with 1M of on-line storage and 54K of 450 nsec, user-available static random-access memory, the firm said.

A keyboard with 103 keys, two serial communications ports, two parallel ports and a 24- by 80-character display on a 12-in. CRT screen are also included. All components are enclosed in a single cabinet.

The 85/P provides the "full Pascal environment," according to the spokesman, including random and sequential files, a screen-oriented editor, interactive source-linked debugger and full documentation plus a 90-day warranty.

The entire system costs $7,495 from Northwest at 121 E. 11th, Eugene, Ore. 97401.

Catalog Cites Dynage Line

BLOOMFIELD, Conn. — Dynage, Inc. is offering a catalog describing its line of logic and I/O modules designed for hazardous industrial control applications.

The modules detailed in the booklet operate at standard logic levels (+5 Vdc for logic 1 and 0Vdc for logic 0) and can be directly interfaced to solid-state sensors, a spokesman stated.

The product line includes logic gates, expanders, timers, counters, comparators, decoders, shift registers, flip-flops, input converters, output drivers, diode matrices and other hardware.

The catalog is available free from the firm located at 1331 Blue Hills Ave., Bloomfield, Conn. 06002.

The Computer for the Professional

The 8813 was built with you, the professional, in mind. It quickly and easily processes cost estimates, payrolls, accounts, inventory, patient/client records and much more. You can write reports, briefs, and proposals on the 8813's typewriter keyboard, see them on the video screen, and instantly correct, revise, or print them.

Using the 8813, one person can process what would normally require many secretaries, several bookkeepers, and a great deal of *time*. And data storage takes a small fraction of the *space* used by previous methods.

You don't need to learn complicated computer languages. The 8813 understands commands in English. If you want to write your own programs, the 8813 includes a simple computer language, BASIC, that you can master in a few days. The 8813 slashes the professional's overhead. It's a powerful time and money-saving ally. Prices for complete systems including printer start at less than $8,000.

See the 8813 at your local dealer or contact PolyMorphic Systems, 460 Ward Drive, Santa Barbara, California, 93111, (805) 967-0468, for the name of the dealer nearest you.

PolyMorphic Systems

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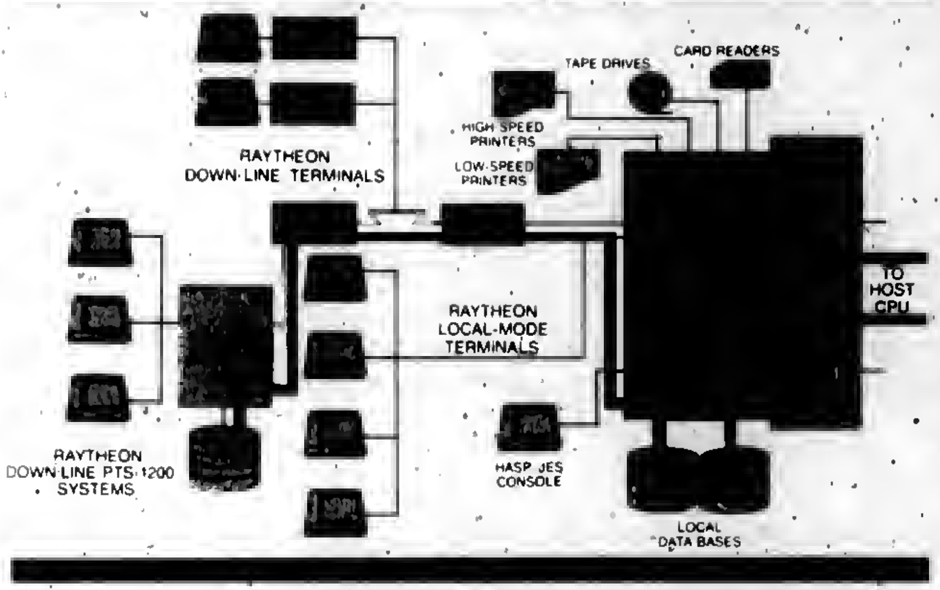
The Raytheon Checklist.

A distributed processing user's best friend.

The term distributed processing is new enough that many people, both users and manufacturers, mean many different things when they talk about it.

Rather than try to add another definition to the many now existing, Raytheon Data Systems has prepared this comparative checklist of the major functions that might normally be considered attributes of any distributed processing system. Regardless of the distributed processing system you eventually select, there are a number of capabilities you will want that system to possess. Obviously, the more features the system has, the greater its capacity to do all the work you have planned now—or might need tomorrow.



Shown above is a typical schematic of a PTS/1200 distributed processing system with a hierarchy of local data bases, multiple terminals in multiple applications, all linked by one or more protocols to a central mainframe

Our checklist itemizes many of the most important features you should consider. They are not the only features, but we think they are the most important.

And—to make the point that Raytheon's PTS/1200 MARK·I and MARK·II systems are extraordinarily powerful distributed processing systems—we've taken the liberty of itemizing their capabilities in each of the columns shown. Do that with other vendors' equipment, and we think you'll choose Raytheon.

Then check prices. The MARK·I is lowest.

After you've looked at the variety of products on the market, you'll also want to see what each costs.

We can tell you about Raytheon's pricing. The PTS/1200 MARK·1 is the lowest. By low, we mean up to 30 per cent below the most popular alternative models. The PTS/1200 MARK·II costs a little more, but is more than twice as powerful as the MARK·1. You won't be able to compare its cost directly with other equipment, because no other equipment can come close to matching its performance.

Solving the installation and productivity problems that these users encounter takes patience, skill and the commitment of an experienced vendor. It takes going beyond a standard product, and finding customized solutions, and often products, to meet a user's requirement.

Most of all, it takes doing it. Over and over and over again. Raytheon has done it over and over and over again.

Fast, easy installation and growth is vital.

Not shown in the checklist is another vital aspect of distributed processing systems—immediacy of installation and ease of expansion. The Raytheon PTS/1200 MARK·1 can be installed in less than a day, with no change to host hardware, or systems or applications software. You become productive right away. And when you want to grow, you simply add capacity—within a single system, or by adding additional systems or devices. Every PTS/1200 is compatible with every other—and with your host mainframe system and protocols in almost every case.

Look hard at experience too.

Beyond the hardware, the price and the easy compatibility, there is the experience factor. The vendor with experience can save the user without it a lot of grief.

Raytheon is the world's largest non-mainframe supplier of intelligent terminals and distributed processing systems. Some of our customers use more than 2,000 Raytheon terminals in data networks located at more than 300 locations either domestically or around the world. Many others have one or several PTS/1200 distributed processing systems at work in remote locations, linked on-line to a central mainframe.

A typical four-station MARK·I system with a 64K-byte controller, 10 MB disk, and one 165cps printer leases for $850 per month, including all software and maintenance.

The 54-Point Checklist

Feature	Typical Configuration	Importance of Feature	Product Capabilities			
			PTS/1200	Brand X	Brand Y	Brand Z
INTELLIGENCE	✓ Dependent totally on host processor ✓ Stand alone (non shareable) intelligence in each station ✓ Small-cluster (shared by 1-8 stations) ✓ Large-cluster (shared by 1-24 or more stations)	Intelligence is based upon the amount of available programmable memory a system possesses. Its purpose is to facilitate local application development and execution. The larger the available memory, the better the applications freedom.	N/A All resources shareable by all stations 64K to 128K bytes 64K to 128K bytes			
CONTROLLER	✓ Word size ✓ Number of operator stations per controller ✓ Number of peripheral attachments per controller ✓ Availability of high-level languages ✓ Ability to perform multi-tasking	The controller is the central processor of a distributed system. Its power in terms of word size, attachment capacities, programmability and ability to perform multiple tasks concurrently is the key limiting factor in its ultimate performance.	16-bit 8 stations or 1-24 stations 1-4 peripherals, or 1-20 peripherals Yes, MACROL, COBOL in the future Yes Up to 32 tasks concurrently on one controller			
TERMINALS	✓ Variety of screen sizes ✓ Variety of keyboard options ✓ Availability of user definable function keys ✓ Ability to provide operator prompting ✓ Ability to attach multiple terminals to phone line	The terminal is the point of operator interface and should be capable of being comfortable to use, easy to use, and easily matched to one or many different applications through customizing.	960 or 1920 3270 typewriter, data entry 16 program function keys plus any key [illegible] Yes: by screen, audio and light indicators [illegible]			
PERIPHERAL ATTACHMENTS	✓ Number of attachments per controller ✓ Low-speed printing devices ✓ High-speed printer devices ✓ Card reading devices ✓ Magnetic tape transports ✓ Printer's word processing quality	The ability to attach a variety of peripheral equipment of various speeds and capacities is a measure of the range of work a system can do.	1-4, or 1-20, any combination [illegible] 300 LPM and 600 LPM [illegible] 800 and 1600 BPI			
COMMUNICATIONS PROTOCOLS	✓ Asynchronous ✓ Synchronous ✓ Binary Synchronous —Batch —Interactive ✓ Synchronous Data Link Control (SDLC)	The ability to support more than one protocol—at the same time on the same system—adds immeasurably to the number of tasks and number of networks a system can work in without additional user development effort.	Yes, TTY RS-232 Yes Yes [illegible]			
INTELLIGENT 3270 OPERATIONS	✓ Local format storage ✓ Local printing ✓ Ability to access and update local data bases ✓ Transactions stored locally, batched for transmission to host ✓ Field verification at each terminal location ✓ Application program decides when to go to host	This feature assures that the system can work immediately and easily with the most popular terminal devices in use today, and extend the performance of those devices in a variety of ways	Yes Yes Yes Yes Yes			
EMULATION CAPABILITIES	✓ 3270 interactive (dumb) ✓ 3270 interactive (intelligent) ✓ 2780 batch ✓ 3780 batch ✓ SDLC batch/interactive ✓ HASP remote job entry ✓ Non-IBM protocols ✓ Specialized protocols	Emulators are software tools that permit a system to operate as a look-alike under other vendors protocols and procedures. Their advantage is to permit direct and immediate attachment to networks using a specific device protocol	Yes Yes Yes Yes Yes, in 1979 Yes Yes Yes			
DATA BASE STORAGE	✓ Multiple disk storage capacities ✓ Memory management software ✓ Ability to expand to very large local storage	Local data base storage under sound memory management techniques assures powerful local filing, easy off-loading of large central files and elimination of unnecessary communications to and from host.	Yes, from 10 to 320MB Yes Yes, to 320 MB per system			
SOFTWARE LANGUAGE	✓ Assembly language ✓ Strong macro command repertoire ✓ High-level compiler language(s) ✓ Easy-to-learn and use ✓ Numerous screen manipulation and interactive programming aids ✓ Parameter-driven aids where required	Language is the facility that makes it possible to tap the power of the basic system by allowing applications to be written easily. Simple but rich high-level language that can be learned easily by programmers or used by non-programmers extend a system's reach that much further	Yes, not needed by user personnel Yes; 150 instructions MATE 1, new COBOL in 1979 Yes Yes Yes, for format creation and source data entry			
NETWORK ENHANCEMENTS	✓ Concurrent communications operation ✓ Downline control of multipoint networks ✓ Remote program development support for mainframe in any language ✓ Teleprinter network on terminal lines ✓ Downline program debugging ✓ Downline terminal loading ✓ High-speed data transmission rates		Yes, batch and interactive at same time Yes, up to 10 drops per controller Yes Yes, on same lines at same time Yes Yes To 9600 BPS			

Raytheon—50,000+ terminals in use now.

When you select Raytheon, you are selecting a total single-source supplier who has installed more than 50,000 intelligent terminals. A supplier with a worldwide field maintenance organization that is linked together by its own distributed processing network that keeps track of every equipment outage for every customer. A supplier that does not need to offer third-party leasing, because it maintains its own self-financed leasing company. And a supplier whose customer list includes a very high percentage of the world's largest industrial, commercial, financial, insurance and government data systems users.

Raytheon. The company to pick when you've completed your distributed processing checklist.

Tell me more about the Raytheon PTS/1200 distributed processing family: CW517B

☐ MARK-I
☐ MARK-II

Tell me more about some of the features shown on The Checklist. I'm especially interested in:

1. ____________
2. ____________
3. ____________
4. ____________

☐ Have a salesman call.
☐ Send me more information.

Name: ____________
Title: ____________
Company: ____________
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Computer Tape Disk Packs Diskettes Cassettes Mag Cards

Now Eight Times Smaller

IBMers Reduce Size of Magnetic Bubbles

YORKTOWN HEIGHTS, N.Y. – IBM scientists here have been able to experimentally make magnetic bubbles that are eight times smaller than those now commercially available – using present materials, techniques and technology.

And while that work was under way, IBM researchers at the firm's San Jose, Calif., facility have patented a method for precision alignment of garnet material that can save as much as 50% of the garnet material normally lost in the slicing process.

Magnetic bubbles are circular regions of reverse magnetization formed in thin-film garnet materials in the presence of a magnetic field. They offer the potential for very high-density storage of information in devices that have no moving parts.

Doctors E.A. Giess and R.J. Kobliska at the IBM Thomas J. Watson Research Center here began a comprehensive study in 1976 of garnet materials to determine more fully the limits to which present-day bubble fabrication techniques might be taken. Their study revealed certain combinations of garnet materials and processing procedures are capable of forming very small bubbles. The results of their investigation were announced in a scientific paper presented in Florence, Italy, at the recent International Magnetics Conference (Intermag).

The experiments demonstrated that stable magnetic bubbles as small as .4 micron in diameter can be formed, compared with the 3- to 5-micron bubbles used in devices today. A micron is 1/25,000 in.

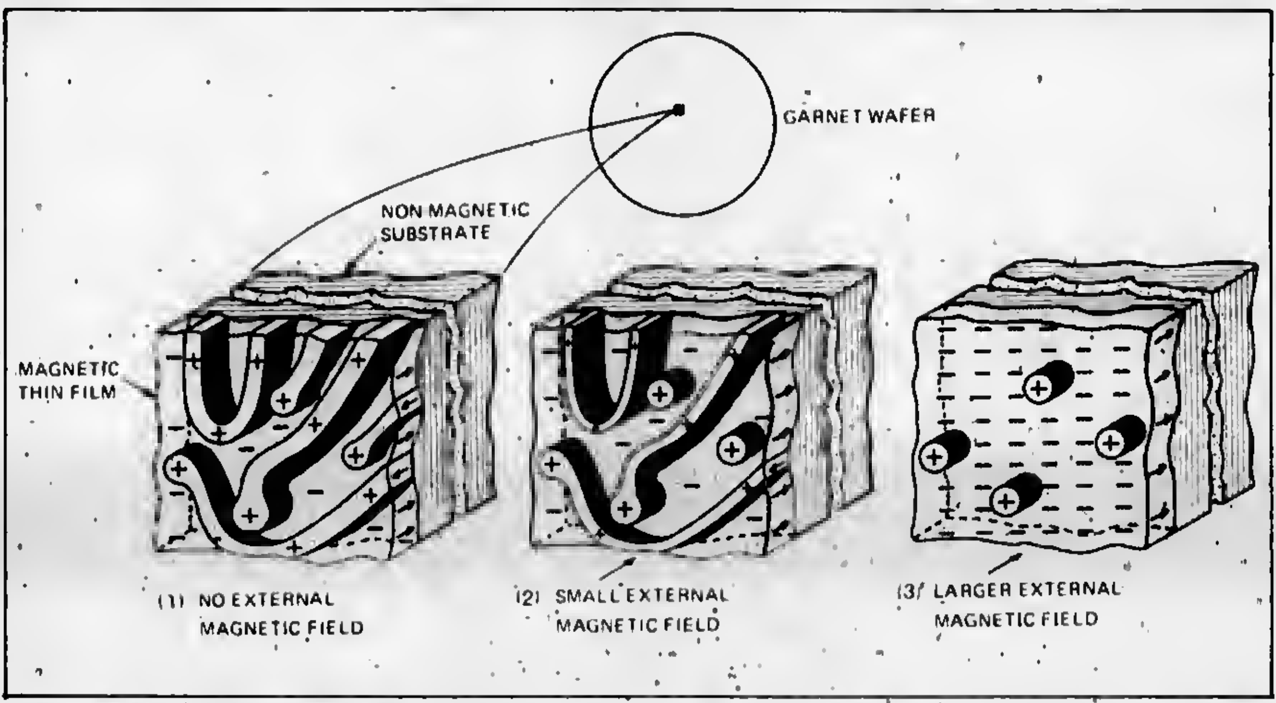
A square-inch garnet with 3-micron bubbles today can hold three million bits of information, whereas a square inch of garnet material may be able to hold 100 million bits of information, using the .4-micron bubbles reported in this study.

Giess and Kobliska focused their attention on measuring the physical and chemical properties of garnets, examining the formation of magnetic bubbles in magnetic fields representative of those needed for bubble devices.

Although their work did not include the making of devices (actual computer components), Giess said the study furnishes basic data needed if devices using bubbles smaller than a micron are to be designed.

"This is really a framework for submicron bubble garnet chemistry," he said. "I'm sure the device engineers will find our work use-

(Continued on Page 76)


GARNET WAFER
NON-MAGNETIC SUBSTRATE
MAGNETIC THIN FILM
(1) NO EXTERNAL MAGNETIC FIELD
(2) SMALL EXTERNAL MAGNETIC FIELD
(3) LARGER EXTERNAL MAGNETIC FIELD

This diagram illustrates how bubbles are formed on a garnet wafer by applying an external magnetic force. The wafer is really a sandwich, consisting of a very thin magnetic film garnet grown on a nonmagnetic substrate.

In the absence of an external field (1), the magnetic film has regions that may be magnetized in one of two directions (represented by plus and minus signs). As an external field is applied (2), the magnetic regions with the same direction as the external field expand and the regions magnetized in the opposite direction shrink until they form little circular cylinders (3).

When viewed from above, these regions of reverse magnetization look circular, leading to the term "magnetic bubbles."

Speculator on IBM's Next Move Sees Multimedia Networking

By Joe Auer

Special to CW

Speculation on IBM's next move should contain two important considerations: when and what. This scenario is based on a series of seemingly unrelated IBM actions.

The "when" is the very early 1980s; the "what" is a new way of doing business – an evolution that future DP historians will record as a revolution few people noticed until it was over.

The suggestion that IBM's long-range business strategy is being seriously threatened by competitive DP products is wishful thinking. To be sure, IBM may be feeling some interim impact from plug-compatible manufacturers (PCM) competition, Japanese mainframes and the like, but IBM's strategies have never been limited to short-term reaction to competitive products.

Rather, IBM has pursued a "grand strategy" that both limits short-term competition and maximizes long-term corporate goals. Despite public fascination over the recent 30 series announcements, IBM is in the process of pursuing a far more important path that should become clear by the early 1980s.

Analysis

By 1980 or 1981, IBM should announce, and begin implementing, an extensive information networking system that will link automated office machines, copiers and facsimile devices, intelligent terminals, small business computers and mainframe communications systems through multipoint voice, digital and teleconferencing communications. In taking this step, IBM will literally

(Continued on Page 80)

TI745's, 743's, 765's, and 763's

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IBM Scientists's Bubbles Eight Times Smaller

(Continued from Page 75)

ful. The more bubbles you can put on a chip, the lower the cost per bit on that chip, and that's what you want."

In the thin-film magnetic layer, the atoms of iron and some of the other elements each behave like tiny magnets, with "north" and "south" poles.

If there were no other factors at play, these atomic magnets would line up perpendicular to the surface plane of the material, with half of the atoms pointing "north pole" up and half with "north pole" down. However, bonding forces within the crystalline atomic structure of the material are such that each atomic magnet is induced to line up parallel to its neighbor.

This results in the formation of regions, or "domains," in the material where groups of atoms are lined up either all "north up" or "north down."

When an external magnetic is applied perpendicular to the magnetic film, the domains aligned in the same direction as the outside field expand and the domains magnetized in the opposite direction shrink. As the outside field is increased the domains of reverse magnetization become smaller and, when viewed from above, circular. Actually, they are right circular cylinders.

These circular areas are called magnetic bubbles. The presence or absence of a bubble can be used to represent the binary numbers of "one" and "zero" that make up computer language.

The man-made garnets used for magnetic bubbles may contain, in addition to iron and oxygen, one or several of the rare earth elements, such as gadolinium, yttrium, europium, samarium, lutetium and neodymium. But what all garnets share in common is a lattice-like atomic structure that acts as template, or blueprint, for "growing" layers of garnet on a base, or substrate, of existing garnet material.

The garnets used for bubble technology today are comprised of a nonmagnetic substrate on which is grown a very thin (only 1/200 the thickness of a human hair) film of magnetic material. Both the film, and the substrate are garnets, but of different chemical elements.

For example, the film garnet contains iron (the principal source for magnetic properties) and the substrate garnet does not. Yet the iron-containing garnet will grow on the substrate according to the lattice structure of the base material.

Since the rate of growth is well-known, scientists can control the thickness of the new layer, or film, by simply stopping the process at the desired time. This is important because the size and magnetic properties of the bubble formed are related directly to the thickness of the magnetic film.

The bubble diameter should be about the same size as its height; otherwise, it will not be stable. Bubbles less than a micron in diameter therefore require films less than a micron thick.

Giess and Kobliska investigated the 12 possible combinations that result from working with two kinds of films, three substrates and two orientations (atomic lattice angular directions).

One of the orientations is called "111" and is used in industry today because crystals are easy to grow in this configuration and it produces films with good magnetic properties. The other orientation is called "100," in which the arrangement of atoms at the surface of the garnet substrate is slightly different than in "111."

The two film types examined by the IBM scientists were one containing europium, lutetium, iron and oxygen and one in which samarium was substituted for the europium.

The substrates included the most common one in use today, gadolinium gallium garnet (GGG), and others using neodymium (NGG) and samarium (SGG). Giess and Kobliska found samarium-based films supported the smallest bubbles, but the bubbles in these films were harder to move around than in europium-based films.

Thus the designer of a bubble device might opt for .6-micron bubbles with greater mobility over .4-micron bubbles moving more sluggishly through the film. A lot depends on the purpose of the device, the researchers noted.

West Coast Research

Meanwhile, in San Jose, Johannes Grandia and J. Charles Hill invented a precision alignment method that can reportedly save as much as 50% of the garnet material normally lost during the preparation of magnetic bubble storage devices.

The process for slicing this hard, single-crystal material into wafers, on which bubble patterns are formed, could save several million dollars for bubble materials suppliers during the next few years, IBM said.

Garnet is expected to be to the bubble memory business what silicon is to semiconductors. Published estimates by bubble materials suppliers project a surge in garnet crystal volume from a current $3 million to over $40 million by 1982.

Co-inventors Grandia and Hill received Patent 4,084,354 for work done at IBM's General Products Division development laboratory in San Jose.

Also suitable for other hard materials like sapphire, their method has potential for processing large silicon crystals used in solar energy applications, IBM said.

In preparing the base material for bubbles, IBM's patented process differes from current methods by first shaping the garnet crystal so its geometric axis is aligned with its crystallographic axis, comparable to the "grain" of the matrial. The heretofore stationary crystal, which is considerably harder than silicon, is then rotated perpendicular to a thin rotating diamond saw blade.

As wafers are sliced, two extremely flat, parallel surfaces are produced with the proper crystallographic orientation for bubble devices.

The wafers can be polished directly to a smooth finish, eliminating a costly and time-consuming lapping stage that typically consumes as much as 20% of the garnet material to obtain parallel surfaces.

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WANG

Reject End to South Africa Business

CDC Shareholders Put Curbs on Takeovers

MINNEAPOLIS — Control Data Corp. shareholders at the recent annual meeting approved two amendments to the articles of incorporation designed to prevent unwanted takeovers and overwhelmingly rejected a proposal to restrict the firm's activities in South Africa.

One of the amendments that the board of directors considered concerned the expected social and economic effects of a takeover on noncontrolling stockholders, employees and other constituents of the company.

The second amendment sets forth specific steps which must be taken prior to completing a merger, including the guarantee of a minimum price per share for stockholders not voting for the merger and assurance by the acquiring entity that it will not substantially alter the two major areas of the firm's business — computers and financing.

Both articles reflect the concern of William C. Norris, chairman and chief executive officer, for the small investor facing a takeover by institutional or other large investors, a CDC spokesman noted.

Commenting on the rejection of the proposal by the United Presbyterian Church calling for a limitation of CDC's activities in South Africa, CDC management stated the measure would end the firm's commitment to work for constructive changes in South Africa.

Norris called on individual investors to support corporations that help solve major social problems, citing examples of CDC's application of technology to bettering society. Specifically he pointed to CDC's establishment of four plants in economically depressed areas and the work it has done with South Dakota's Rosebud Indian Reservation in applying computer technology to improving health care delivery.

On April 26, just a few days prior to the annual meeting, CDC pleaded guilty to making illegal payments to a foreign government and was fined $1.4 million. In response to shareholder criticism, outside director Joseph M. Barr stated that questionable payments to foreign governments had stopped.

In other business, shareholders reelected 16 members of CDC's board of directors without opposition.

Without being more specific, Norris said CDC would meet or exceed budget expectations for this year.

Scan-Data Inks CDC Agreement

NORRISTOWN, Pa. — Scan-Data Corp. recently signed a memorandum of understanding with Control Data Corp. (CDC) providing for cooperative business arrangements between the two companies and for an investment in Scan-Data by CDC.

Specific contracts and details still have to be negotiated. The completion of the transaction is subject to several conditions, including agreement by Scan-Data's noteholders to exchange their notes for Scan-Data common stock and approval by the company's major lender to the restructuring of its current debt.

"From a financial point of view, the restructuring of our company's debt and the infusion of new capital will substantially improve our financial posture and profitability," according to Robert R. Burns, president of Scan-Data.

Two of the proposed future business arrangements are Scan-Data's assumption of marketing responsibility for CDC's optical character recognition products and CDC's assistance with Scan-Data's Positran fast food order and entry control system.

The agreement, according to CDC President Robert M. Price, is a continuation of CDC's cooperative business approach that stresses the independence of smaller enterprises, extends the resources of larger ones.

Acquisitions

United Telecommunications, Inc., has made an agreement in principle for the acquisition of **Calma Co.** Calma will operate as a division of United Computing Systems, Inc.

American Computer Sciences, a New York software house, has announced its merger with **Teleprocessing Techniques, Inc.**, a New Jersey software corporation.

National CSS, Inc. has agreed in principle to acquire **Zytron Corp.**, a privately held company based in Menlo Park, Calif. The proposed transaction is subject to the approval of Zytron's board and stockholders, the National CSS board and certain other conditions.

NCR Corp. has agreed in principle to sell its **Appleton Papers Division** to **B.A.T. Industries Ltd.**, the British group operating in the tobacco, paper, cosmetics and retailing industries, for a cash purchase of $280 million. The agreement is subject to approval.

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Out of Total $60 Billion: IRD

$15 Billion Communications Mart Up for Grabs

NEW CANAAN, Conn. — The U.S. market for telecommunications service and equipment will reach $60 billion this year, with $15 billion open to competition, according to a market study released by International Resource Development, Inc. (IRD).

The 298-page report, "Telecommunications Market Opportunities in the United States, 1978" examines more than 90 separate telecommunications market segments and analyzes the opportunities, current market size, leading competitors and 10-year growth prospects within each segment.

Over the next 10 years, the overall market is expected to grow at about 4% annually, reaching $88 billion in 1988. However, those market segments able to compete with the Bell System will grow at much higher rates — 10% to 100% annually, IRD said.

The competitive portion of the market will increase from $15 billion to $30 billion annually by 1988, according to the report.

Both short- and long-term market opportunities are available, IRD said. Among the specific short-term growth areas it cited were medium-speed (2- and 3- minute) facsimile machines, specialty telephone devices, data multiplexers, satellite delay compensation units and value-added network services such as the "electronic mailbox."

Long-term growth markets include the cordless telephone computer conferencing services, satellite communications and electronic switching systems. Also, depending upon the outcome of the Execunet issue between MCI Telecommunications Corp. and the Federal Communications Commission [CW, May 15], the specialized carrier field could become an explosive market, IRD said.

The industry itself, according to IRD, is characterized by dozens of segments, with entry possibilities for the large, international telecommunications equipment vendors as well as for small, innovative specialty firms.

The likelihood that the Bell System will become more open to procurement from outside suppliers has, according to IRD's director of development, Stephen A. Caswell, "transformed the telecommunications market from a clubby environment to one of strong competition, which will increase during the next decade."

Further details on the report are available from IRD at 125 Elm St., P.O. Box 1131, New Canaan, Conn. 06840.

Orders & Installations

U-Haul International, Inc. has installed an Itel Corp. AS/5 Model 3 at its DP center. The system will provide on-line support for all of the firm's international DP functions.

John Fluke Manufacturing Co. of Mountlake Terrace, Wash., has taken delivery on a Graphic Data System manufactured by Calma Corp. The order is valued at $377,500.

The Huntington National Bank of Columbus, Ohio, has installed two Burroughs Corp. B4800 systems valued at $4 million in its Electronic DP Division.

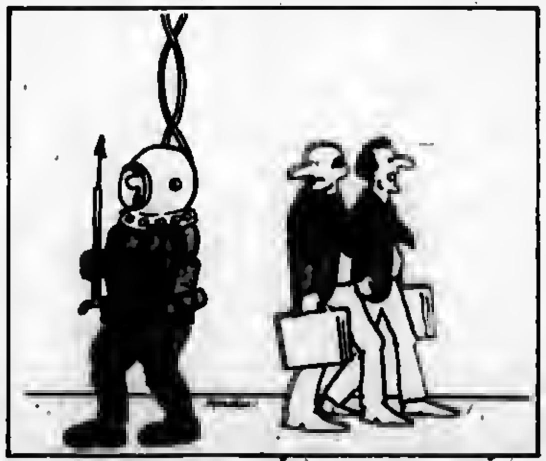
The U.S. Air Force has installed an Itel Corp. AS/5 Model 3 as part of its program to upgrade the efficiency of the Aeronautical Systems Division headquartered at Wright-Patterson Air Force Base, Dayton, Ohio.

Pacific Northwest Bell Telephone Co. has ordered a Univac 1100/82 system, valued at $4.3 million for time-sharing applications.

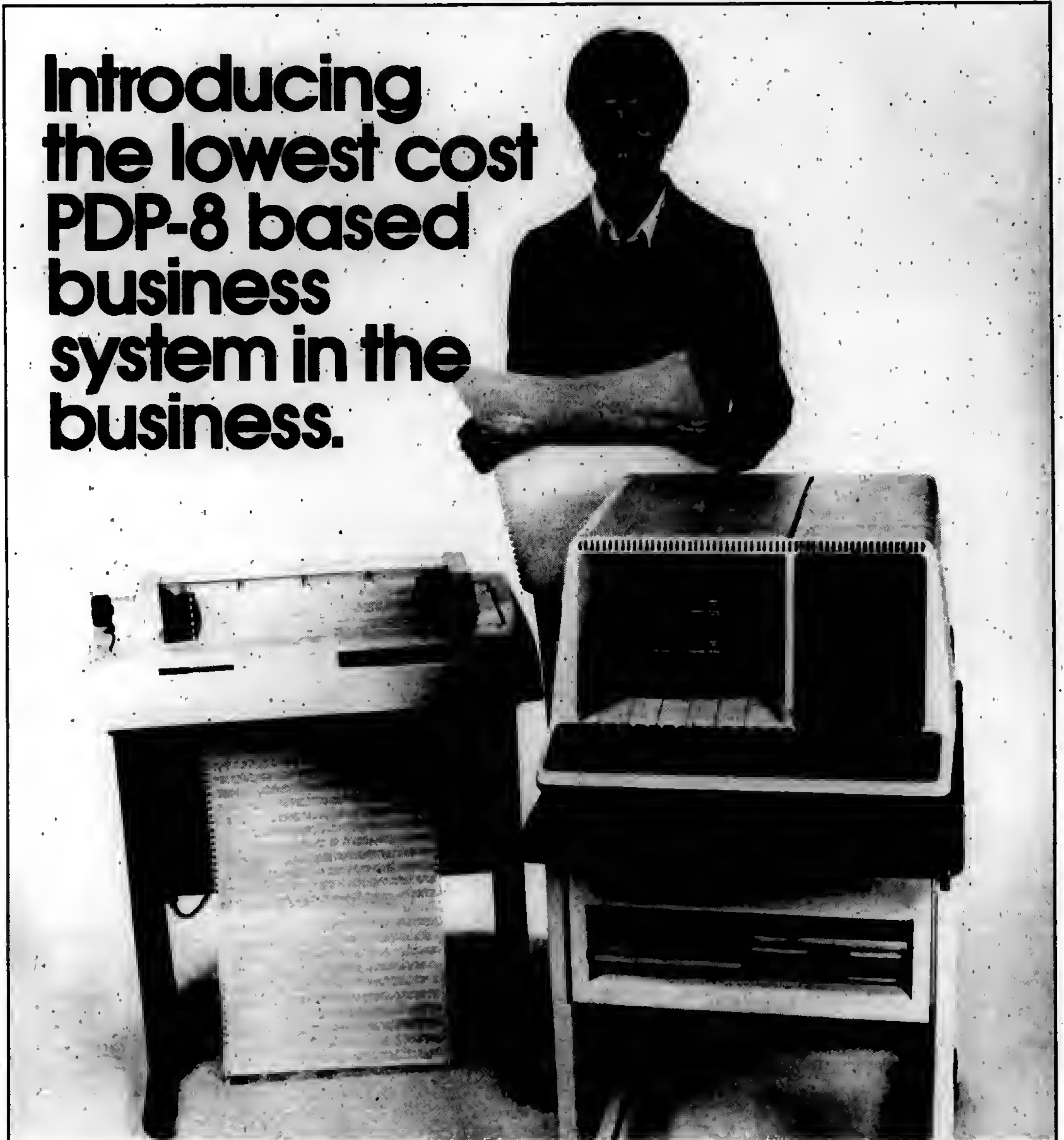
Cambridge Thermionic Corp. of Cambridge, Mass., has ordered a 90/30 system from Univac to improve production scheduling and inventory management capabilities. The Sure Fit Products Co. of Bethlehem, Pa., has also ordered a 90/30 system to expedite the firm's business operations. Alterman Foods, Inc. of Atlanta has ordered a 90/30 system for on-line DP operations.

Computer Resources, Inc. has installed the first Micro-Measure, a printing response time monitor, at Standard Oil of Ohio in Cleveland.

Standard Federal Savings and Loan Association has installed two Burroughs Corp. B4800 systems at its main office in Troy, Mich. The systems are valued at $1.2 million.



'He's Really Been Feeling the Pressure Lately . . .'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Digital Communications Seen $35 Billion Mart

PALO ALTO, Calif. — The U.S. market for telecommunications transmission/network products will top $35 billion by 1985 with digital equipment capturing over 40% of the market compared with the 12.7% it held in 1975, according to a recent two-volume study released here by Comquest Corp.

The digital sector could be even larger, the report predicted, if the Bell System continues to convert to digital Class-5 electronic switching systems.

The study, "Digital Trends in Telecommunications," analyzes both the U.S. and Canadian markets, projecting the Canadian market at $5.5 billion by 1985, when 60% of the transmission/-switching network products will be classified as digital.

Although the number of companies offering products with digital technology is still limited in comparison with those committed to analog technology, most larger companies are working in both product areas, Comquest noted.

While digital technology is considered state-of-the-art today, the study predicted it will become status quo in the 1980s.

Systems using fiber optic transmission, common-channel interoffice signalling and digital speech interpolation will be affected by new digital transmission network equipment, the study claimed, with major innovation expected in memory, processor and analog interface device technology.

Electronic funds transfer, distributed data processing and electronic mail systems will propel the demand for digital networks.

Remote switching and satellite systems were other product areas forecast to increasingly use digitized methods.

The report segments the market into six areas — total U.S., Bell System, General Telephone, other independent telephone companies, other users and Canada.

While there is universal agreement that future telecommunications networks will be digital, there is less agreement on the timetable for implementation, the study concluded. The process of conversion will not be fully achieved in the U.S. until after the turn of the century, but somewhat earlier in Canada, it said.

Expansions

NEC Microcomputers Inc. has relocated its North American operations from Lexington, Mass., to an office complex in Wellesley, Mass. The 24,000 sq-ft space will house 70 persons.

Cambridge Memories, Inc. (CMI) is expanding its headquarters to a new 100,000 sq-ft building in Waltham, Mass. The facility will house the majority of CMI's manufacturing, engineering and marketing operations.

Cray Research, Inc. has broken ground for a 25,000 sq-ft headquarters building in Mendota Heights, Minn. The facility will house the firm's executive offices and marketing organization.

Data Printer Corp. is moving from Cambridge, Mass. to a 182,000 sq-ft facility in Malden, Mass., that will house production, engineering, quality control, test and laboratory space and corporate offices.

Logical Machine Corp. has moved its research and development and field engineering departments to a 12,600 sq-ft facility in the Moffett Park Area of Sunnyvale, Calif.

Sycor, Inc. has opened a 24,000 sq-ft addition to its Goldsboro, N.C., production facility.

Megatek Corp. will move its corporate headquarters and Graphics Group from Point Loma, Calif., to a new 24,000 sq-ft facility in San Diego's Sorrento Valley Industrial Park.

Arista Manufacturing Systems has opened its first West Coast office at 5310 Beethoven St., Los Angeles, Calif. 90066.

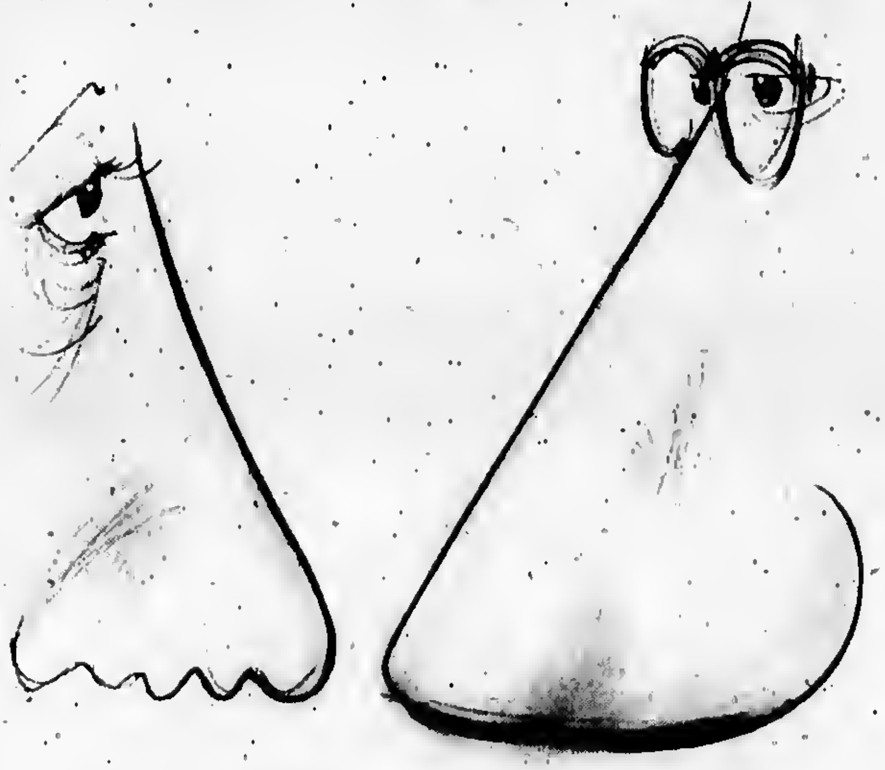
Codex Corp. of Newton, Mass., has opened a liaison office in Tokyo to provide direct marketing and technical support to Codex distributors throughout the Far East.

Contracts

Digital Associates Corp. has awarded to Memorex Corp. a $1 million third-party maintenance agreement covering printer systems supplied by DAC. DAC will sign service agreements with users, and Memorex will then provide service.

Midwest Telephone Co. of Minnesota has signed contracts with Stromberg-Carlson Corp. for two System Century Digital Central Offices.

Input Output Computer Services of Cambridge, Mass., has been awarded an Air Force Electronic Systems Division contract valued at about $1.8 million to provide and install seven data translators.



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Total Communications Seen Next IBM Move

(Continued from Page 75)

create a revolution by evolution.

Competitive OEMs, PCMs and third-party leasing companies will be left in what will amount to only one small portion of the new industry: "data processing." DP, as we know it today, will become out of date in a period of a few short years.

That IBM and Satellite Business Systems (SBS) researchers are pursuing significant communications improvement is relatively well known. What may not be fully appreciated is the quantum jump that IBM's 1980s strategy may give to that company. In many respects, IBM's early '80s strategy may be the ultimate counterpunch — or the "industry ploy" — of the decade.

Change in Emphasis

When taken together, several facts lend support to the scenario. For one, IBM has recently changed its longstanding marketing strategy from emphasizing user rentals to emphasizing user purchases.

Price reductions, marketing priorities and low purchase/-lease ratios now make purchases quite advantageous on commonly accepted rent vs. purchase parameters. This shift could simply represent efforts by IBM to meet purchase competition from other sources, to increase purchase income or to "lock in" rental customers.

On the other hand, and in many an expert's opinion, it may indicate IBM is planning an announcement that would cause dramatic obsolescence in the present IBM product line.

Another important fact adding fuel to the scenario is that substantial research and development expenditures have not really been evident in IBM product announcements for several years. Although this fact may suggest IBM's R&D efforts have not been as successful or dramatic as in previous periods, it may also indicate the real evidence of the bulk of these expenditures has not yet been announced.

Interviews with numerous industry experts produce several views indicating there may be in excess of a $2 billion R&D investment by IBM that is yet to show its face in the form of proportionately higher technology in IBM product offerings.

The so-called "30 series" merely represents a renameplating and repricing of equipment in the 370 line, which may be an indication that IBM is extending the 370 life span pending an early '80s announcement.

The 30 series machines have relatively low price/lease ratios, which traditionally suggest a short marketing life.

In addition, SBS is alive, well and proceeding toward implementation of a revolutionary voice, data, facsimile and teleconferencing communications network — probably by 1981. (SBS is a venture composed of subsidiaries of IBM, Comsat General and Aetna Life Insurance.)

Assuming the system works, the impact of the SBS concept may be one of the most dramatic technological developments in decades — if the DP industry provides information processing equipment that is capable of taking full advantage of SBS opportunities.

IBM's key role in SBS strongly suggests IBM will strive to provide a full spectrum of products that will both lead to SBS' success and ensure a substantial profit to IBM through its other divisions.

To accommodate such high-speed transmissions, high-speed processors will be needed. IBM may well fill that requirement with CPUs that are far larger than anything in use today.

Certain defense and space industry contractors are developing IBM-requested proposals for extremely small ground stations for high-speed satellite communications. These proposals may be aimed at creating antennae small enough for user company or IBM branch office installation.

The possibility of such installations, coupled with the extensive communications capability being built into the office products line, suggests the SBS concept may be applicable to far more companies than some analysts suggest.

Office Products

Also, IBM is quietly installing innovative communications capabilities in its office products line. While the full extent of these efforts is not yet known, the company is building high-speed communications capabilities into its word-processing equipment and, perhaps, into its advanced copier line.

For the present, few if any DP manufacturers have the ability to offer an integrated product line of word processing devices, advanced copier machines, small business computers and mainframe DP systems. IBM has long evidenced interest in exploiting this advantage under the concept of "information" processing.

This "A to Z" coverage in people, products and services currently in place is a weapons system that IBM can synergize via SBS. IBM would then be a "one-stop shop" with all the advantages of a *single* vendor — including transmission.

Effect on Lawsuit

IBM does not feel seriously threatened by the Department of Justice suit. Consequently, it is perfectly willing to pursue a course of minimizing competition through aggressive and innovative systems introductions.

Indeed, the introduction of a whole new era of "information networking" could leave the Justice Department with an antitrust lawsuit involving an essentially out-of-date industry.

One of the more fascinationg possibilities is that IBM's SBS activities will place the DP giant into direct communications competition with AT&T — itself the subject of antitrust claims by the Justice Department. It would indeed be ironic if IBM ended up asserting that its SBS foray and early '80s strategy was actually pro-competitive when viewed in the communications market presently dominated by AT&T.

Although IBM could make it considerably more difficult for PCMs and other vendors to compete for peripheral and 370 and 30 series replacement-level business, it has permitted this competition to continue at relatively regulated, and perhaps increasing, levels.

This could indicate IBM's "concern" over the antitrust implications of more predatory practices. However, IBM has seldom refused to regulate and stifle competition where it was clearly advantageous to do so.

Rather, IBM may be biding its time, waiting for the implementation of its early '80s counterpunch and encouraging its competitors to spend the bulk of their R&D dollars on potentially obsolete present-generation hardware.

IBM has not chosen to exploit or even offer significant competition in the so-called "distributed data processing" arena. This fact strongly suggests IBM may be planning to jump over the entire distributed data processing concept into the suggested multimedia networking system.

Many authorities fully expect IBM to make a major announcement in the early '80s. The announcement may involve a fourth-generation series, but problems with Josephson Junction and bubble memory technologies may be sufficient to prevent introduction of a fourth-generation mainframe (as we know it today) by that date.

The essence of the next step will be communications networking capability, using mixed voice and digital transmissions, rather than fourth-generation mainframes. Indeed, users and competitive vendors that focus only on fourth-generation hardware advances may well be left at the starting post — for the wrong race.

In pursuing this goal, IBM is conducting a revolution by evolution: hardware will continue to evolve, and fourth-generation technology will be introduced over a period of time as it becomes cost-effective.

The revolution, however, will occur in total information communications and in the linking of existing and future hardware, software and services in IBM's new worldwide information network.

This article is abstracted from CNReport's *April issue.* CNReport *is available for $20 per issue from International Computer Negotiations, 400 New York Ave., Box 364, Winter Park, Fla. 32790.*

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Revenues Rise 33% at DEC, Earnings Grow $9 Million

MAYNARD, Mass. — Digital Equipment Corp. reported revenues of $374.7 million for the third quarter, up 33% from the same period a year ago and producing earnings of $36.9 million or 87 cents a share. This compared with revenues of $282.7 million and earnings of $27.9 million or 72 cents a share in the year-ago quarter.

For the nine months ended April 1, the firm posted revenues of just over $1 billion and earnings of $95.8 million or $2.31 a share. In the previous year's nine-month period, revenues reached $728.2 million and earnings totaled $67.3 million or $1.73 a share.

Initial shipments of the 36-bit Decsystem-2020 and the 32-bit VAX-11/780 systems are under way, the firm reported.

End-user customer demand continued to grow in the third quarter, a spokesman said, while orders from resellers were sluggish, a reflection that these customers are working down their backlogs.

DEC completed the planned phase-over of leased facilities in Phoenix, Ariz., Colorado Springs, Colo., and Salem and Merrimack, N.H., to larger, company-owned buildings in those locations.

Delivery of products is typically within 90 days, the firm said.

Financial News

Comdisco Period Shows 23% Gain In Net Income

ROSEMONT, Ill. — Comdisco, Inc.'s earnings totaled $892,644 or 54 cents a share on revenues of $28.1 million in the second quarter, ahead of last year's quarterly results of $722,957 in earnings or 46 cents a share on revenues of $26.3 million.

Earnings growth over the same period a year ago was 23%, outdistancing sales growth of 6.2%. The increase was generated by the larger volume of computer leasing activity, improved earnings from cash fees generated by Comdisco's financial services subsidiary and the lower effective income tax rate, the firm stated.

Comdisco is a remarketer of used IBM 360 and 370 equipment, buying, selling and leasing three products.

A surge of activity is expected for the third and fourth quarters of the company's fiscal year when IBM begins delivering its 30 series processors, Comdisco said.

SDC Net Dives In Third Quarter

SANTA MONICA, Calif. — System Development Corp.'s (SDC) third-quarter earnings of $136,000 or 9 cents a share on sales of $36.5 million were down dramatically from year-ago results of $760,000 or 40 cents a share on sales of $33.2 million.

Nine-month results showed revenues at $103.9 million and earnings at $1.1 million or 70 cents a share, compared with 1977 nine-month postings of $94.2 million revenues and earnings of $1.8 million or 99 cents a share.

Heavy Start-Up Costs

The lower earnings in the third quarter were attributed to heavy startup costs on a long-term claims-processing program which SDCs chairman and president, Dr. George E. Mueller, claimed will generate revenues for the company for at least three years.

The firm reported new business bookings were at a record level.

Nickels & Dimes

General Automation, Inc. has finalized a comprehensive long-term loan agreement with three banks providing $25 million in working capital for domestic operations. In addition, the firm reported, the agreement also allows GA to negotiate an increase in foreign borrowing from the present limit of $6 million to a maximum of $10 million.

$ $ $

The board of directors of **Comdisco, Inc.** declared a dividend of 8 cents a share on its common stock for the second quarter ended March 31. The dividend is payable June 1.

$ $ $

Amdahl Corp. shareholders approved an increase of common shares from 10 million to 40 million. The company's board of directors approved a two-for one split and a quarterly dividend of 5 cents a share payable May 26.

$ $ $

Threshold Technology, Inc. recently established a principal banking relationship with Nordic American Banking Corp. of New York.

$ $ $

Boothe Courier Corp. recently made a cash tender offer to purchase 2 million shares (approximately 59%) of its common stock and all of its qualified stock options. The price offered for the common shares is $17 per share. The offer expired May 9.

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CSC Year Earnings Rise As Quarter Net Grows 23%

EL SEGUNDO, Calif. — Fourth-quarter results for Computer Sciences Corp. (CSC) rose 23% over year-ago amounts as earnings reached $3.9 million or 28 cents a share on revenues of $77.5 million.

In the year-ago quarter, CSC posted earnings of $3.1 million or 21 cents a share on revenues of $63.2 million. All 1978 figures are unaudited.

The firm reported year-end revenues of $276.9 million and earnings of $13.9 million or 97 cents a share, up from revenues of $234.7 million and earnings of $11.6 million or 80 cents a share in 1977.

Contract services provided to commercial and government clients generated revenue of $199.1 million, up from $177 million the year before, with sales to the federal government leading growth.

The other major source of revenue came from CSC's Infonet time-sharing operation, the firm said, which increased to $77.8 million this year, up 35% from last year.

Initial costs of developing Infonet's European markets and lower margins on other data services operations reduced operating margins for the Data Services Group as a whole, the company reported, but margins for this year were greater than in 1977.

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1

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3

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As a successful, technically-focused consultant, you could expect your compensation to surpass $60,000 (in current dollars) within 10 years.

4

This position is based in St. Louis. About half your work would be in other cities; however, you could count on being home on weekends.

5

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- Data communications systems
- Hardware/software monitoring
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- Distributed systems
- Computer workload scheduling
- EDP transfer pricing
- Data system security—contingency planning

In addition, you must have outstanding written and oral communication skills and be able to devote a tremendous amount of energy to your work.

6

In considering you for this position, we must estimate how marketable you would be as a consultant. To help us, please be sure that your resume ennumerates for each project cited: the problem, your specific role, and the resulting benefits.

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Sperry Quarter Revenues Hit $1 Billion for First Time

NEW YORK — Sperry Rand Corp.'s fourth-quarter revenues topped $1 billion for the first time and earnings rose 24.6% to $59.5 million or $1.53 a share. This compares with revenues of $897 million and earnings of $47.8 million or $1.25 a share in the year-ago quarter.

Year-End Earnings

Year-end earnings totaled $176.6 million or $4.60 a share on revenues of $3.6 billion, up 12.6% from 1977 earnings of $156.8 million or $4.11 per share on revenues of $3.2 billion.

Computer revenues for the year rose 18% with fourth-quarter revenues increases reported at 33%. The firm attributed the gains to the heavy demand for the large-scale 1100/80 series introduced about a year ago.

The firm also reported bookings up 16% and backlog orders up 18% over last year-end totals.

Financial News

CA Quarter Net Gain Slow

IRVINE, Calif. — Computer Automation, Inc. reported a sales increase of 42% for its third quarter, but expressed disappointment at a sluggish 9% increase in earnings.

The third quarter ended April 2 with earnings of $1.7 million or 89 cents a share on record sales of $17 million. Third-quarter 1977 results showed net income of $1.6 million or 82 cents a share on sales of $12 million.

Nine-Month Results

For the nine months, the company posted sales of $43.6 million and earnings of $4.6 million or $2.32 a share compared with sales of $29.9 million and earnings of $3.5 million or $1.78 a share in the year-ago period.

D.H. Methvin, CA president, attributed the profit margin decline for the quarter on startup costs for the company's minicomputer manufacturing plant in Dallas; costs of marketing expansion in Europe; and heavy expenditures for new product development.

Further, above-average levels of receivables and inventories required the firm to use its revolving bank line, resulting in increased interest expense, he added.

Centronics Net Hits Record

HUDSON, N.H. — Centronics Data Computer Corp. said unusually high demand for two new product lines contributed to record third-quarter earnings of $3.6 million or 62 cents a share on revenues of $19.6 million.

Year-ago third-quarter earnings totaled $3.2 million or 53 cents a share on revenues of $14.8 million.

Although unaudited, nine-month results for 1978 show sales at $53.4 million and earnings at $10.1 million or $1.74 a share, topping 1977 sales of $42 million and earnings of $9.1 million or $1.51 a share.

Series 700 Demand

According to Robert Howard, president of Centronics, "The Series 700 is now our largest product line in number of machines and dollars of sales and is at the start of its production life cycle. Demand for our 700 and 6000 series has caused us to become production-limited.

"This situation will be relieved with the July opening of our new assembly building in Hudson and our Irish plant expansion, which will be completed in August," he noted.

Earnings Soar 92% In STC First Quarter

LOUISVILLE, Colo. — Storage Technology Corp. (STC) boosted net income during the first quarter by 92%, earning $3.5 million or 65 cents a share on revenues of $54.2 million.

This compared with earnings of $1.8 million or 37 cents a share on revenues of $32 million in the 1977 period.

Commenting on first-quarter results, President Jesse Aweida said, "STC is in the most rapid growth phase of its history. New orders and backlogs continue to be at an all-time high."

New Registrations

WAVETEK, 9045 Balboa Ave., San Diego, Calif. 92123, filed to register 42,881 shares of common stock. No underwriter is involved.

IBM, Armonk, N.Y. 10504, filed to register 25,000 shares of capital stock. No underwriter is involved

DATAPOINT CORP., 8725 Datapoint Drive, San Antonio, Texas 78284, has filed to register 600,000 common shares from the company and 11,900 shares from a selling shareholder and warrantholder. The issue is being underwritten by a syndicate headed by Kidder, Peabody and Co., Inc.

HONEYWELL, Inc., Honeywell Plaza, Minneapolis, Minn. 55408, filed to register 80,000 shares of common stock and $5 million of participations. No underwriter is involved.

PRIME COMPUTER, INC., 40 Walnut St., Wellesley Hills, Mass. 02181, has filed to register $15 million of subordinated debentures due 1993. Underwriter will be Smith, Barney, Harris Upham & Co., Inc., 120 Broadway, New York, N.Y. 10005

NCR CORP., 1700 S. Patterson Blvd., Dayton, Ohio 45479, filed to register 1.3 million shares of common stock. No underwriter is involved

COMPUTERIZED AUTOMOTIVE REPORTING SERVICE, INC., 210 Automation Way, P.O. Box 235, Birmingham, Ala 35201, has filed to register 46,500 shares of common stock. No underwriter is involved.

COMPUTER TRANSCEIVER SYSTEMS, INC., East 66 Midland Ave., Paramus, N.J. 07652, filed to register $1,175,000 of 10% subordinated debentures due 1988. No underwriter is involved.

CAMBRIDGE MEMORIES, INC., 12 Crosby Drive, Bedford, Mass. 01730, filed to register 100,000 shares of common stock. No underwriter is involved.

HEWLETT-PACKARD CO., 1501 Page Mill Road, Palo Alto, Calif. 94304, has filed to register 1 million shares of common stock. Underwriter: Morgan Stanley & Co., Inc., 55 Water St., New York, N.Y.

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***International Design** — Develop design philosophy and Architecture Definition of switching systems for international markets. This involves high level design structure development end detailed studies of critical problem areas. Define specific design implementation tasks, review progress and coordinate developments with implementation teams abroad.*

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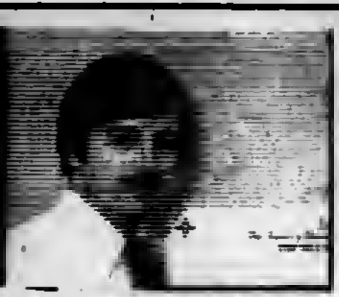

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(817) 732-8191

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To work in designing and developing on-line applications. COBOL experience required. Send resume, salery history, and salary requirements, by June 9, 1978, to:

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Mgr. Data Processing
Gateway Technical Institute
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$1,064-$1,235

Full time permanent position to develop computer programs and operate an IBM 360/30 computer. Must have minimum one year full time experience in operations/programming in COBOL/RPG II under DOS. District paid fringe benefits. Apply Hartnall College Business Office, 156 Homestead Ave., Salinas, Ca. 93901. DEADLINE: Friday 5/26/78.

ATTENTION SKIERS

Reno based Gannett/West, 30 minutes from the nearest slope, has an immediate opening for a programmer/analyst position. You will be responsible for development, installation and maintenance of business application software at local newspaper sites. We are using DEC PDP 11/60 and 70's with RSTS and Basic Plus 2.

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SCT's '77 Was A Great Year 1978 Will Be Even Greater Discuss Your Tomorrow...NOW!

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Positions are located in both urban and semi-rural areas of: Massachusetts, Florida, Ohio, Illinois, California and suburban New York City/Philadelphia.

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NCR built the Universal Product Code computer market. More than 250,000 computerized checkout terminals have already been installed world-wide. Demand for this remarkably successful application of our pioneering work in mini and microprocessor technology will be accelerating sharply.

Our Engineering & Manufacturing Division - the leader in ECR/POS intelligent terminals and CPU link-up - is growing rapidly; and retail acceptance of our new generation C-2140 multi-microprocessor is creating unprecedented ground floor opportunities. If you would like a key role in the world's most visible business computer company, and have a background in one or more of the following areas, contact us at once.

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- Microprocessor Software (Assembly Level)
- Operating Systems Design
- I/O Drivers
- Diagnostics
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COMPONENT-RELIABILITY ENGINEERS and QUALITY CONTROL ENGINEERS with BS degrees in EE, CS or related disciplines.

NCR/Millsboro is located in the heart of the "Delmarva Peninsula" - one of the most ideal living areas on the Eastern seaboard. We're minutes away from wildlife preserves and the nation's finest beaches, and are within 3-hour drives of Philadelphia, Baltimore and Washington.

Run NCR through check-out by calling Ron Tull, Collect at (302) 934-8111 (Weekdays 8:00 a.m. to 4:00 p.m.)

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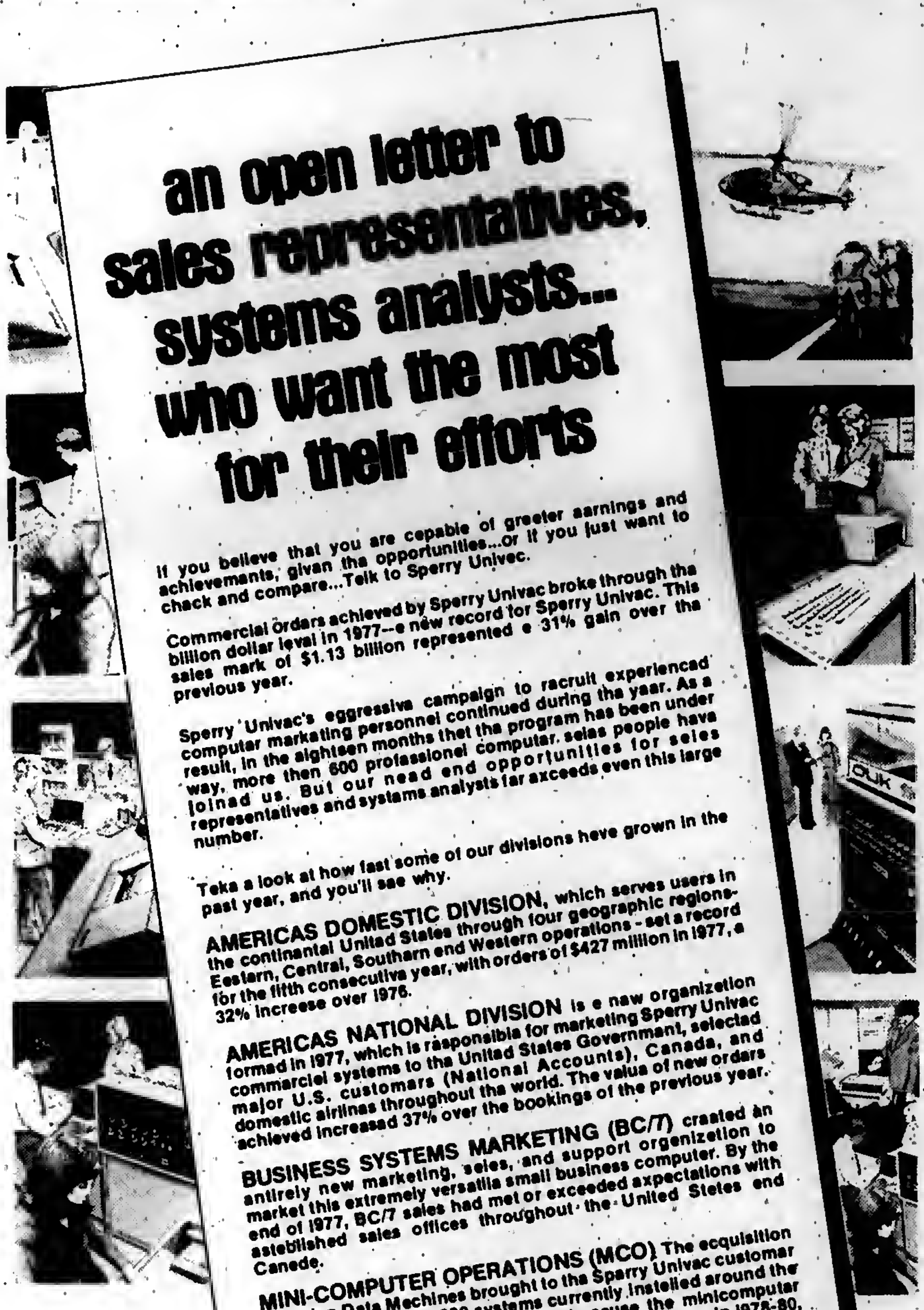
An Equal Opportunity Employer NCR

When it comes to career opportunities ... NCR MEANS BUSINESS.



an open letter to sales representatives, systems analysts... who want the most for their efforts

If you believe that you are capable of greater earnings and achievements, given the opportunities...or if you just want to check and compare...Talk to Sperry Univac.

Commercial orders achieved by Sperry Univac broke through the billion dollar level in 1977--a new record for Sperry Univac. This sales mark of $1.13 billion represented a 31% gain over the previous year.

Sperry Univac's aggressive campaign to recruit experienced computer marketing personnel continued during the year. As a result, in the eighteen months that the program has been under way, more than 600 professional computer sales people have joined us. But our need and opportunities for sales representatives and systems analysts far exceeds even this large number.

Take a look at how fast some of our divisions have grown in the past year, and you'll see why.

AMERICAS DOMESTIC DIVISION, which serves users in the continental United States through four geographic regions - Eastern, Central, Southern and Western operations - set a record for the fifth consecutive year, with orders of $427 million in 1977, a 32% increase over 1976.

AMERICAS NATIONAL DIVISION is a new organization formed in 1977, which is responsible for marketing Sperry Univac commercial systems to the United States Government, selected major U.S. customers (National Accounts), Canada, and domestic airlines throughout the world. The value of new orders achieved increased 37% over the bookings of the previous year.

BUSINESS SYSTEMS MARKETING (BC/7) created an entirely new marketing, sales, and support organization to market this extremely versatile small business computer. By the end of 1977, BC/7 sales had met or exceeded expectations with established sales offices throughout the United States and Canada.

MINI-COMPUTER OPERATIONS (MCO) The acquisition of Varian Data Machines brought to the Sperry Univac customer base an additional 7,000 systems currently installed around the world. This addition is significant because the minicomputer market offers extremely attractive growth prospects. In 1978-80, minicomputer sales are expected to grow at an annual compound rate of 35%, more than twice as fast as the mainframe market.

IMMEDIATE OPPORTUNITIES EXIST THROUGHOUT THE UNITED STATES & CANADA

SALES REPRESENTATIVES/SYSTEMS ANALYSTS

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P.S. See Us At The NCC

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EDP PROJECT LEADERS

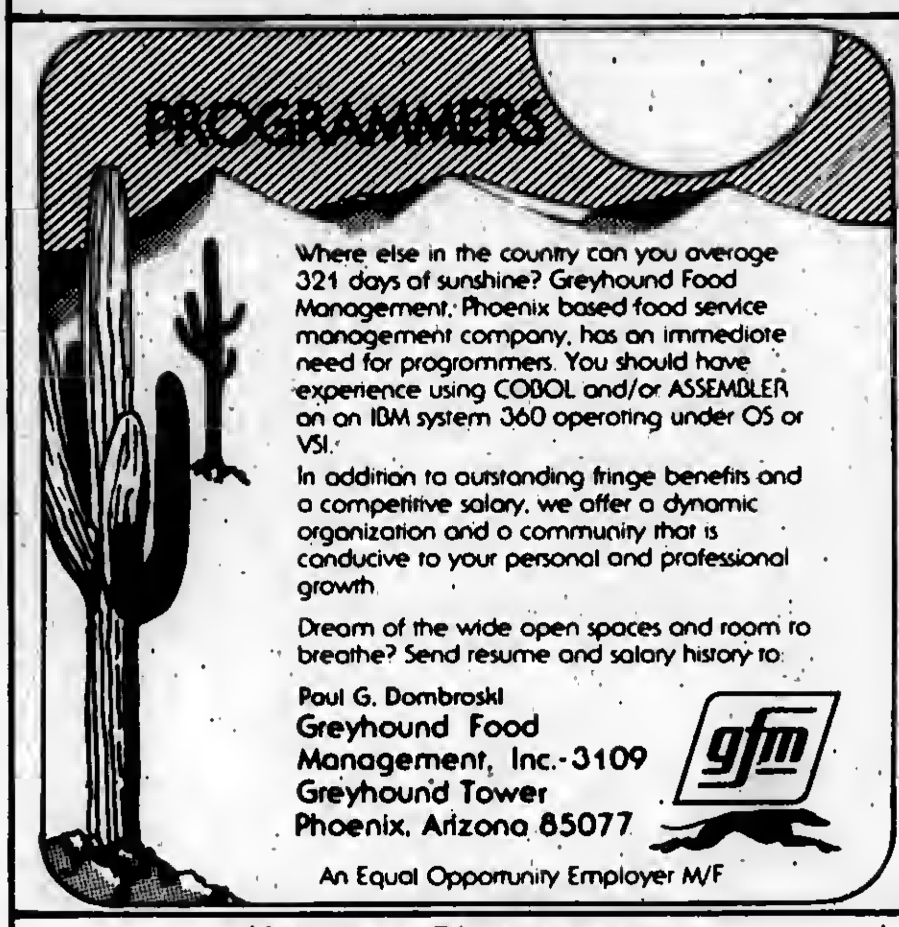
GTE International seeks Project Leaders for challenging assignments at home entertainment products factory in Sidi-bel-Abbes, Algeria.
To qualify, you should have at least 3 years experience in design, analysis and programming of systems. Knowledge of Honeywell 6000 hardware and COBOL required. IDS and IMS experience required. Candidate must have start-up experience in manufacturing systems.

Fluency in French required.

Send resume including salary history to: Personnel Dept., GTE International, 32 Third Avenue, Burlington, Massachusetts 01803.

GTE INTERNATIONAL
INCORPORATED

An Equal Opportunity Employer M/F



PROGRAMMERS

Where else in the country can you average 321 days of sunshine? Greyhound Food Management, Phoenix based food service management company, has an immediate need for programmers. You should have experience using COBOL and/or ASSEMBLER on an IBM system 360 operating under OS or VSI.

In addition to outstanding fringe benefits and a competitive salary, we offer a dynamic organization and a community that is conducive to your personal and professional growth.

Dream of the wide open spaces and room to breathe? Send resume and salary history to:

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Phoenix, Arizona 85077

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Systems Programmers

Senior & Entry Level Positions

Battelle, one of the world leaders in research and development has immediate openings in the Computer Center Software Support group.

Assignments will include the design of features for the maintenance of operating systems software for both CDC 6000/CYBER NOS/BE and DEC VAX 11/780 VMS systems.

SENIOR LEVEL

Requires a minimum of 3 years' experience with CDC operating systems in a large computer center environment; large scale PDP11 or DEC-20 experience helpful.

ENTRY LEVEL

Requires excellent academic records and references.

You'll each be participating in challenging and interesting projects and must be capable of communicating effectively with a large and diverse user population as well as demonstrated ability in assembly language and FORTRAN programming.

Battelle also has an ongoing need for Project Researchers in a number of computer-oriented disciplines. Challenging and interesting research projects are under way in computer-controlled test equipment, simulation, technical software design, analysis and engineering, microcomputers and interactive graphics.

Positions carry excellent salaries and generous benefits. Send resume in confidence to:

Leslie G. Hill, Manager, Employment

Battelle
Columbus Laboratories
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Columbus, Ohio 43201

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Sr. Prog Anal COBOL, IMS	$20K
Systems Analyst Environ t, COBOL	$20K
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Proj Leader Fortran, Basic, TSO	$22K
Prog. Analyst COBOL, OS	$14-17K
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Scien. Prog.	$15-17K

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Senior Programmer Analyst: three years experience COBOL and JCL. Using IBM 370/OS remote-batch system, converting to in-house HP-3000. $14,000-$17,000/year. Excellent fringes.

Another programming position, lower salary.

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Not coming to NCC? See us now.

Whether you make it to this years' National Computer Conference may not be really important. What IS important is your career and how you can advance it; at the show, during the show, after the show . . . or now!

If you come to the show come by and see our extensive line of computer graphic terminals systems. See for yourself why we are the undisputed leader in the marketplace: From manufacturing to marketing to service. And while you are there take some time to talk to one of our professionals about joining our team. Because of our dynamic growth we currently have openings throughout the United States for additional sales managers, sales engineers, and systems analysts. There is no better time than now to join Tektronix and perhaps for the first time in your career, get with the leader.

Don't wait for the show. Call our toll free number now, and we'll arrange a personal interview for you now, during the show, or after the show. Our current openings include:

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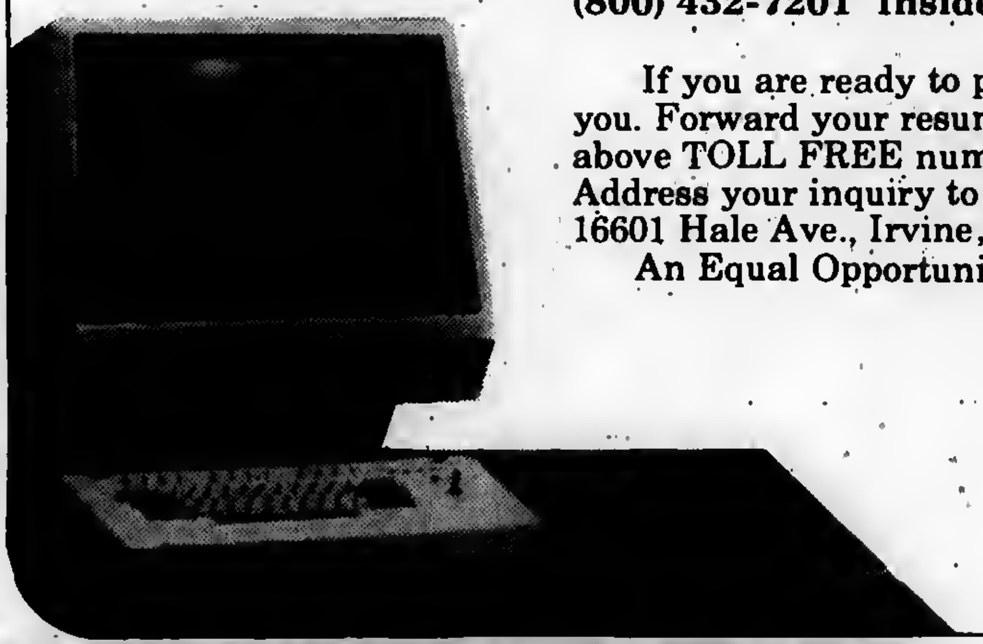

If you are ready to put your talents to work, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to Tod Sorensen, TEKTRONIX, INC., 16601 Hale Ave., Irvine, CA 92714.

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STATISTICAL COORDINATOR

The Clemson University Computer Center is seaking a Statistical Coordinator to work within its Academic Computing Support Group. This position will be responsible for evaluation, acquisition, installation, development, and maintenance of statistical software used in both batch and TSO environments. Additional responsibilities include coordinating the activities of part-time faculty consultants, supervision of documentation preparation, and development of seminars relating to statistical computing.

Applicants should possess the following qualifications;

1) Ph.D. in statistics or related field, or substantial progress toward such a degree
2) Demonstrated ability in design and implementation of statistical software
3) Working familiarity with major statistical software systems
4) Ability to communicate effectively with faculty and administrators representing a wide variaty of disciplines.
5) Knowledge of FORTRAN, PL/1, 370 BAL, OS/VS, JCL, and TSO Internals
6) Teaching and managerial experience

This job is classified as Systems Programmer II by the State of South Carolina, and has a starting salary of $15,786.

Please send resume to:

C.J. Duckenfield, Dir.
Clemson Univarsity
Computer Center
Clemson, S.C. 29631
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Affirmative Action Employer

SENIOR SYSTEMS ANALYST/ PROGRAMMER

Applicants must demonstrate the ability to confer with managers, scientists, engineers and graduate students in order to define business or scientific/engineering data processing problems, formulating statements of these problems and devising solutions. Requirements include a BS or MS degree in Science or Engineering, with a strong background in Mathematics and Statistics. Applicants should have 5-10 years computing background, including academic experience, with broad computer exposure in the areas of time sharing and batch. Experience in FORTRAN is required, PL/1 and some BAL desired. Salary open, and dependent upon qualifications and experience.

Send complete resume to:

Director of Personnel
The Institute of
Paper Chemistry
P.O. Box 1039
Appleton, Wis. 54912

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ANALYST/ PROGRAMMER

Needed Analyst/Programmer for a large-scale Massachusetts educational computer network to participate in design and implementation of administrative systems for Education - using integrated data base techniques. Requirements: Bachelor's or equivalent experience; 2-3 years experience with administrative application on a large-scale system. CDC CYBER-6000 and/or educational administration exoerience oreferred.

Please send resume to:
Joseph Yuska
MSCCN
150 Causeway St.
Boston, MA 02114

Software Technicians

MVS 168 MP enviroment

Operating Systems

Advanced technical support group seeks OS/VS systems software programmers with at least a year of experience to support and maintain current operating systems.

Teleprocessing

Progressive teleprocessing group seeks experienced TCAM/VTAM programmers to participate in development of SNA/SDLC network. At leaast one year TCAM/VTAM experience desirable.

We can offer qualified candidates a highly competitive starting salary plus comprehensive fringe benefits and attractive, modern, far northwest Chicago suburban location.

For more information or to schedule an interview please submit resume or call:

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We are an established package software comapny located in northern Indiana, 90 minutas from Chicago. Our rapid growth has created several attractive career opportunities for the right people. We offer a friendly small town lifestyla with outstanding recreational facilities available for tennis, golf, fishing, boating and numerous winter sports. We are a progressive, people-oriented organization. The positions offer excellent salaries, good benefits, flexible working hours, and exceptional advancement opportunities. Openings currently exist in:

Programming - We have several openings at varying levels. Requirements range from 0-6 years experience. Knowledge of PDP-11's, RSTS/E, BASIC-PLUS and/or accounting applications desirable. Degree a plus.

For immediate consideration, please send your resume, with salary history, references and requirements to Mr. Al Chesser, PLYCOM Services, Inc., P.O. Box 160, Plymouth, IN 46563.

Plycom services, Inc

SYSTEMS & PROGRAMMING MANAGER

We are a rapidly expanding retail chain whose corporate headquarters are located in metropolitan New Jersey. We have just completed installing a "Total Merchandising System" and are now ready to embark upon an on-line warehousing system, plus an expansion of our present P.O.S. system to capture all financial and merchandising data at store level.

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The successful candidate must have a minimum of 5 years' experience with COBOL programming techniques and the use of ISAM files in a multi-programming environment. 2 years' supervisory programming experience is also required. Experience in a retail or warehouse environment is helpful but not essential.

Comprehensive company-paid life and health insurance benefits, profit-sharing and annual bonus offered. Salary negotiable. All replies held in strict confidence. Please send resume and salary history to:

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Experienced in discovering and isolating hardware faults.

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Experienced in firmware design with a desire to grow within a dynamic department.

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Opportunity to join small group and work on real-time systems development. Should have experience in developing programs in both ASSEMBLY and FORTRAN languages, and have or seek overall systems understanding in a state-of-the-art computer manufacturer environment.

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Minimum of 1 year experience working on state-of-the-art computer hardware. You'll work closely with design engineers on advanced hardware computer design.

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Individual we seek must be familiar with both software and hardware computer fields. The successful candidate must be able to interact among hardware design engineers, software programmers and most important, our customers in day to day working environment. As project engineer, you will be responsible for customer interface from initial proposals through completion of the computer sales. Prefer 2 to 5 years experience.

SALES SUPPORT SPECIALIST

Position will provide field sales and analysis support in the operating systems area. Prefer 2 plus years experience.

FOR IMMEDIATE AND CONFIDENTIAL CONSIDERATION, please send your resume or letter of information with current salary to Mr. Frederick J. Brillante.

SYSTEMS
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This position offers an excellent salary and comprehensive benefits program.

Interested and qualified candidates should send resume, including salary history, in confidence to: S.E. Woogmester.

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University Computing Ctr.

Manager Academic User Services incl. statistical and general consulting sections. Master's deg. req'd. Must effectively communicate with faculty, staff and student users. High level computer languages and three years mgm't. exp. on large general purpose computer systems in university environments req'd. Statistical educ. and exp. highly desireable. Xerox Sigma/CP-V computer exp. desireable. Send resumes to Dr. David Vaught, Dir. Computer Services, Memphis State Univ., Memphis, TN 38152 by May 29, 1978. incl. tel. number and available times for possible telephone contact. EQUAL OPPORTUNITY EMPLOYER, M/F

DIRECTOR TECHNICAL SUPPORT

New England corp. creating executive level position for promotable DP pro to direct all tech. aspects of a lge. IBM Data Center. Indiv. must have extensive hardware/software planning, evaluation of IBM products and services. Salary to $40,000 (Fee Paid). Contact Stan Durbas, Robert Half Personnel,

ROBERT HALF
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Apply your software background to the unique and fast-paced environment of Ink-Jet.

Mead Digital Systems, a recognized leader in the development and commercialization of ink-jet imaging offers the exceptional individual the opportunity:

- **To develop and lead software products through conceptualization to the marketplace.**
- **For unusually attractive professional growth.**
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To meet the challenge of these opportunities, your applications experience must include any three of the following:

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- **A minimum of two years writing ASSEMBLER and FORTRAN programs.**
- **Mini-computer experience, preferably with Interdata, desirable.**
- **Developing software and font designs for digital type composing machines.**
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Although we're part of the $1.8 Billion Mead Corporation, our small group offers the opportunity to start at ground level with full support - and move up rapidly into advanced technical or management positions. Highly competitive salary and comprehensive benefits.

Your contributions and abilities will be evaluated carefully and fully recognized. Please forward detailed resume in confidence to: Manager, Professional Employment. No agencies, please.

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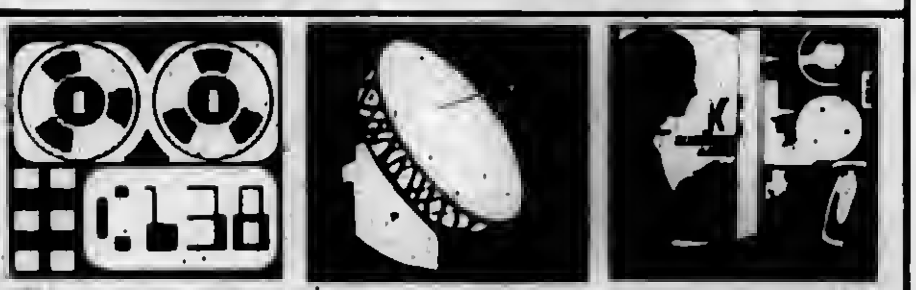

Computer Scientists & Software Engineers

Would you like to be a contributor at one of the San Francisco Bay Area's fastest growing software systems developers? Are you one of those especially talented individuals who relishes the challenge of solving complex problems, who wants to stay on the forefront of technology, who uses structured design and implementation methods, and who would like to work in an environment where you experience in one or more of the following areas would be recognized and put to immediate use?

- **UNIX-based software engineering**
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  - **Distributed data base management systems**
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  - **Local network architectures**
  - **Network protocols (ARPAnet, EtherNet)**
- **Reliable systems technology**
  - **Formal specification and program verification**
  - **Secure systems technology**
- **Microprocessor systems architecture**
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- **Communications systems**
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If you have a BS, MS, PhD or equivalent experience in one or more of the areas listed above, please send us a copy of your resume in confidence - or call toll free (800) 227-8433. If you qualify for one of our select positions, you will receive the professional recognition you deserve, excellent compensation, and one of the best fringe benefit packages in the country. Refer to Professional Employment, Dept. PF-52.

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SYSTEMS ANALYST

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Excellent opportunity for experienced Analyst/Programmer to join our REGIONAL SUPPORT GROUP. You will provide technical advice and consultation to our NCR District offices and customers. Your responsibilities will range from fault resolution to systems design and configuration. Our comprehensive training program will complement your current capabilities.

We offer competitive salary and comprehensive employee benefits. If you have a degree and are looking for a rewarding career move, contact us today for confidential consideration.

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(301) 948-9269 or 948-4700

Or send resume to NCR Corporation, 2301 Research Blvd., Rockville, MD 20850, Attn: Field Support.

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Complete Computer Systems

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MAJOR EXPANSION...
INFORMATION SYSTEMS

Outstanding career opportunities in manufacturing, distribution and financial systems.

PROJECT LEADERS & MANAGERS
SENIOR SYSTEMS ANALYSTS
SENIOR PROGRAMMER ANALYSTS
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We are the systems planning and development department of one of the world's leading consumer products corporations based in New York City. Our expansion affords exceptional opportunities for experienced skilled systems and programming professionals anxious for the challenge and reward associated in the implementation of enhanced systems to support the management of the business.

If you have worked on manufacturing, distribution or financial systems in a major corporation and have had experience in implementing any of the following applications: General ledger, materials requirement planning, accounts receivable, production scheduling, raw material inventory control, and forecasting . . . we can offer you:

- *The challenge and responsibility of creative original systems and program design & implementation*
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If you are interested, let us hear from you. Send resume or letter describing your background, accomplishments and salary history to:
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The Technical Services Division of Sperry Univac designs and develops advanced software systems. We enjoy an enviable record of accomplishment end a reputation for producing high quality software. Our success is due to our highly talanted and innovative professional staff. We are seeking top-notch software specialists who feel they cen contribute in any of the following arees:

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SYSTEMS & PROGRAMMING MANAGER

Idaho based Statewide Educational Planning and Reporting System (SEPARS) needs Systems & Programming Manager. Plans, organizes, directs and controls systems and programming activity. Over 50 public school districts utilizing the service. SEPARS also provides service the the State Department of Education, Vocational Education, and the State Board of Education. Applicant should have bachelors degree. Prefer over five years data processing experienca with at least two in management.

Boise, Idaho is the capital of Idaho. It has an excellent climate and a variety of cultural and recreational opportunities.

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Position requires a B.S. degree, six to eight years DP experience, two years of project supervision with three to five years comprehensive expertise in payroll/personnel system applications. Large scale mainframe, data base and online experience is also required.

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Your 5 plus years as a systems analyst and programmer should have given you a broad based knowledge of System 3, RPG II, CCP, and TOTAL, and the ability to communicate this knowledge to others. Responsibilities of this position will include research directed toward establishing corporate-wide standards and policies, training, and planning, programming testing, and implementing computer programs of general utility to the company.

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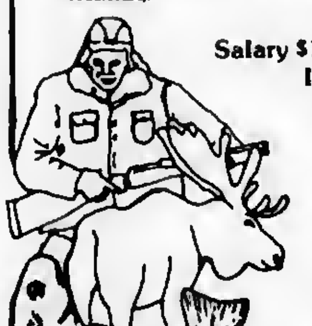

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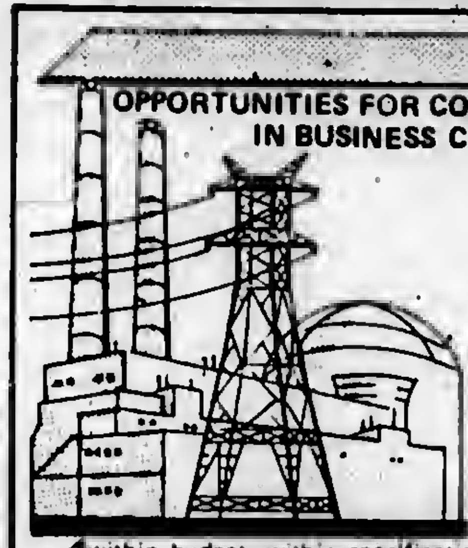

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You will be responsible for developing workload systems to provide a basis for controlled computer system measurement and evaluation. You will work with a team of professionals doing research of computer system workload classification, analysis, creation and synthesis. MVS or related systems experience is necessary, and a familiarity with online and database system exercisers is desirable. Please indicate 4922-E on your response.

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The Las Vegas Operations of **EG & G, Inc.**, a dynamically diversified technological corporation broadly based in the electronics industry, currently has openings for Systems Applications Programmers with recent experience in real-time, mini-computer based data acquisition and control systems. Positions require technical degree and a minimum of two years experience in programming and software planning or analysis at the systems level. Familiarity with DEC PDP-11 operating systems is a definite plus.

Major responsibilities will be problem definition, specification and design of system and application level software for a multi-computer data acquisition network. These duties will be performed in conjunction with project management which coordinates problem statements and proposed solutions. Other responsibilities will include some implementation and coding, software verification and providing technical assistance to a variety of software design efforts.

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Employment Branch (CW-0043)
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Knoxville, Tennessee 37902

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To inquire, send resume, including salary history, or call:
Ken Loomis, Information Systems Division Personnel
The Stop & Shop Companies, Inc.
P.O. Box 369, Boston, MA 02101 (617) 463-4546

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The emphasis is on management and administrative skills, attitudes and orientation.

In a location overlooking San Francisco Bay, a group of department heads, a member of the Board of Supervisors, and the management consulting team of Jan and Paul Weber met recently to define the qualifications for a very special person: the Director of a new Information Services Department for Alameda County.

This new Department will play a major role supporting the delivery of criminal justice, welfare, health care, and other essential services to over one million people. It will combine the existing centralized Data Processing Center with a new Information Management Division, which will coordinate Countywide distributed systems, data bases, standards and training.

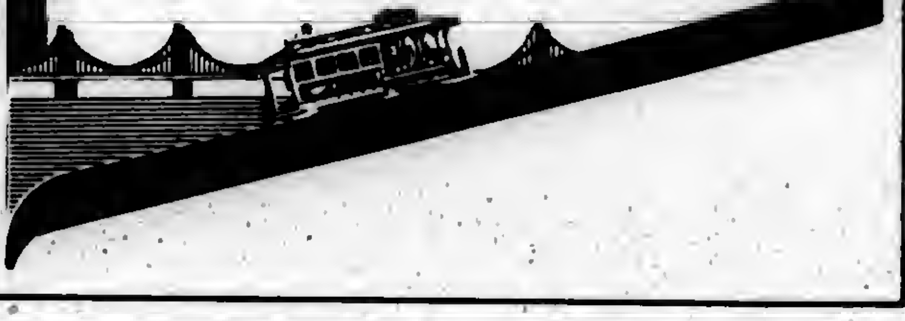
The Department's budget of ten million dollars will include a staff over over 200, two 370/158's and a 370/155 serving more than 600 terminals in eight Bay Area counties. Distributed equipment will incude twelve minicomputers, and more installations are planned.

Alameda County is located in a lively, beautiful, varied area of great culture, climate, history and dynamic change. It encompasses thirteen cities, including Berkeley, site of the University of California.

To meet the challenge of this position, the Director of the Information Services Department must have strength, intelligence and a flexible, innovative approach; be a good listener and an articulate, dynamic communicator; display and inspire trust; have a broad management background including data processing; work effectively in County government; understand current issues and future trends of this technical field; have a service philosophy and be able to instill it in others; be able to attract, select, and retain quality personnel; and be committed to affirmative action.

The position offers great challenge and equally great potential for success. Over a year of studies has set the stage for creating the Information Services Department on July 1, 1978. The Director should be aboard soon thereafter to take charge of the new Department and oversee the selection of an Assistant Director for the new Division. Recognizing the need for an exceptional individual, the County is offering a salary negotiable to $45,000 and an extensive package of management benefits.

If you feel that you are this special person and that this challenging position will provide you with the growth and job satisfaction you are looking for, act now. Mail your resume to Tom Duncan, Alameda County Personnel, 1221 Oak St., Oakland, CA 94612. Or call him at (415) 874-7111. Alameda County is an Equal Opportunity/Affirmative Action Employer.



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This position is at Corporate Headquarters, Fremont, Michigan, and involves less than 25% travel. The company utilizes a 370/148 in communication with System 3 computers at plants throughout the United States.

Please send your resume in confidence to:
Stan M. Houck
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PROGRAMMERS

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The University of Kansas Academic Computer Center seeks a qualified person as a full-time Communications Programmer. Primary responsibilities include: programming mini-computers to support remote access to a Honeywell 66/60; data communications consulting and problem diagnosis. Salary $13,500 to $14,500 depending on qualifications and experience. Submit resume to David L. Nordlund, Assistant Director, P.O. Drawer 2007, University of Kansas, Lawrence, Kansas 66045 on or before June 5, 1978.

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BALTIMORE, MD 21304 — R. Nelsen, 409 Washington Ave., 301/296-4500
CHARLOTTE, NC 29202 — J. Schwab, 1742 South Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Rd., 319/749-6030
FORT LEE, NJ 07024 — R. Mansfield, 2135 Center Ave., 201/947-6920
MCLEAN, VA 22101 — G. Nugent, 7931 Jones Branch Dr., 703/790-1335
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PITTSBURGH, PA 15222 — J. Beck, 4 Gateway Ctr., 412/232-0410
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PROGRAMMER ANALYST

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Excellent compensation package in addition to a complete benefit program. You are invited to send a resume of your professional qualifications, including salary history to Kathy Warehime:

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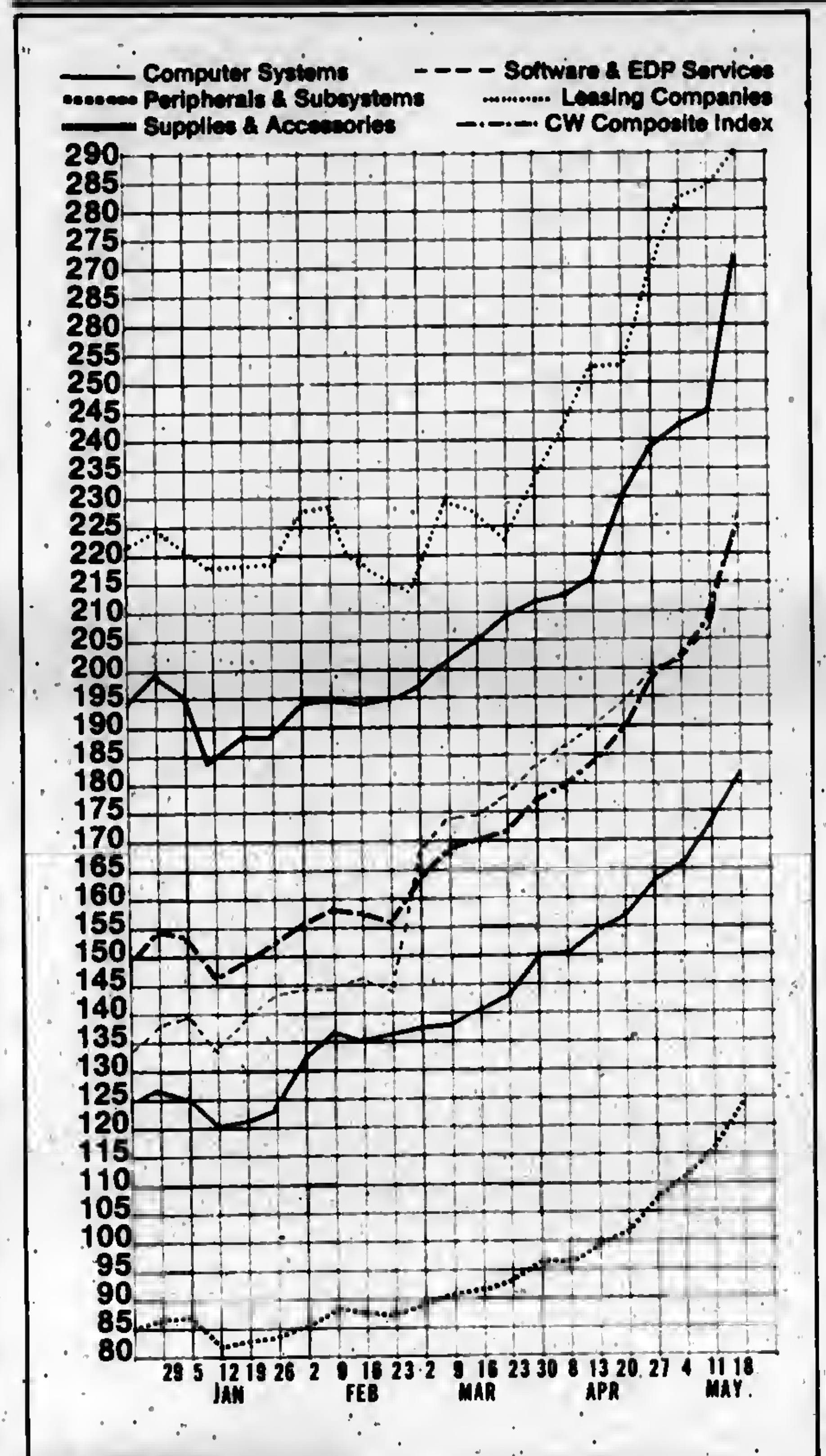

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Year Ended Feb. 28

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Shr Ernd	$1.88	e$1.41
Revenue	48,893,000	41,703,000
Earnings	3,858,000	3,222,000
3 Mo Shr	.48	e.37
Revenue	13,019,000	10,663,000
Earnings	1,077,000	844,000

e-Adjusted for a stock dividend in November 1977.

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Three Months Ended March 31

	1978	1977
Shr Ernd	$.29	$.28
Revenue	0,113,749	7,383,825
Tax Cred	....	493,785
Earnings	1,074,930	981,024

RAPIDATA
Three Months Ended March 31

	1978	1977
Shr Ernd	$.16	$.09
Revenue	4,805,301	4,414,961
Earnings	316,868	167,199

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Three Months Ended March 31

	1978	1977
Shr Ernd	$.33	e$.28
Revenue	14,070,302	10,313,631
Earnings	1,979,172	1,549,703

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Three Months Ended March 31

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Earnings	1,119,100	701,500
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Revenue	18,318,900	12,975,000
Earnings	2,442,300	1,489,800

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Three Months Ended April 2

	1978	1977
Shr Ernd	$.57	$.30
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Tax Cred	....	150,000
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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 17, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977-78 RANGE ($)	CLOSE MAY 17 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 56	34 1/8	+5 3/4	+20.2
N	BURROUGHS CORP	35- 91	73 5/8	+3 3/8	+8.2
O	COMPUTER AUTOMATION	18- 33	34 1/2	+3	+9.3
N	CONTROL DATA CORP	20- 33	32 1/2	+1 1/2	+4.8
O	CRAY RESEARCH INC	15- 46	45 3/4	+1 1/4	+2.8
N	DATA GENERAL CORP	35- 59	58 1/2	+3 1/4	+9.8
N	DATAPOINT CORP	18- 36	53 3/4	+4 3/8	+8.8
N	DIGITAL EQUIPMENT	37- 33	49 1/4	+2 1/4	+4.7
N	ELECTRONIC ASSOC.	2- 8	7 3/4	+2 1/2	+47.6
A	ELECTRONIC ENGINEER.	8- 17	16 3/8	+ 1/8	+0.7
O	FOUR-PHASE SYSTEMS	13- 32	31 3/4	+3 1/4	+11.4
N	FOXBORO	28- 54	36 1/8	+3 1/8	+9.4
O	GENERAL AUTOMATION	6- 10	9 3/4	0	0.0
O	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	62- 87	81 3/8	+7 3/8	+9.9
N	HONEYWELL INC	43- 58	38 1/8	+6 1/8	+11.7
N	IBM	236-286	266	+6 1/4	+2.4
O	MANAGEMENT ASSIST	5- 18	18	+2	+12.5
O	MICRODATA CORP	7- 18	14 1/4	+1 1/4	+9.6
O	MINI-COMPUTER SYST	5- 12	8	+1	+14.2
C	MODULAR COMPUTER SYS	5- 13	14 1/2	+2	+16.0
N	NCR	32- 57	56 1/2	+5	+9.7
O	PRIME COMPUTER INC	12- 39	39 1/8	+3 3/8	+9.4
N	PERKIN-ELMER	17- 29	23 1/8	+2 1/4	+10.7
N	RAYTHEON CO	16- 47	45 5/8	+3 1/4	+7.6
N	SPERRY RAND	30- 44	43 7/8	+4 1/8	+10.3
O	SYCOR INC	8- 24	23 7/8	+1 3/4	+7.9
A	SYSTEMS ENG. LABS	3- 19	18 5/8	+2 7/8	+18.2
A	WANG LABS.	10- 23	23	+4 5/8	+23.1

LEASING COMPANIES

EXCH		1977-78 RANGE ($)	CLOSE MAY 17 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	5 7/8	0	0.0
C	BOOTHE COURIER CORP	8- 16	18 1/4	+1 3/8	+9.7
C	COMDISCO INC	9- 17	13 1/4	+ 3/4	+5.1
A	COMMERCE GROUP CORP	1- 3	7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	7/8	0	0.0
N	DATRONIC RENTAL	0- 2	1 3/8	- 1/4	-13.3
A	DCL INC	1- 4	4	- 1/8	-3.0
N	DPF INC	6- 12	11 5/8	+ 1/4	+2.1
N	ITEL	13- 27	26 3/4	+2 3/8	+9.7
N	LEASCO CORP	19- 34	32 3/8	+ 1/8	+0.3
O	LEASPAC CORP	1- 2	1 7/8	+ 1/4	+15.3
A	PIONEER TEX CORP	5- 11	5 3/4	- 1/8	-2.1
N	U.S. LEASING	10- 16	15 1/4	+ 3/8	+2.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
($) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		1977-78 RANGE ($)	CLOSE MAY 17 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 1/8	+ 1/8	+12.3
O	AMACOMP INC	7- 14	13 7/8	+2 3/8	+23.3
A	APPLIED DATA RES.	3- 14	13 1/2	+2	+17.3
N	AUTOMATIC DATA PROC	23- 31	31 1/4	+1	+3.3
O	COLEMAN AMERICAN COS	1- 2	1 1/2	0	0.0
O	COMPU-SERV NETWORK	7- 13	11	+2 1/4	+23.7
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
C	COMPUTEX HORIZONS	1- 2	2 1/4	0	0.0
C	COMPUTEX NETWORK	6- 11	10	+ 3/8	+6.6
N	COMPUTER SCIENCES	7- 12	11 3/4	+ 5/8	+3.6
O	COMPUTER TASK GROUP	1- 2	3 1/4	+ 1/2	+18.1
O	COMPUTER USAGE	1- 4	3 1/2	+ 1/8	+3.7
O	COMSHARE	3- 15	13	+3	+23.0
O	DATA DIMENSIONS INC	3- 3	4 5/8	+1 1/8	+32.1
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 23	21 1/2	+2 3/8	+13.9
O	INSYTE CORP	2- 3	1 1/8	- 1/8	-10.0
C	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 5/8	0	0.0
O	KEYDATA CORP	1- 3	2 1/4	+ 3/8	+20.0
A	LOGICON	7- 17	14 1/4	0	0.0
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 23	23 1/4	+4	+18.8
O	NATIONAL DATA CORP	4- 12	12	+1 1/4	+11.6
A	ON LINE SYSTEMS INC	16- 23	24 1/2	+1	+4.2
N	PLANNING RESEARCH	3- 7	7	+ 1/8	+1.8
O	PROGRAMMING & SYS	1- 1	1	+ 1/4	+33.3
O	RAPIDATA INC	2- 3	4 3/4	+ 3/8	+8.5
O	REYNOLDS & REYNOLDS	17- 26	26	+3 1/4	+14.2
O	SCIENTIFIC COMPUTERS	1- 4	5 5/8	+ 1/8	+2.2
O	TYMSHARE INC	14- 27	26 7/8	+3 7/8	+16.8
A	URS SYSTEMS	4- 7	6 3/8	+ 3/8	+6.2
N	WYLY CORP	1- 3	3 1/4	+ 1/4	+3.0

PERIPHERALS & SUBSYSTEMS

EXCH		1977-78 RANGE ($)	CLOSE MAY 17 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 24	23 7/8	+2 3/8	+12.3
C	ADVANCED MEMORY SYS	7- 14	14 3/8	+2	+16.1
N	AMPEX CORP	8- 16	13 1/4	+ 3/4	+3.1
O	ANDERSON JACOBSON	3- 8	7 1/4	0	0.0
N	APPLIED DIG DATA SYS	10- 20	16 1/8	+1 3/4	+12.1
O	BEEHIVE INT'L	3- 12	3 7/8	- 3/8	-6.0
A	BOLT, BERANEK & NEW	6- 10	9 3/8	+1 1/2	+19.0
N	BUNKER-RAMO	8- 17	16 3/4	- 1/8	-0.7
A	CALCOMP	3- 8	8 3/8	+1	+13.5
O	CAMBRIDGE MEMORIES	1- 6	6 1/8	+1 1/8	+22.5
N	CENTRONICS DATA COMP	16- 30	25 3/8	+4 1/8	+19.4
C	COGNITRONICS	1- 1	1 1/4	+ 3/8	+33.7
O	COMPUTER COMMUN.	3- 9	9 3/8	+ 7/8	+10.0
O	COMPUTER CONSOLES	4- 7	6 1/2	+ 1/4	+4.0
A	COMPUTER EQUIPMENT	2- 6	3	0	0.0
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
C	COMTEN	9- 22	20	+ 1/8	+0.6
N	CONRAC CORP	19- 28	23	+1 1/2	+6.3
O	DATA ACCESS SYSTEMS	4- 5	4 1/2	0	0.0
O	DATA 100	6- 17	16 3/4	0	0.0
A	DATA PRODUCTS CORP	9- 20	19	- 1/8	-0.6
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 4	4	+ 1/8	+3.2
O	DECISION DATA COMPUT	2- 3	2 3/4	+ 5/8	+29.4
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 19	18 7/8	+1	+3.3
O	DATARAM CORP	2- 24	24	+4 1/2	+23.0
M	ELECTRONIC M & M	4- 7	7 1/4	+1 5/8	+28.8
O	FABRI-TEK	1- 2	1 1/4	-	-4.3
O	GENERAL COMPUTER SYS	0- 2	1	0	0.0
N	HAZELTINE CORP	8- 13	13	+1	+7.1
N	HARRIS CORP	28- 38	38 3/8	+3 3/8	+10.1
O	INFOREX INC	4- 9	9 1/4	+ 7/8	+10.4
O	INFORMATION INTL INC	8- 14	9 3/4	0	0.0
O	INTEL CORP	38- 39	58	+5	+9.4
A	LUNDY ELECTRONICS	3- 6	3 1/4	- 3/4	-18.7
O	MSI DATA CORP	6- 19	16 5/8	+1 3/8	+7.9
N	MEMOREX	23- 47	47 1/4	+3 3/4	+8.6
N	MOHAWK DATA SCI	5- 12	12 1/4	+2 3/8	+24.0
O	PENRIL CORP	2- 9	8 3/4	+ 1/4	+2.9
N	PERTEC CORP	7- 14	13 3/8	- 1/4	-1.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 3	3 3/8	0	0.0
O	RECOGNITION EQUIP	6- 10	9	+ 3/8	+4.3
O	SCAN DATA	1- 4	3 3/8	- 1/8	-3.5
O	STORAGE TECHNOLOGY	10- 39	39	+ 3/4	+1.9
O	T BAR INC	7- 19	13 3/4	-1 1/2	-8.6
O	TALLY CORP.	4- 9	8 3/4	- 1/4	-2.7
A	TEC INC	6- 10	7 7/8	0	0.0
N	TEKTRONIX INC	29- 44	44	+3 3/8	+8.3
N	TELEX	2- 6	6	+1 1/8	+23.0
O	TESDATA SYSTEMS CP	13- 20	19	+ 1/2	+2.7
O	WILTEK INC	1- 1	3/8	+ 1/8	+23.0

SUPPLIES & ACCESSORIES

EXCH		1977-78 RANGE ($)	CLOSE MAY 17 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	9 1/4	+ 7/8	+10.4
O	BALTIMORE BUS FORMS	1- 4	3 1/2	0	0.0
A	BARRY WRIGHT	10- 25	24 3/4	+2 3/8	+11.8
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 25	23	+1 5/8	+6.9
N	ENNIS BUS. FORMS	6- 13	14 3/4	+ 3/8	+2.6
N	3M COMPANY	43- 36	33 3/8	+3 7/8	+7.3
C	MOORE CORP LTD	24- 37	32 1/4	+3 3/4	+13.1
N	NASHUA CORP	16- 31	30 7/8	+2 1/4	+7.8
O	STANDARD REGISTER	18- 26	24 3/4	- 1/2	-1.9
O	TAB PRODUCTS CO	8- 19	10 5/8	- 3/4	-6.5
N	UARCO	18- 27	26 7/8	- 1/8	-0.4
A	WABASH MAGNETICS	10- 13	13 1/2	+ 3/8	+4.8
N	WALLACE BUS FORMS	17- 24	23 3/8	+ 1/8	+0.5

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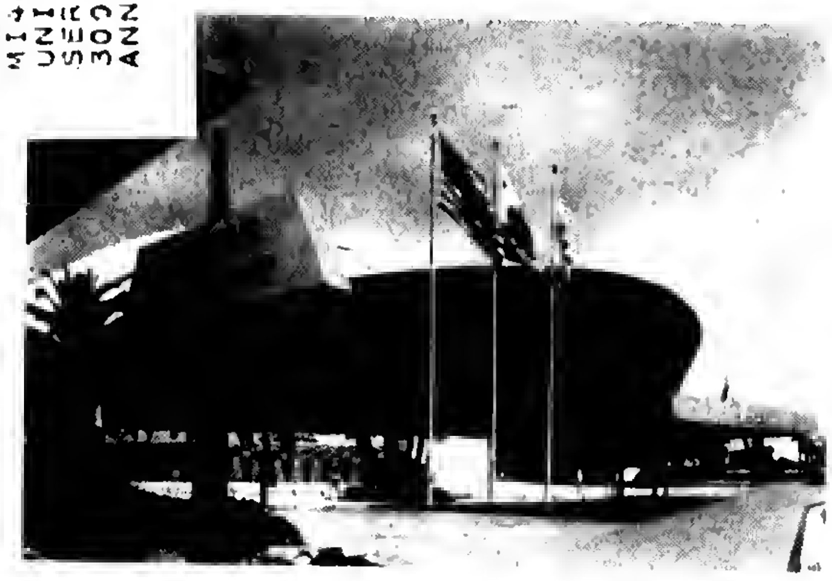
ɔther Record-Setter



ANAHEIM, Calif. — The largest exhihit of computer equipment ever assembled in the U.S. — and probably the world — will open here next week as the 1978 National Computer Conference begins on June 5 for four days.

A record-setting audience of more than 40,000 is expected for the show.

A preview of events, the session schedule, exhibits and after-the-show attractions here and in the surrounding area begins after Page 54.

In the main exhibit area, 353 companies will he displaying equipment in 1,401 booths — an increase from the 317 companies displaying equipment in 1,140 booths at last year's up-until-now record-setting exhibit.

And in addition to the main exhibit in the convention center, another 110 companies will occupy 141 booths at the Personal Computing Festival that will run concurrently at the Disneyland Hotel here, boosting the total numher of exhibitors to 463 in 1,542 booth spaces.

In the 107 sessions of the technical program area, the focus will be on computers and energy and other computer application areas, in addition to subjects ranging from artificial intelligence to computer crime and privacy.

A fee of $75 entitles an attendee to four days of conference sessions, four days on the exhibit floor and a copy of the proceedings. For $25, an attendee can get a one-day shot at the exhibit and attend any of that day's conference sessions or get a four-day admission ticket to the exhibit.

A one-day ticket to see the exhibits costs $10. A ticket to the Personal Computing Festival costs $9 for three days or $5 for one day and can be applied to any of the NCC registration plans. Students get the whole package for $10.

Churches Hit IBM Inaction On Rights in South Africa

By E. Drake Lundell Jr.
CW Staff

NEW YORK — IBM's policy of not selling computers for applications that abridge human rights is "hardly worth the paper it is written on," according to church-related groups protesting the use of computers in such applications.

At the same time, it appears that in at least one case IBM may be skirting — but not breaking — U.S. government regulations against the export of computer equipment or service to the military and police in South Africa.

Although the firm has stated in principle that it will not knowingly bid on equipment for repressive applications, "We're skeptical about how serious IBM is in applying those principles," Tim Smith of the Interfaith Center on Corporate Responsihility (ICCR) said here.

That skepticism was fed particularly by a meeting hetween church groups and IBM top management at which IBM management said it would continue to service computer systems installed in the South African Department of Defense.

In addition, *Computerworld* has learned that the Computer and Business Equipment Manufacturers Association (Chema) — with IBM as the largest member — lohbied against adoption of regulations that might have slowed IBM's and other memhers' trade even hefore the han was imposed.

The specific U.S. government regulation IBM may be skirting is a supplement to the Export Administration Regulations (No. 175) issued on Feb. 16. It was enacted to bring the U.S. in line with United Nations resolutions on trade with South Africa.

The regulation "imposes an embargo on exports and reexports of U.S.-origin commodities . . . for use by military or police entities of the Republic of South Africa and Namibia" and was issued "in order to further U.S. foreign policy regarding the preservation of human rights," according to the Commerce Department.

The regulation also clearly states that "this includes the export and reexport of commodities and technical data to service equipment owned, controlled or used hy or for" the police and/or military in South Africa

Despite these regulations,

(Continued on Page 4)

Communications Bill Ready for June Debut

By Ronald A. Frank
CW Staff

LAS VEGAS — A rewritten version of the Communications Act of 1934 will be introduced in Congress early this June hy the House Suhcommittee on Communications.

Word that a draft of the bill would be unveiled soon came from Harry Shooshan, chief counsel of the suhcommittee, in a speech at the recent annual conference of the International Communications Association (ICA) here.

After the proposed legislation is introduced, hearings will probably begin in July, and it is expected that a final communications bill will be introduced in Congress sometime during January, Shooshan told the conference attendees.

Although he declined to discuss the specifics of the legislative proposal, the House counsel described it as being "deregulatory" in nature.

During its 18 months of work on the hill, the subcommittee recognized that the Federal Communications Commission should be given "great discretion" and, at the same time, more direction, he said.

While ICA was meeting here, Rep. Lionel Van Deerlin (D-Calif.), chairman of the suhcommittee, told a meeting of the American Electronics Association in Washington, D.C., that he personally favored including a provision in the revised act that would require AT&T to divest itself of Western Electric Co., its manufacturing suhsidiary.

A suhcommittee spokesman stressed that Van Deerlin was giving his personal views and, until the hill is unveiled in June, it will not be certain whether this requirement for divestiture will be favored

(Continued on Page 6)

Input Chief Charged With Theft

By Brad Schultz
CW Staff

HAWTHORNE, Calif. — The computer input operations supervisor for the county welfare district office here has been charged with using the department's computer system to steal more than $23,000 in public funds.

George Soto Vega allegedly fed false data to the Los Angeles County Department of Public Social Services (DPSS) computer system, causing the system to generate welfare checks payable to him and at least two accomplices.

Because of the embezzlement, the DPSS is beefing up its system security, converting to a new CPU and implementing a number of new security procedures, a DPSS internal affairs source stated.

Vega allegedly sent checks totaling $8,025 to himself, $10,760 to another person and $5,040 to a third person from January through March, according to Lt. Ed Alec of the Los Angeles district attorney's office. The checks were made out in amounts ranging from less than $300 to $585, Alec said. About $13,000 of the missing funds have been recovered.

Vega's purported scheme involved manipulation of public assistance case data input at the Hawthorne DPSS district office. Public assistance cases originate at DPSS district offices, where relevant data is accumulated on cassette tapes using Sycor, Inc. terminals. This data is then transmitted to a Honeywell Information

(Continued on Page 6)

Canada Curbing All Foreign Labor

By Don Leavitt
CW Staff

OTTAWA — In a move to improve the employment possihilities for its own citizens, the Canadian government recently limited the ability of non-Canadians to accept even temporary work in this country without what may be a long waiting period.

Under the 1976 Immigration Act and related regulations, foreign workers must have government authorization before starting work here. This requirement applies no matter how short the proposed work; even a half-day effort by a non-Canadian, if paid for by a Canadian firm, would require a work permit, a spokeswoman noted.

Although many DP assignments are long-term and therefore subject to other rules, independent consultants, systems engineers and trainers typically work on short-term projects and their activities could be sharply impacted hy the new regulations.

Very sharply impacted indeed. Hank Calero, a lecturer for New York-hased AMR International, for example, was within two hours of finishing a two-day seminar in Vancouver in early April shortly after the regulations went into effect. Immigration officials interrupted his presentation, questioned him and made him leave the country when he

(Continued on Page 6)

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Act Termed 'Indiscretion'

Sleuth Gets Canadian Crime Data

By Brad Schultz
CW Staff

OTTAWA — Civilian employees of the Ottawa Police Department gave confidential criminal history information stored in the Canadian Police Information Centre (CPIC) network to a private investigation agency, the Ontario Police Commission (OPC) has found.

The agency — Universal Investigations Services Ltd. — was used by the Hudson's Bay Co., a Canadian department store chain, to screen applicants for "high-risk security jobs."

The CPIC network, similar to the U.S. Federal Bureau of Investigation's National Crime Information Center, is accessed by virtually all municipal police departments in Canada. The OPC oversees its use in Ontario.

No prosecutions are expected in this case. In the OPC's opinion, no municipal, provincial or federal laws were violated. OPC's chairman; Judge Tom Graham, called the affair simply an "indiscretion."

Local Matter

Since the action occurred at the municipal level, the Canadian federal privacy act was not violated. That law applies only to abuse of data managed by federal government institutions, a spokesman at the Canadian Ministry of Justice explained.

Hudson's Bay management did not know CPIC was used to screen its job applicants, according to the firm's general manager, Blair Bustard. The retail store chain ended its relationship with Universal when police inquiries began, he added.

A Universal spokesman said his firm will not discuss the matter with the press.

The Royal Canadian Mounted Police (RCMP) reportedly began an investigation on a tip from a Hudson's Bay security section employee. The employee, Rosemary Morgan, submitted five fictitious names to Universal with the secret approval of the RCMP, according to one source.

The RCMP later found two of the false names in CPIC files used by the Ottawa police, the source said. Personnel had already started checking out those names on the network.

Morgan "abruptly quit" her position after the RCMP interest became known, according to another source.

Question of Intent

CPIC terminals are the responsibility of local chiefs of police, OPC's Graham stated, adding it is illegal for anyone to access the network without a police chief's authorization.

The OPC concluded that certain persons did access CPIC without authorization but it found no grounds for prosecution. The parties involved mistakenly thought they were doing the right thing, Graham said.

The OPC review focused on the intent of the individuals involved. The commission found that no one was paid to transfer the information to Universal.

In such reviews, the question of intent and the relative significance of the data abused are critical to establishing culpability, the Ministry of Justice spokesman explained.

Workers in U.S. Agencies Would Have Met Worse Fate

WASHINGTON, D.C. — Civilian employees of the Ottawa Police Department who turned over criminal history information to a private investigation agency are going unpunished. If those employees had been working for a U.S. law enforcement agency, their fate would have been far different.

A U.S. law enforcement agency that gave criminal history information from the FBI's National Crime Information Center (NCIC) network to the private sector for job applicant screening purposes would be in violation of federal law, according to the director of the NCIC, Frank Buell.

Under U.S. Public Law 92-544, a law enforcement agency may only provide NCIC criminal histories to other government bodies, such as licensing agencies. However, even this is prohibited unless specifically authorized by a state statute, which must be approved by the U.S. Attorney General, Buell said.

In a sense, licensing agencies may operate as intermediaries for private firms or organizations by using their authorized NCIC access to inquire whether an individual is subject to arrest or an obvious security risk, Buell indicated. But a criminal history itself may not pass from the NCIC to the private sector via any intermediary whatsoever, he said.

Criminal histories derived from local sources are not subject to 92-544, although state laws do provide similar constraints, Buell noted. A municipal police department might provide a history to a local barber licensing agency without violating federal law, although such an action might well violate state law, he explained.

There are no criminal sanctions for an individual violating 92-544, but the enforcement agency for which that person worked would suffer disenfranchisement from NCIC services until he was removed, Buell said.

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U.S. Firms in South Africa Boast 'Affirmative Action'

PHILADELPHIA — When discussing business in South Africa, many companies note they are following a six-principle Affirmative Action program for their employees there.

The program, developed by the Rev. Leon Sullivan of the Zion Baptist Church here, is followed by IBM and NCR Corp. as well as by other computer industry firms which are among the 55 U.S. companies in the program — out of a total of 375 US. companies doing business in South Africa.

The problem with the six principles, according to Tim Smith of the Interfaith Center on Corporate Responsibility, is that while they do improve the lot of blacks and others employed by the firms doing business in South Africa, they "completely ignore" the larger issue of white minority domination in that country and a social system that allows that minority to keep the black majority in subjugation.

The six principles require the firms to prohibit segregation in eating and work facilities; institute equal and fair employment practices; pay equally; initiate training programs that will prepare blacks and other nonwhites for supervisory positions; increase the number of blacks in management positions; and try to improve the quality of employees' lives outside the work environment.

IBM, for example, has 100 black employees out of a work force of 1,100 in South Africa, Smith indicated, and better working conditions for them will have little effect in the country where 18.6 million blacks are ruled by 4.4 million whites.

Furthermore, the six principles "totally ignore" the question of to whom equipment is being sold and how it is being used, Smith said.

In the past, U.S.-based groups supporting the black liberation movement in South Africa have contended that computers are being used by apartheid supporters to "find automated solutions (consistent with white control)" to take the pressure off the need for skilled workers so that South African business will not have to train and advance blacks they employ.

As early as late 1971, the American Committee on Africa charged that "computers can do more than any other technique to enable apartheid to survive; computer methods allow the economy to run with a minimum of skilled workers, methodically reducing the economic pressure that was beginning to force training and upgrading on the job for black workers."

Ban Affects Only IBM

By Marcia Blumenthal
CW Staff

IBM is apparently the only mainframe computer maker affected by the Carter Administration's ban on servicing equipment installed in military or police applications in South Africa.

In fact, at least one other mainframer is working with church groups to avoid installing systems that might aid repression.

Control Data Corp. presently has no computers installed with the police and military, and officials at the Interfaith Center on Corporate Responsibility said CDC was discussing possible new accounts in the country before signing orders.

NCR Corp. does have a 399 electronic accounting machine installed at the Armaments Board in South Africa, but said the question of service has not arisen.

Amdahl Corp. said it did not do business with South Africa, and Honeywell Information Systems, Inc. said it had no computers installed in South Africa at all, having stopped marketing there in 1976.

Both Burroughs Corp. and Univac also said they had no computers installed in military or police applications in that country.

Groups Attack IBM Inaction on Rights

(Continued from Page 1)

however; Smith said that during the meeting In April, IBM officials indicated they would continue to service the systems — reportedly a 360/40, a 370/145 and a 370/158 — the firm has installed in the South African Department of Defense.

Other reports in the British publication *Computer Weekly* quoted Jack Clarke, the head of IBM South Africa, as indicating that service would continue "on a restricted basis" using stocks built up in South Africa, despite the Carter Administration ban.

IBM last week officially confirmed that it would continue to service the computers installed in the South African Defense Department, but only from parts already on hand in that country. Further, no changes or upgrades in either hardware or software will be made.

IBM also said the computers in question were being used only for administrative purposes. In addition, the firm maintained it has no systems installed in South African law enforcement agencies and said it believes that none of its computers are being used in repressive applications.

Under the letter of the law, IBM's actions are legal, Commerce officials said last week, noting that U.S. companies can use parts that were in South Africa before the ban was imposed for such service.

Furthermore, Commerce noted that large multinational firms such as IBM could use parts of totally foreign origin to service their equipment installed at police and defense organizations in South Africa, despite the U.S. government ban.

Cbema Protest

Cbema protested the regulations before they were even issued.

That association's foreign trade director, Lloyd Kaufman, said the group sent a letter last December to Frank A. Weil, Commerce assistant secretary for industry and trade, protesting the possibilities of such relations.

Cbema — with a reported one-third of its budget made up of dues from IBM — said the Commerce Department should not pass any regulations on the servicing of computer and office equipment because of current lease arrangements some of Cbema's members have with the police and military of South Africa.

However, it appears IBM is the only mainframe computer producer affected by the ban since it is the only one with operational equipment in the South African military, according to a CW survey of manufacturers (See accompanying story).

In addition, Cbema told Commerce it was worried about "secondary" effects of such a ban on U.S. trade.

Such a ban, Cbema said, would show other potential customers in countries with human rights problems that the U.S. government might cut trade with them and would force them to turn to non-U.S. suppliers for computers and other equipment.

ICCR 'Gravely Disappointed'

In general, the ICCR — a consortium of national Protestant organizations and 150 local Catholic groups — and other organizations such as the American Committee on Africa are "gravely disappointed" in IBM's position with respect to such trade because the firm has not adopted any concrete regulations to govern it.

Even though Frank Cary, IBM chairman, promised at the 1977 stockholders' meeting to restrict trade for applications that violate human rights, there has been no formal implementation of this policy at IBM and no guidelines given to managers for implementation, Smith noted.

One particular application the church groups see as repressive concerns the use of computers in population control.

One of the methods the South African government uses to enforce its apartheid laws is the pass system, which requires every black African to carry a 50-page identification document with information on age, sex, race, district in which he is permitted to live, ethnic group to which he belongs, educational status and so forth.

All of these dossiers on Black Africans are stored on an International Computers Ltd. CPU in a massive data base that is accessible throughout the country by police officials.

An IBM 360/50 is used as an extension of this system run by the South African Interior Department. It does not contain data on blacks in the country, but is used to store dossiers on "coloreds" (mixed-race people), "Asians" and "whites," Smith said and IBM confirmed.

"Clearly, in a police state we feel this is an aid to repression," Smith said, adding that IBM has chosen to view it as simply a census system.

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No Policy Yet on Private Sector

Carter Chided for Dragging Feet on Privacy

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — A U.S. House of Representatives subcommittee last week chided the Carter Administration for its failure to translate the Privacy Protection Study Commission's recommendations into policy statements and legislative proposals.

Those recommendations, issued last June, focus on privacy protection in the private sector.

"Legislative action has been stalled while waiting for an administrative policy" on this issue, Rep. Richardson Preyer (D-N.C.) told the Administration's representative during hearings here. Preyer, chairman of the House Subcommittee on Government Information and Individual Rights, added that recent months have seen "growing pressure on Congress to proceed without waiting for the Administration to develop its position on privacy."

Appearing before the subcommittee to explain President Carter's plans for developing a privacy position, C.L. Haslam, general counsel for the Department of Commerce, reported that a minimum of two months will pass before the White House has a proposed privacy stance in hand. The interagency task force set up by the President last December was to have distilled the Privacy Commission's 162 recommendations into policy and legislative proposals by May 31.

Carter personally received the privacy commission's eagerly awaited report last July [CW, July 18]. At that time, he promised Chairman David Linowes and the other commissioners that theirs was one report that would not be allowed to collect dust on federal shelves.

Complexity Blamed for Delay

The commerce general counsel assured the House subcommittee that the Carter Administration places the highest priority on privacy issues. Appearing on behalf of Commerce Secretary Juanita Kreps, who co-chairs the interagency privacy task force with Stuart E. Eizenstat, assistant to the President for domestic affairs and policy, and Assistant Commerce Secretary Designate Henry Geller, Haslam noted that privacy was selected as one of the first areas for study under Carter's new domestic policy review system.

The complexity of the subject matter — not staff turnover — has caused the delay in transmitting proposed administrative position to Carter, Haslam asserted. He said the approach taken to privacy by the President will follow the privacy commission's lead.

In addition, Haslam suggested the Office of Management and Budget (OMB) would be "a logical place" to house overall privacy responsibilities, but stressed that no decision to give OMB such authority has been made.

HEW View

After listening to Haslam and asking him whether Congress should wait any longer for the President to offer his legislative proposals, Preyer turned to executive branch witnesses from the Department of Health, Education and Welfare (HEW), who offered their views on bills dealing with medical records that are now before the legislature.

HEW has nearly completed draft legislation on medical record confidentiality and expects to send its proposed bill to Capitol Hill within three to four weeks, according to Richard Beattie, HEW deputy general counsel.

Beattie told the subcommittee that HEW's suggested legislation will also generally follow the recommendations made by the privacy commission. The department would have a medical records statute cover all institutions which desire to receive federal funding under Medicare and Medicaid programs.

Otherwise, HEW believes any law should initially be directed at hospitals, skilled nursing facilities and intermediate care facilities. The privacy commission recommended that a law governing medical record confidentiality apply to a broader range of health care institutions, but HEW contends this is unnecessary.

Similarly, "while we might have the authority to extend privacy legislation to private physicians, such an action would be a major step for us in the absence of clear abuse," Beattie stated.

HEW would go beyond the privacy commission, however, in allowing researchers access to medical records. "We need to strike a balance between privacy protection and the administration of health care programs," Beattie said. Biological information and data about epidemics isn't enough where studies of health care utilization and costs are at issue, he added.

The proposed HEW legislation would require researchers to be familiar with the laws governing medical record confidentiality.

HEW took issue again with the privacy commission by arguing the need to retain personal identifiers on medical records that find their way into research. There are times when researchers discover a need for follow-up information about care and treatment, making contact with former patients imperative, Beattie suggested.

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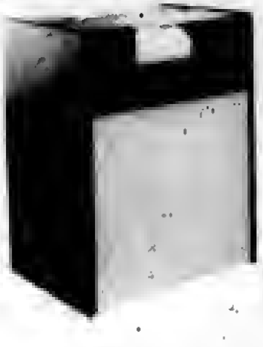

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Canada Seeks Foreign Labor Limits

(Continued from Page 1)

failed to produce the now necessary authorization.

AMR spokesmen in New York said last week that Calero's incident was the only one they knew of related to the new crackdown and added that since it happened, they have been trying to work with Canadian provisional and federal officials to avoid any repetition.

Getting Authorization

Obtaining a work permit — officially an "employment authorization" — is a four-step process. As the first step, a job offer from the foreign worker's prospective Canadian employer must be presented by the employer to the nearest Canada Manpower Centre, a local office of the government's nationwide employment service.

The manpower center then matches the job offer against files it has on unemployed Canadians or it advertises in newspapers for Canadian candidates for the job. If newspapers are used, this part of the process may take three weeks or a month, the spokeswoman acknowledged.

If the center finds that no qualified Canadian resident is available to fill the job, however, the Canadian government office nearest the prospective job holder's home is notified. Only then will the prospective non-Canadian employee be called in for an interview and asked to complete an application (in duplicate) for an employment authorization.

The interview will determine if the worker qualifies| for temporary entry under Canada's immigration law and if the worker is qualified for the job being offered. A pamphlet outlining the basic procedure leaves unexplained how the interviewer determines if the worker is qualified in any technical field such as DP.

A medical examination at the worker's expense may be required, the pamphlet added. In any case, if the worker's application is approved, he will receive a visa and an employment authorization to cover "the particular job for the period of time the employer will need [his] services."

The pamphlet later reiterates that the work permit is issued only for a specific period of time. "If the authorized job is terminated or extended, the worker should contact the nearest Canada Immigration Centre without delay. All applications for an extension or a change in conditions must be made before the authorization expires," it warns.

Employees making temporary intercompany transfers from, for example, a U.S. corporate office to a Canadian affiliate, must apply for the employment authorization before they can go to work. In this situation, however, the manpower center certification step is waived and the process is quite automatic, the spokeswoman said.

Independent consultants are not exempt from the certification step, she stressed, even if they are being hired by a non-Canadian firm to do work here. Lecturers at public seminars, such as the AMR series, are also subject to the entire authorization process, she continued.

Input Chief Charged in Welfare Rip-Off

(Continued from Page 1)

Systems, Inc. 3200 CPU at the DPSS central facility.

DPSS internal investigators believe Vega created false information on the terminal equipment and transmitted it to the 3200, bypassing normal authorization procedures. This false information "reactivated" terminated welfare cases, sending payment checks to persons Vega is said to have specified, rather than the former recipients.

Vega allegedly caused documents confirming the cases he illegally reactivated to be sent to other districts, hoping in this way to conceal the embezzlement, according to Jim Wingman, chief of DPSS internal affairs. Confirmations are automatically generated by the 3200 each time a district changes the status of a case, he explained.

Rerouted Confirmations

According to investigators, Vega thought he was safe in sending the false confirmations to other district offices. His own office received no confirming documents on the illegally reactivated cases, and he disposed of the source documents created there, they said.

But the offices which received those confirmations could not match them with any of their own cases. Eventually DPSS internal affairs was apprised of the situation, and an investigation began that is still under way. Vega was discharged and a warrant for his arrest was issued soon afterward.

Vega has pleaded not guilty to 11 counts of theft of public funds and one count of grand larceny. He is currently awaiting trial.

To date, none of his alleged accomplices have been criminally charged in the matter.

As a result of the affair, which exposed a number of weak points in system security, the DPSS is replacing its HIS 3200 with a Univac 1100 CPU, according to Al Bague, a computer analyst assisting the DPSS internal investigation. The department is also replacing its Sycor input operation with Univac UPS 400 terminals.

"Part of the new installation calls for automatic polling of districts, with district locations fixed so there is no transmission by a Sycor operator," Bague said. "Once you go to transmit, you can only transmit during a period when the central computer is polling a given district and already has the location all locked in."

The software also locks in points of transmission, storing this information "permanently" on file, without the possibility of user override, he noted.

Confirmation documents are the only central documentation generated when a transaction is submitted. "There is no ongoing, permanent record of transmission inputs in raw form . . . and no retention of the pages showing the original data as transmitted," Bague said.

Communications Bill Ready

(Continued from Page 1)

by other members of the subcommittee and incorporated into the bill.

The lawmaker's remarks came during a question-and-answer session and were not part of his prepared comments. As such, the chairman was representing an opinion that may or may not be included in the legislation, the staff spokesman said.

Shooshan said that although White House sources have referred to the rewriting of the 1934 act as a "healthy exercise," the Administration has not released any statements with respect to where it stands on the bill itself.

In drafting the legislation, the House subcommittee has kept in close contact with its counterparts in the Senate.

One of the problems in introducing the measure in Congress is that lawmakers have relatively limited knowledge about the communications area, Shooshan said. Many members of Congress gave their name to the original Consumer Communications Reform Act without understanding what issues were involved, he said.

User Input Urged

Commenting on the change approved by ICA members at the conference to become more involved with regulatory issues, Shooshan said it was most important that users provide input and make their positions known to their representatives in Congress when the new bill is up for hearings.

The counsel told ICA members that two recent votes might have been reversed if users had spoken out on the issues. In one case, the post office wanted to experiment with electronic mail, but current laws prohibit anyone but the post office from supplying postal services. Because of this possible conflict, provisions for the post office to study electronic mail were deleted from the legislation.

In the second case, a satellite bill would have allowed users to deal directly with Comsat, which is classified as a carrier's carrier.

In both instances, at least some input from users might well have changed the course of the legislation, he said.

Asked if the soon-to-be-announced legislation has sidetracked the recommendations of the telephone industry task force, Shooshan said no, adding that a four-point program presenting the position of the telephone industry had recently been completed by the phone companies and this plan is now under subcommittee consideration.

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Central Software Standards Advised for DDP

By Howard A. Karten
CW Staff

NEW YORK — Retaining centralized control of software standards is an essential element in implementing a distributed data processing (DDP) system, according to Leo J. Cohen, president of Performance Development Corp. and keynote speaker at a recent Mid-Atlantic Computer Expo '78 session on critical decisions in DDP.

Cohen, the author of several technical works in the DP field, told the heavily attended session that electrical, or merely technical, connection of the elements in a network is a relatively minor point "now that there are $14.95 chip processors." A more significant concern, he said, should be the creation of software and functional interface standards in one location in an organization. Setting these specifications centrally means they can be enforced locally, and an organization need not necessarily rely on only one vendor for equipment.

Noting that "DP history is largely a history of keeping designers and programmers happy and busy, while little has been heard, historically, from the end user," Cohen discussed how user departments should plan "from ground zero" to enter DDP.

The most important element in this planning, he said, is what he called a "requirement statement." The requirement statement should be created jointly with the user, through negotiation and consultation. It is important to realize, he said, that the end user thinks in non-DP terms.

To obtain the requirements statement, Cohen said he uses what he calls a service analysis, which he said is his term for systems analysis.

In discussing the use of the data with a client or end user, Cohen said he asks four things about the data: how frequently it will be used, how soon the user will need an answer after inputting data, what data elements must be present in the data base to delivery service and what operations must be performed on the data in order to satisfy the [non-DP] client or user.

The answers to these questions, he said, give him some idea of the criteria for distribution.

The need for a strong network administrator comes about, Cohen said, because "someone's got to know where it all is, how it's working, what adjustments should be made and so forth."

The primary role of the network administrator then becomes not hardware, software or training, but data administration. According to Cohen, this consists of finding out where the data is, preserving its quality and movement' and seeing that it gets to those who need it.

Mini Selection Chaotic But Rewarding, User Says

By a CW Staff Writer

NEW YORK — Dealing with minicomputer vendors is more difficult, more suspect, more chaotic and more dynamic than dealing with mainframe vendors, but ultimately more rewarding. Although the risks are higher, the rewards are also bigger and far greater economies can be achieved.

These were some of the views shared by Matthew H. Dietz, Systems Manager for Marketing at the Schering Corp. in New Jersey, with attendees at the workshop in distributed data processing (DDP) at the Mid-Atlantic Computer Expo '78 here recently.

Dietz said selling his management on the idea of DDP was difficult, since it was — and is — committed to the idea of centralized DP.

Dietz, whose company moved directly from the use of time-sharing services to an in-house DDP system, drew heavily from his company's experience in DDP for his presentations. He suggested five criteria to use in deciding whether to replace an existing application with DDP:

- Whether on-line availability is needed in the application.
- Whether the equipment proposed for DDP use is adaptable to the existing physical environment.
- Whether it uses Basic.
- Whether it can be used by non-DP personnel.
- Whether the equipment is immediately available.

This last point is important, Dietz said, because vendors often try to sell equipment not actually available, but on the drawing board or production line.

The actual measurement criteria used to assess equipment can be divided into five areas, Dietz believes. These are hardware and software capabilities of the system, characteristics of the vendor itself and the costs and risks associated with the decision to convert.

Adaptability to the existing environment, the ability to support further growth and immediate availability are the most important hardware considerations, Dietz said, while the use of Basic and the ability of non-DPers to use the system are the most important software considerations.

Selection Process

Using his measurement criteria to assess the products offered by the vendors, Dietz said his company, a division of Schering-Plough Corp., found that the products being offered were so similar in capabilities and functions that it was necessary to assess the capabilities of the vendors themselves.

When his company selected Datapoint Corp., a strong factor influencing that decision was the fact that the company offered a "try before you buy" option for three months. That, he said, is the only way such a system can really be evaluated.

After bringing in the Datapoint equipment, Dietz assigned a full-time analyst to the marketing users. This was a significant factor in his success.

Looking back over his experience with the system, the manager said he found a number of surprises — some pleasant, some not so pleasant. On the pleasant side he said the level of service he received from the vendor was "excellent."

"I heard that [Datapoint's] idea of service was slowing up the delivery truck as it passed your company," he told the audience.

The unpleasant surprises, although they affected the company's original projection of savings, were not major.

First, the air conditioning proved inadequate after the company cut back to save power during the energy crisis.

Second, to achieve its goals, the company needed a full Basic compiler instead of the free, stripped-down compiler offered with the equipment. The larger compiler meant the company could run only one partition in the machine instead of the two it had originally planned.

Dietz stressed that users have to learn from experience.

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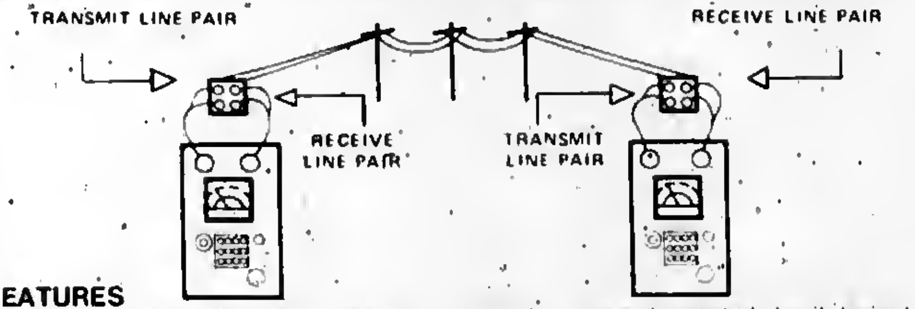

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Hartford Bank System Features Fedwire Link

By Brad Schultz
CW Staff

HARTFORD, Conn. — The Hartford National Bank and Trust Co. has installed an Automated Funds Transfer (AFT) system featuring a computer-to-computer funds transfer link with the Federal Reserve Bank of Boston (FRBB).

Other Federal Reserve Districts have similar links, but Hartford National's Federal Reserve Wire (Fedwire) interface is the first of its kind in New England. Financial Industry Systems (FIS) of Hartford is now marketing the Fedwire link program and the complete AFT package.

The AFT system was designed to streamline Hartford National's processing of large dollar transactions with correspondent banks and commercial customers. On an average day, the system executes 1,100 to 1,200 transactions representing $800 million to $1 billion, according to Chris Book, manager of the bank's money transfer department.

About 60% of this dollar volume is generated by customer activity and the other 40% by transit activity, Book said. Typical transit activity includes deposits and withdrawals applied to Hartford National's accounts with other banks, he explained, noting that individual transactions of $25 million are not uncommon.

Examples of links similar to Hartford National's Fedwire interface that have been operating in other Federal Reserve districts include the link between FRB-New York and Irving Trust and the link between FRB-Cleveland and the Mellon Bank, Book said.

The AFT system controls all communications between Hartford National and the FRBB, FIS systems development officer Bingham W. Higgins said.

The system is said to manage security by assigning protocols. It reportedly routes each message to the correct files; generates each day's settlement, audit and management reports; and processes all transactions in real time.

The system also features an interface with the Bankwire administrative network, which handles transactions and transmits messages among a number of large banks, Higgins added.

'All-Electronic' Environment

Book said the system has enabled his department to shift from an "all-paper" to an "all-electronic" environment, yielding better access to information for customer service and internal research.

Describing the system's benefits, Book said that "funds are available faster for use by the customer. In addition, documents needed to ensure that funds transfers are out the same day are produced automatically, on-line.

"Demand deposit accounts are updated instantly, on-line, and business growth has been efficiently absorbed. Administrative productivity has also been improved, enabling personnel to do more and better work. Over the past year, business volume has doubled, but there has been no increase in staff," he continued.

"Errors are caught [on video display] and corrected promptly at the data entry point [via text editing]. When an error is made, the error alone is corrected without repeating the transaction," Book added.

The Fedwire interface allows communication between Hartford National's IBM 370/158 and the FRBB's Federal Reserve Communications System (FRCS).

This link employs the Basic Telecommunications Access Method (Btam), supported by IBM's CICS and OS/-MVS Release 1.3, and it complies with the 1975 FRCS Computer Link Implementation Guidelines for First District Member Banks, Higgins stated.

The Fedwire interface is integrated with the rest of the AFT system via certain facilities of CICS, including temporary storage, transient data queuing and automatic task initiation, Higgins said, indicating that the interface module can thus operate asynchronously with the other processed transactions. IBM's Vsam is used for primary file storage, he added.

Message Transmission

Funds transfer messages are transmitted to and from FRBB at 2,400 bit/-sec via leased communications lines. Book's department uses eight IBM 3270 CRT terminals and two IBM 3284/2 printers, he noted.

The AFT system interfaces Bankwire via an Incoterm Corp. STD 325/2 CRT terminal with a Digital Equipment Corp. PDP-75 punched paper tape output device modified to emulate an IBM 3275, with the punch operating as if the CRT terminal were connected to a 3284 printer, Higgins said.

The system consists of basic modules whose functions are Fedwire processing, pending and history storage, statement rendering, and "due from bank" processing, he continued, adding that all modules except Fedwire are written in ANS Cobol.

FIS developed AFT in conjunction with Hartford National as a pilot project, Book indicated, explaining that FIS regularly manages the bank's DP department and could thus take advantage of a normally close working relationship.

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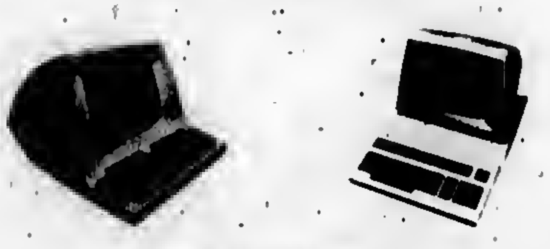
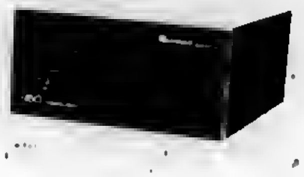
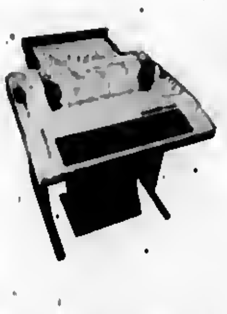
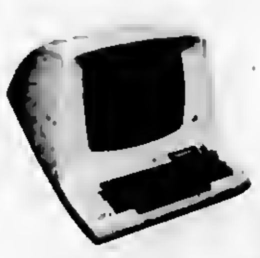
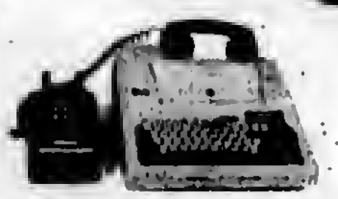
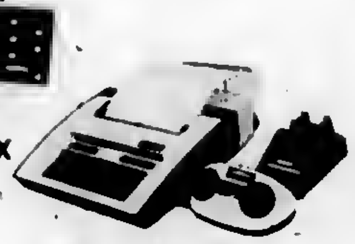












System Helps Manage County Road Repair

By Tim Scannell
CW Staff

PONTIAC, Mich. — Potholes and damaged highways are the enemy and DP is the protagonist as the Oakland County authorities here fight to maintain its system of roadways.

Since 1969, the Oakland County Road Commission has been using a computerized management system in this battle to help get more funds allocated for road repair and less for administrative purposes, according to John R. Gnau Jr., chairman of the commission's board. "The system realized a cost savings of $489,000 in the first three years of operation while making possible comparable levels of maintenance work," Gnau said. "We've been able to produce at least 10% more work for the dollars available."

The system was initially developed and set up by the consulting firm of Roy Jorgensen Associates, Inc. of Gaithersburg, Md., but has since been customized to meet the specific needs and conditions of the Oakland County area, Robert Steeger, maintenance operations engineer, explained. As a matter of fact, the consulting firm tends to frown upon the use of its name in referring to the system because "every client that it has worked with now has a program that's adapted to its needs and people ought to be describing their systems as their own rather than Jorgensen's," Steeger said.

The principles around which the system is built are those used in virtually any industry, Steeger continued. There are series of programs and subprograms that handle planning, budgeting, inventory, work loads, priorities and other factors important to an efficient operation, he noted.

Road, Activity Records

Basically, "we have an inventory of every maintainable feature on the road system . . . and a list of work activities," Steeger explained. "Each activity requires a certain crew size and a certain complement of equipment and materials." All of this information is fed into the computer, correlated and used by the maintenance supervisors to decide when and where pothole patching, road grading and similar tasks will be done, Steeger stated.

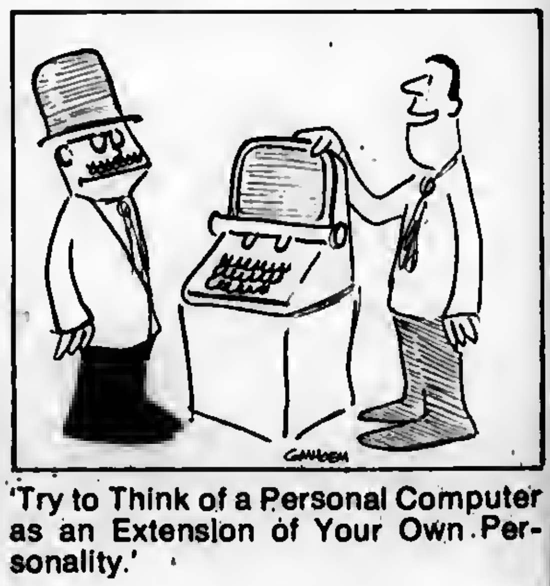
"Say we have 100 miles of road that is going to be pothole patched," he said. "Based on our experience and our own objectives for the year, we may decide to budget at a level of 4 tons of 'coldmix' per mile. This would generate a program of 400 tons for the year."

Supervisors also know from experience that it takes a three-man crew for pothole patching and that they use about 4 tons per day, Steeger said. This would give the commission about 100 crew-days or 300 man-days to allocate throughout the whole year.

The system totals work activities for the entire year, spreads them out on a month-by-month basis and, taking into consideration the budget restrictions, "informs us as to what level we ought to be staffing and utilizing materials for a particular district," Steeger noted.

Of course, the commission makes adjustments in its figures during the year to handle unforeseen conditions, more severe or less severe than it had anticipated on an average yearly basis, he said.

The majority of the maintenance programs for the Oakland County commission were formerly run in a batch time-sharing mode by a service bureau located at American University in Washington, D.C. However, the commission has recently finished converting the operation to run on its own Burroughs Corp. 2700, Gnau said.



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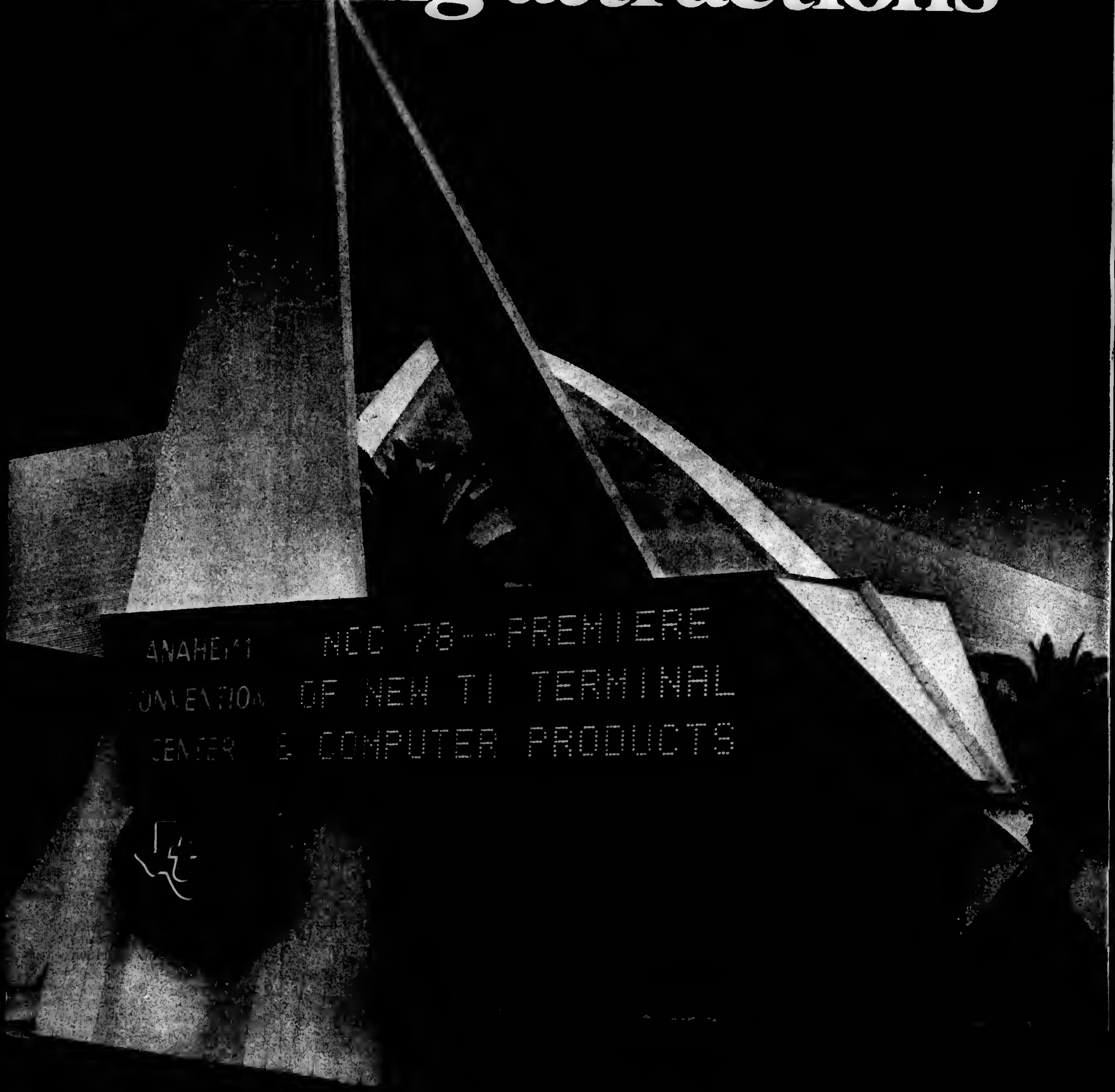
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Welfare Parents Bucking SSN Tags for Children

By Marguerite Zientara
CW Staff

BOSTON — A group of Massachusetts welfare parents are foregoing their welfare benefits rather than submit to the Social Security numbering of their children for DP recordkeeping.

Since January 1975, the Welfare Enumeration Project of the U.S. Department of Health, Education and Welfare (HEW) has required all recipients of Aid to Families with Dependent Children (AFDC), including the children themselves, to obtain Social Security numbers (SSN) in order to receive benefits. It was HEW that interpreted the law, passed in December 1975, to include children in the definition of "recipient."

To oppose the project in Massachusetts, a group of parents has formed the Welfare Enumeration Emancipation Program (Weep), a statewide organization with about 35 active members. Weep has a class action suit pending in U.S. District Court to stop the project on a number of legal grounds.

The suit, filed in June 1977, charges that the SSN regulation is an invasion of the privacy of those involved in the program, according to Michael Avery, Massachusetts Civil Liberties Union lawyer. "This could be a step toward requiring everybody to have a unique identifying number. Since it is probably easier to prey on poor people than on anyone else, the danger is that [the government] may first make poor people, then gradually everyone, assume a unique identifier," Avery asserted.

Avery said the information is computerized but those opposing the enumeration project are still trying to determine to what extent it is computerized and to what uses the information is put. "No single, articulate and satisfactory reason has been given" for the existence of the program by HEW or the State Welfare Department, Avery said.

According to Steve Kane, Assistant Commissioner of Assistance Payments for the State Public Welfare Department, the program arose out of "congressional needs to avoid errors, to avoid duplicate cases and to have a unique identifier for AFDC recipients. The unique identifier is needed so they can match files and find out if children are receiving Social Security Title 2 survivors' benefits, in addition to AFDC," Kane explained.

'Phony Issue'

Avery, however, sees the matter of welfare fraud as a "completely phony issue." He declared, "I think the total amount of money that goes for welfare fraud in this country is probably less than the amount of money one major corporation writes off on martini lunches in the course of a month. It is easier for people to get concerned if they can blame the issue on poor people."

Even though the national law requiring the SSN for AFDC benefits went into effect in 1975, Massachusetts did not require the SSN until February 1977 because "the State Welfare Department says it somehow postponed it," according to Jacqueline Dittrich, one of Weep's founders. When the program was first started, she said, appeals were heard and denied from February through May of 1977, and only since January of this year have recipients' checks stopped.

"Part of the problem," Dittrich said, "is that social workers are informing recipients that if they appeal, it's a useless way of objecting to the program because appeals are routinely denied. On the other hand, the State Welfare Department is telling us we need to make more noise by filing appeals in order to stop the program."

Support for Weep

Besides backing from the Massachusetts Civil Liberties Union, Weep is receiving support from the Massachusetts Law Reform Institute and Legal Services of Cape Cod and the Islands. Earlier this year, State Rep. Tom Lynch filed a resolution, still pending, to put a moratorium on the enumeration project until the federal court rules on the class action suit.

According to Tony Winsor, Massachusetts Law Reform Institute lawyer, there is a state statute under which a person can appeal such matters through an administrative hearing "which you lose and then go to Superior Court." Winsor continued, "We don't understand why they're requiring a lot of legal, mental and other effort by people in order to do the gracious thing pending resolution of these matters." He added that the legal appeal process could take "anywhere from a few months to a few years."

Similar suits have been filed in Minnesota, Vermont and New Jersey. Minnesota and Vermont ruled in favor of the recipients; New Jersey ruled in favor of HEW. All the cases are now under appeal.

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Charged With Submitting False Claims

DP Training School Owner on Trial for Fraud

By Marguerite Zientara
CW Staff

DETROIT — The owner of a computer training school has gone on trial here on four counts of fraudulently obtaining federal funds.

The government has already won a civil suit against the school — the Institute of Computer Technology (ICT) in suburban Oak Park — charging it with submitting false claims under a program to enable welfare recipients to receive training.

And now the school's owner, Harry M. Borcherding, is facing criminal charges for the same conduct. Borcherding and the school allegedly submitted $389,103 in fraudulent claims under the Basic Educational Opportunity Grant (BEOG) program, according to the indictments handed down by the grand jury here and the earlier civil action.

The basic charges of fraud involve the allegation that the school had less than 24 hours of classroom time per week for students enrolled in the programs, but this was only discovered after the school apparently tried to boost enrollment through the use of computer-generated forms and pressure selling techniques at the local welfare office.

Under the BEOG program, a student seeking vocational training after high school can apply to the federal government for a grant, which he then takes to a participating school. The school, in turn, enrolls the student and submits his grant form to the government for cash.

Blank Applications

Several months after ICT gained approval to participate in the program in 1972, Borcherding approached the Wayne County Department of Social Services with a proposal to recruit 3,000 public assistance recipients for ICT training as DP specialists, according to Delois Whitaker, employment and training program specialist for the Social Services Department. Borcherding asked the department to sign up applicants from among the department's clients, which it agreed to do.

Social Services workers, however, became concerned when they received computer-generated applications which were blank except where information had been preprinted in three areas, Whitaker said.

In the space for the student's home address, the school's name and address had been printed and the answer "yes" preprinted in reply to a query on whether the student was a U.S. citizen. "No" was preprinted as the answer to whether the student had had prior training, Whitaker said.

Borcherding indicated that since these were the answers required for eligibility, it would save time if they were filled in, according to Whitaker.

The department did agree finally to help recruit as close to 1,000 applicants as possible, but "we were not pressuring anybody, we asked them to complete [the form] only if they were interested in computer science," Whitaker said.

Only eighteen applicants were recruited and, when the March 15, 1975 deadline for BEOG forms was near, Borcherding sent the Department a letter saying that there was an "urgent need to get more [applicants]," according to Whitaker.

Accordingly, Borcherding got clearance from the department to send a team of recruiters to the Social Services Department's offices, where they recruited 3,300 applicants in about eight days' time, Whitaker said. "People in the office indicated [the team of recruiters] was not doing a thorough job of interviewing and were just signing people up," she said.

Contractor Refuses

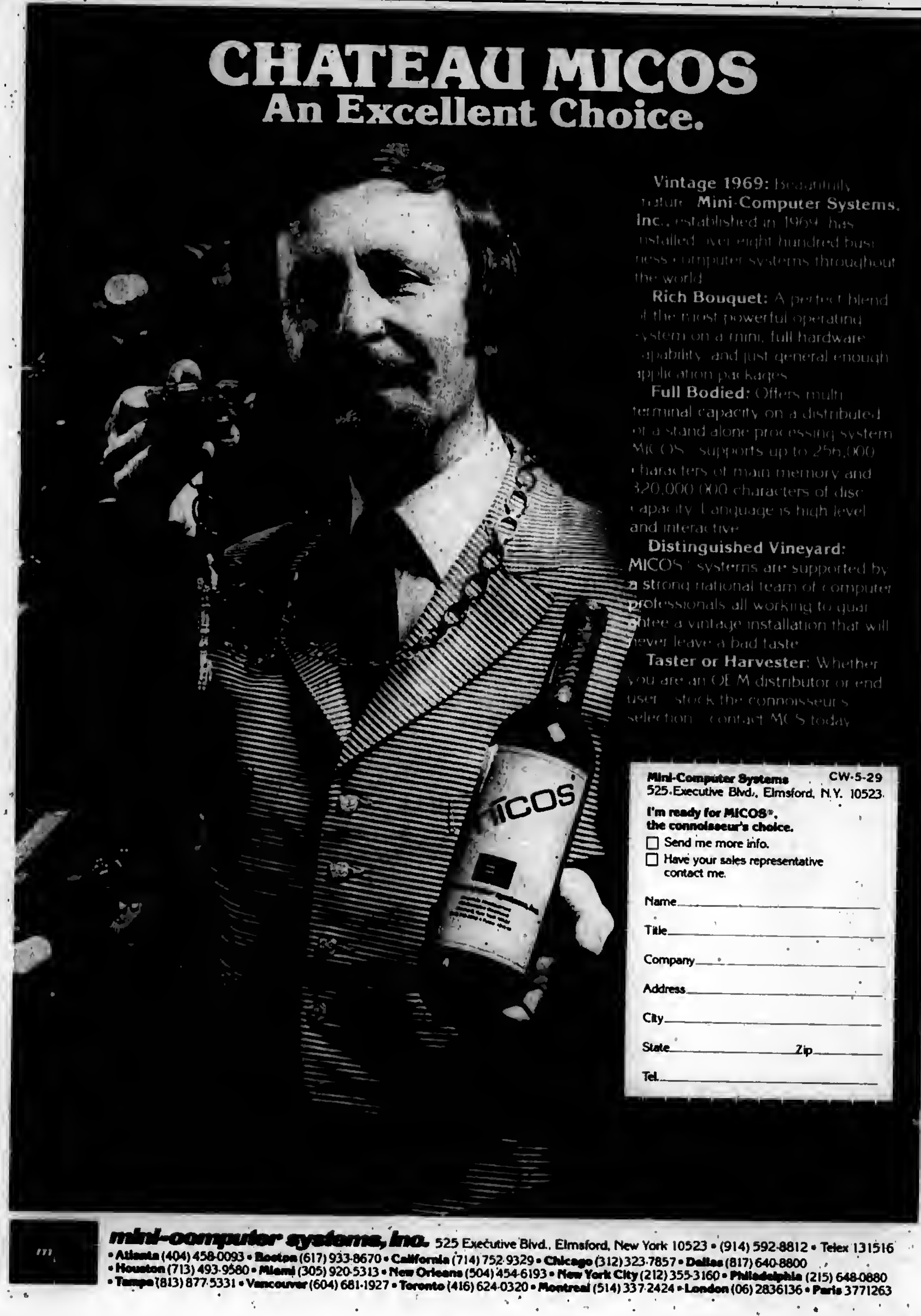
After weeding out duplications obtained in those eight days, the school sent about 2,000 grant applications to the government contractor hired to process them, the American College Testing Program in Iowa City, Iowa. Since they were delivered the day before the deadline and did not contain prospective students' home addresses, the contractor refused to process them, according to court testimony.

Because of suspicion in the U.S. Office of Education concerning the school's irregular applications, federal auditors conducted a survey of ICT from May 12, 1975 until the beginning of September 1975. Their findings were the basis of the criminal case filed last January charging Borcherding with four counts of "false, fictitious and fraudulent" statements, according to Harold Gurewitz, U.S. attorney in the federal District court.

The indictments charged Borcherding with falsifying attendance sheets and computer printouts indicating the number of hours per week that certain DP classes were held. They charged that Borcherding said the classes met five hours a day, five days a week for four weeks, when "in truth" they met less than 24 hours a week, Gurewitz said.

Throughout the case, Borcheding has maintained his innocence.

No judgment has been made on last fall's civil trial verdict against ICT, on which the government could be awarded a total of $786,206.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Federal Aid Form Seen as Billion-Dollar Saver

By Edith Holmes
CW Staff

WASHINGTON, D.C. — The human resources team of the President's DP reorganization project believes a single application form for a variety of human services along with computer-assisted determination of an individual's eligibility will save the federal government billions of dollars annually. Such a system would also save millions of Americans much frustration in their dealings with the nation's multitude of welfare and benefit programs.

In its recently issued report [CW, May 22], the reorganization team described the present means by which welfare and benefit aid is obtained with the following scenario: A widow living in an apartment with her three children and her invalid mother loses her job. Her savings run out and she believes herself eligible for some type of welare, but she has no understanding of the government programs available.

Current System

Under today's delivery system, this woman would have to apply for federally funded human sevices at several different offices in various parts of her community. She would have to fill out many forms for such programs as Supplemental Security Income, food stamps, Aid to Families with Dependent Children and Medicare.

Each one of these programs has its own eligibility criteria and normally, its own administration. The woman, who may be eligible for several of these services, must provide her own transportation to and from each program office.

Once at an office, she must wade through lines, forms and the determination of her eligibiity for a service. "The staffs of the several program offices must review every item of information provided by the client, verify numerous items and calculate whether the client is eligible for the service applied for," the reorganiztion team pointed out.

"This process is lengthy, time-consuming, often results in errors and is satisfactory to neither the agency nor the client," the team concluded.

Under the team's preferred scenario, the same woman telephones or walks to a nearby public assistance office and explains her situation to a professional social worker. The social worker invites her to sit down and punches a few keys on a terminal keyboard.

Questions begin to appear on the CRT and can be read by the woman and the social worker at the same time. Together they answer the questions; the social worker enters the answers into the system. The questions deal with total income, household expenses, residence and so on.

After approximately eight to 10 minutes, the questions are completed and the social worker requests a display of the programs for which the woman could be eligible. The CRT response is instantaneous and states that the woman is eligible for five human services programs if the information she provided is correct.

The woman is then supplied with a printout describing each of these programs.

Printout of Forms

Another button on the keyboard pushed by the social worker results in a printout of the forms the woman will need to complete to apply for those programs.

Finally, the system lists the verification items the woman must present to the public assistance office to verify her eligibility. These items incude copies of birth certificates, check stubs from wages and rent receipts.

The social worker asks the woman to complete the forms at home and, together with the verification items, return them in person or through the mail.

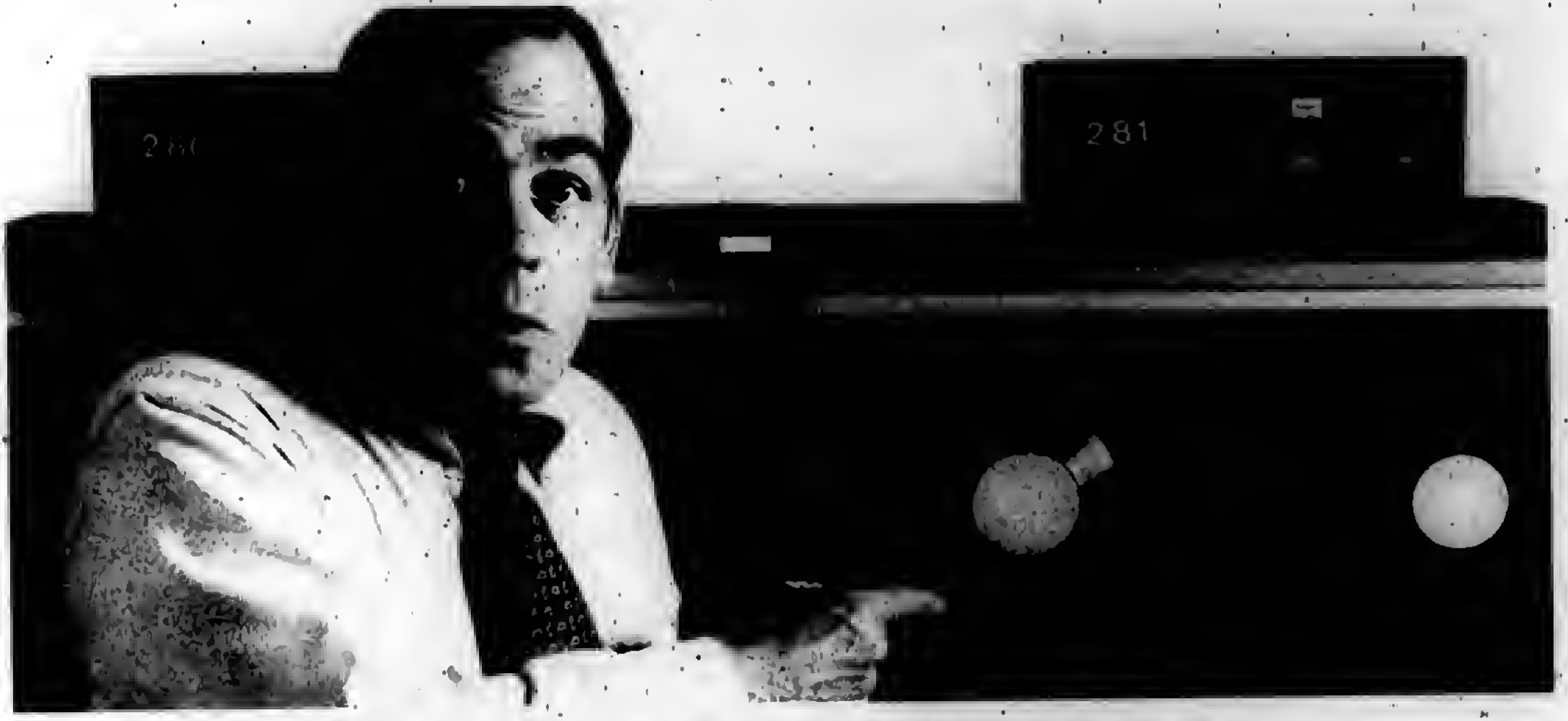
If the application were conducted by telephone, the program descriptions, forms and list of items to be verified would be mailed to the client.

Only 20 Minutes

This entire process would take 20 minutes and the woman's tentative eligibility for the five programs would be determined with 99% accuracy, according to the reorganization team. All that would remain would be for one office to check the validity of the verification items when they arrive later. If the client could provide them within a few hours, service to her can begin on the same day she applies.

"If this scenario were a reality today, the federal govenment would be saving billions of dollars annually, and many of the client interface problems identified . . . would be nonexistent," the human resources team stated.

The team is convinced this scenario is not only possible right now, it is essentially taking place on a pilot basis in such states as Wisconsin and South Dakota.



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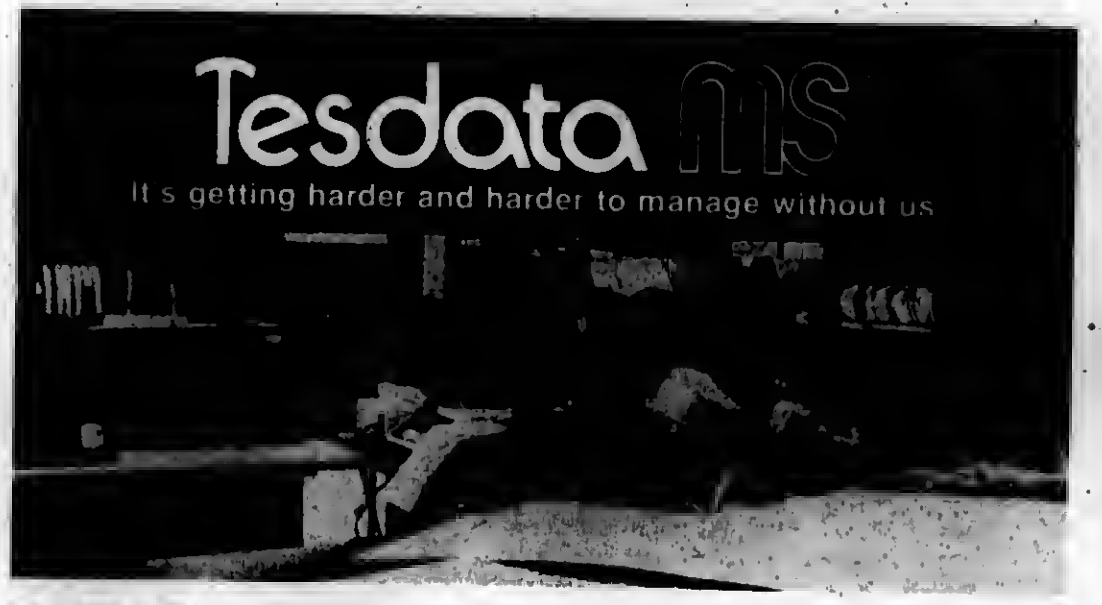

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Data Base Systems: Design, Implementation And Management, Part II

By Ronald G. Ross

	Change File Descr.	Change Logic	Compile	Test	Man-Months
Programs using new data elements:					
Traditional:	Yes	Yes	Yes	Yes	1.00
Data Base:	No	Yes	Yes	Yes	.95
Programs not using new data elements:					
Traditional:	Yes	No	Yes	No	1.25
Data Base:	No	No	No	No	0.00

Other modifications:

Traditional:	write update program, test and document.	.75
Data Base:	change data base description; reload data base; document.	.50

Total man-months:

Traditional:	3.00
Data Base:	1.45

Figure 1: Man-months for changeover under traditional and DBMS approach. This illustration assumes a DBMS with data element level independence. Without this, the data base programs not using the new data element would probably have to be recompiled in order to accommodate a new record description. This would not be the case if the new data element were placed in a record by itself or in one that was not used.

For a user interested in acquiring data management software, two distinct questions arise in the evaluation of commercial DBMS, neither of which lends itself to an easy answer. The first question has to do with what should be considered in selecting a DBMS.

A fully justified answer to this question presupposes a comprehensive determination of needs, a consideration of the alternatives and an investigation of the impact of DBMS on the organization. Only after these topics have been explored should the second question be addressed — but only if DBMS are still perceived to be a viable alternative in solving organizational needs.

This second question asks how the DBMS on the market today are to be properly evaluated. Answering this question, of course, involves establishing contact with DBMS vendors, who will supply additional data base information. This information is naturally slanted to their own products.

Too many organizations have allowed vendors to answer Question No. 1 as well as Question No. 2. An organization is well advised to remain within the framework of a two-stage evaluation, in which vendors address only question No. 2

In surveying the DBMS on the market, there is no definitive answer to the question of which system is best. All have their merits, and all have shortcomings. Which is best really depends on the specific needs of a given organization.

Considerations in Selecting a DBMS

There are two alternatives to DBMS, given the need to upgrade data services. The first is enhancing existing inhouse software; the second is purchasing a data management system (DMS), a less complex version of DBMS. Opting for either of these alternatives over DBMS indicates that organizational data needs, including needs projected for the future, do not require the data structuring and management services offered by a DBMS.

How are these data needs to be determined? There are general guidelines that can be followed; these aim at pinpointing significant deficiencies in current data management.

The problem most often cited is the extensive duplication of identical data within two or more existing master files. DBMS have facilities for reducing these redundant data, consequently streamlining data access and improving update procedures.

A second common problem in data management is the need for extensive record sorting to produce high-volume reports. Again, DBMS have facilities that provide more direct access to individual data.

Another guideline, less tangible perhaps than the first two, is difficulty in implementing changes to record descriptions because of the need for extensive program modification and recompilation; a case study that illustrates this problem follows. Data independence, sometimes overplayed as a DBMS virtue, does in fact mean significant savings in this type of program maintenance.

A large public organization employs approximately 25,000 people in various capacities. The DP department is responsible for maintaining the payroll/personnel system, which has been automated for some time.

The personnel master file is created and maintained using Cobol file descriptions. Approximately 80 active programs (about 40% of the total for the entire system) process this file.

In July 1977, at the end of the fiscal year, it was decided that a new data element was needed in this file, although the same element already existed in the payroll master file. The new data element added 35 bytes to the length of the personnel file.

Each of the 80 programs processing this file had to be recompiled to accommodate the new data element, even though only 10 of these programs actually used it in their respective processing tasks. Logic changes in these 10 programs were relatively straightforward, but some retesting was required.

An especially troublesome matter was updating the new data element. Established procedures existed to update the data element in the payroll file, but these could not be applied directly to the personnel master file. It was decided that a special program was to be written that copied update transactions from the payroll system to the personnel system. After some minor editing, these transactions could be applied to the personnel master file.

This new program was to be run periodically, depending on the processing load in the payroll/personnel system. The actual time lag in updating the personnel master file turned out to be a week or, in some cases, even more.

On several occasions users complained that they could not use the reports they were receiving because of discrepancies in control totals and other information. This problem was partially resolved by running the program nightly.

A post-project study showed approximately three man-months' effort had been required to effect the changeover. This manpower investment came at a critical time because of year-end processing in several departments in the organization, including the budget area.

During this period there was noticeable strain on computer resources, which revealed itself most clearly in prolonged turnaround. A number of people felt that the change had not been worth its cost in implementation.

Figure 1 outlines the manpower savings that would have accrued had the payroll/personnel system been implemented under a DBMS. This analysis reveals a saving of approximately 50% to effect the changeover in a data base environment.

Other benefits would have resulted in the following areas:

- Reduction in storage of approximately 775,000 bytes ([35 bytes -4 bytes for pointers] x 25,000 records).
- Savings in compile time for programs not using the new data elements (see Figure 1).
- Uniformity in update; a payroll update renders the data element immedi-

(Continued on Page 18)

Traditional Organization	Data Base Organization	Benefits
Each application typically has its own master file, which contains data duplicated in files of related systems.	The DBMS creates and maintains interfile access paths automatically so that the same data may be used by multiple applications.	Reduce general data redundancy across application files.
Each physical file containing the data to be updated must be processed separately. This is usually done at different times, causing discrepancies in various reports	A program updates data in a single shared data base. The new data are immediately available for all applications.	Reduce the programming effort required for file updating.
Changes in record definition or expansion of record sizes must be reflected in every program accessing the data.	Data description is segregated from application programs. Only those programs actually referring to the changed data type need be modified	Reduce the program modification brought about by changes in data definition.
Most traditional file systems support a single access path so that additional retrieval requirements must be satisfied by search and sort procedures	DBMS provide automatic generation, and maintenance of interfile linkage and indexes, which allows tailoring of access to meet the requirements of application systems.	Increase the accessibility of data by providing multiple access paths and retrieval sequences
Application programmers often supply their own data names	For many access operations, the applications programmer must use names known to the DBMS. Central data definitions are often maintained in a data dictionary system	Encourage the use of standardized data-naming conventions.
Coding of security systems is an independent task Such systems are difficult to implement especially in COBOL	Control blocks are generated that specify which data elements an individual application program can access Control information and undesignated data are not available to the program	Provide data security
No automatic facility is provided, therefore each application system must program its own recovery procedures Standardized recovery procedures are difficult to define and implement	Recoverability is an automatic feature of DBMS Once processing errors are detected the system can restore the data base files to the last intact file copy All transactions against the data base are logged on tape, from which quick file restoration is possible	Provide recoverability
Tape handling is a major activity in production runs	Data base files reside on disk	Reduce operator intervention and associated production errors
Application systems and data communications are sometimes difficult to integrate within acceptable standards of performance	Most DBMS have integrated or interfaced teleprocessing monitors	Promote data communications services

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Figure 2: The benefits associated with data base organization, compared with traditional organization.

(Continued from Page 17)

ately current to the personnel system.

There are other guidelines, too numerous to discuss individually, for determining data needs and the advisibility of selecting a DBMS. A useful exercise at this point is to consider the advantages of DBMS (Figure 2) in an examination of current conditions in the organization.

This exercise may or may not reveal facts of considerable interest; in either case its purpose is served. Investment of several man-months and careful documentation of the results are recommended.

The alternatives to DBMS, as mentioned are enhancement of in-house software and acquisition of a DMS. It is generally accepted that it is unwise to attempt development of in-house software that matches the capabilities of DBMS.

This consensus is based on the extent of costs for both initial investment and continuing support. It is no small item that the vendor is responsible for maintaining DBMS software.

Although in-house I/O modules and data managers are by no means a thing of the past, there is some feeling, well justified by experience, that these types of projects are not for any but the best (and best funded) DP department.

Projects of less than DBMS scope must of course be judged on individual merit. An additional consideration, however, is the delay in implementation time of in-house projects; DBMS (and DMS) packages are "up" rather quickly — *and at a relatively fixed cost.*

Attractive Option

DMS may be an attractive alternative for some organizations, especially where organizational needs fall somewhat below the capabilities provided by DBMS. Generally, DMS do provide a degree of data independence, again with the advantage of vendor-supported software, but do not attempt to lessen data redundancy or streamline data access on a large scale.

As a rule, DMS concentrate on improved data access from a single file for a single, although not necesarily small, application. Improved data access is especially defined as optimization of report generation.

DBMS, on the other hand, are oriented toward support of more than one application by the interrelation of multiple files. Improved data access is defined more broadly, especially as it refers to telecommunications.

Both types of systems — DMS and DBMS — generally support high-level search capabilities, which are somewhat more restricted in DMS because of the limitations in file structuring.

DMS vendors claim their systems can significantly reduce the implementation time of application systems. This claim has substantial justification in fact. Some DMS packages — for example, Mark IV from Informatics, Inc. and Ramis from Mathematica, Inc. — are very popular and may indeed be a viable alternative for some organizations. In investigating these systems it is important to keep in mind the distinctions between DMS and DBMS, which tend to be obscured by vendor terminology.

Avoiding a Nightmare

If either of the altneratives to DBMS — a DMS or software enhancement — proves to be entirely sufficient to meet organizational needs, there is no need to continue with the selection analysis. If not, important considerations remain before the actual selection of a DBMS. Experience with data base systems shows that these considerations are often underrated or neglected at great future cost.

The impact of a DBMS on an organization is disruptive. The technology of DBMS is new and difficult and requires substantial investment in training. More than this, the data base approach cuts across traditional installation management and requires staff reorganization and hiring.

The transition to a data base system is highly visible, in particular because users outside the DP department are inevitably involved in the reshaping of data needs and goals.

In fact, although the majority of nightmare tales about DBMS are not actually true, there are a number of areas in DBMS design and application that present problems too significant to overlook. A list of these problem areas is presented here:

Operations

1. Data base management systems often require a great deal of overhead in hardware and software resources, not only during implementation but on a continuing basis.
2. Production is often disrupted during conversion to the data base system.
3. DBMS operation costs, especially the costs associated with periodic reoganization of data base files, can be deceptive and thus reduce efficient resource allocation.
4. Some DBMS have inadequate or difficult restart capabilities and system crash protection.
5. Most DBMS do not report adequate statistics on internal data structuring status.

Programming

1. Installation and maintenance of the data base system requires a continuing investment of professional resources that may retard other project development.
2. DBMS require conversion programs for transferring data from existing files to data base format.
3. Increased dependence on an externally supplied DBMS package may decrease the organization's ability to rely on in-house personnel for system support.
4. Some DBMS have undesirable restrictions in data handling and cumbersome interface standards.
5. Some DBMS lack an effective query language and/or generalized report feature.

Personnel

1. Sufficient education of personnel in data base use is expensive and time-consuming.
2. It may prove difficult to acquire and keep qualified personnel, especially people knowledgeable of a particular system.
3. The implementation of data base systems disrupts established organizational patterns and precipitates a degree of organizational stress.

Service

1. Some DBMS have inadequate capabilities for preventing unauthorized access to data. This problem is made more significant by the centralization of data base files.
2. Because of this centralization, loss of data base files may have even worse implications for service than a corresponding loss in traditional application files.
3. Unless, they are properly structured and maintained, the data collected in the data base may appear in-

ertial to users and programmers alike.

4. System reorganization requires periodic downtime.

Future Development

1. DBMS tend to cause lock-in to a particular format and system, which may restrict choices among new software and/or hardware.

2. The inappropriate application of DBMS capabilities may cause performance degradation over a period extending well into the future.

The impact of most of these problems can be minimized by careful implementation of the data base system. This implementation requires a significant investment of time and money, but considerable payoff can be expected in the long run.

There is, of course, substantial opportunity for improved data service in changing to a DBMS, provided the change is properly managed. Even so, full analysis of projected changes beforehand is wise.

In summary, a DBMS package selected and purchased is not a data base system up and running. The commitment required to reach this goal is so substantial that it alone should deter those who have not already decided that a DBMS is the best, or perhaps the only, solution to data needs.

Evaluation of Current DBMS

None of the DBMS on the market has distinguished itself as preeminent. Each system is designed for maximum benefits in some, but not all, areas. In fact, there are major differences even in the approach to data management itself, the most obvious cleavage being between physical linkage and data inversion.

A further complicating fact is that the operational characteristics of a given system depend not only on the hardware configuration of an installation, but also on the nature of the organization's application data. By its very design, a DBMS is extremely data-dependent in performance.

This does not imply that any current system falls below minimum standards in basic data handling; rather, it means that each installation has a unique set of application circumstances that must

(Continued on Page 20)

Hardware	DBMS
IBM 360/370	IMS TOTAL IDMS SYSTEM 2000 ADABAS Model 204 DATACOM/DB INQUIRE NOMAD*
Burroughs 6700/7700	DMS-II
Burroughs 1700	DMS-II
UNIVAC 1100 Series	DMS 1100 SYSTEM 2000
UNIVAC Series 90	DMS/90
UNIVAC Series 70	DMS/90 TOTAL
Honeywell Series 600, 6000, 60 Level 66	I-D-S/II (I) TOTAL
Honeywell Series 200 and 2000	TOTAL
Digitel DECsystem-10, DECsystem-20	DBMS-10 MAGNUM*
CDC 6000/Cyber 70, 170	SYSTEM 2000 TOTAL DMS-170
Sigma 5/6/7/9 (H.I.S.)	EDMS
NCR Century Series, Criterion Series	TOTAL

*Remote computing only.

Figure 3: DBMS classified by mainframe hardware family.

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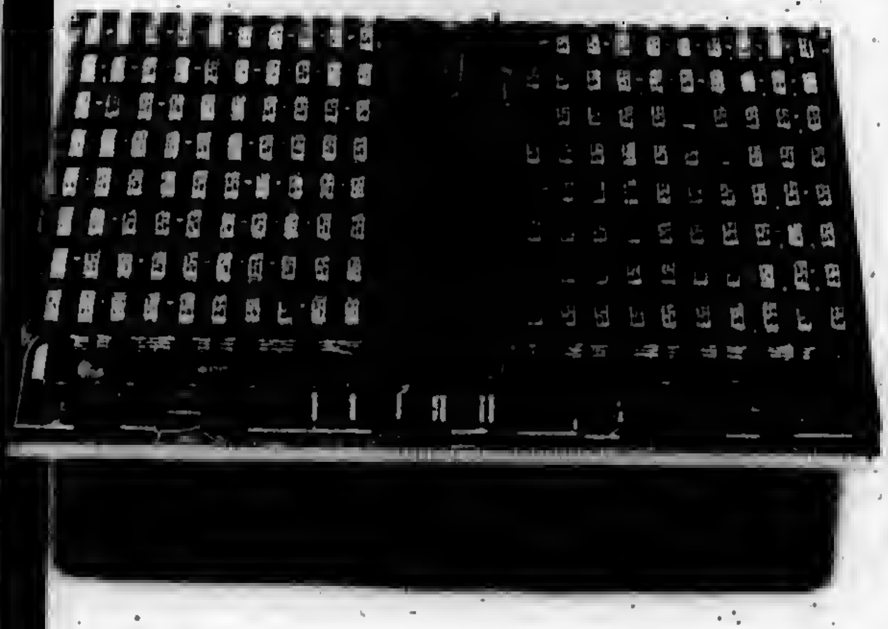

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be taken into account when selecting the best DBMS package.

Hardware systems, of course, immediately restrict choices among DBMS, especially for the non-IBM user. Figure 3 classifies DBMS by hardware.

One of the more interesting recent developments in the data base field has been the cross-mainframe implementation of several DBMS, most notably Total by Cincom Systems, Inc. and System 2000 by MRI Systems Corp.

Another interesting development that may prove very significant for the systems of the future is the implementation of DBMS on midi- and mini-sized computers. Examples are Image/3000 by Hewlett-Packard Co., Total by Cincom Systems and DBMS-11 by Digital Equipment Corp.

Somewhat the dark horse in the data base field, at least for the present, is the role that the Codasyl specifications for DBMS standardization are to play in the evolution of data base systems. This issue greatly divides current data base thinking.

There are three essential steps in close DBMS evaluation:

1. *A list of DBMS evaluation criteria is devised.* A sample list is presented in Figure 4. The first two criteria — consumption of system resources and interfacing with a generalized teleprocessing system — should be singled out for especially close attention.

2. *An effective strategy for incorporating the unique needs of the installation into the evaluation process is defined.* One such strategy is presented in Figure 5. Its distinguishing characteristic is the weighing of individual criteria according to their importance to the needs of the organization.

3. *The DBMS themselves are rated.* Information for this rating may come from a variety of sources:

- Vendor presentations and literature. (A "demo" can sometimes be arranged, though often at a cost to the users.)
- Recent periodical publications and other independent studies.

An Algorithm for Evaluating DBMS

Step 1. For the individual criteria within each major evaluation area (see the preceding list), assign relative weights based on an average score of 100. Each weight should reflect the importance of the criterion to the overall philosophy and projected hardware configuration of your installation. The accuracy of the evaluation depends on a realistic estimate of these weights.

Step 2. Rate each DBMS package on each criterion, assigning a score of 1 to 10. This score reflects the strength of that system for the given criterion; the higher the score, the better the system.

Step 3. Multiply each criterion's weight by the rating of each DBMS package on the given criterion. This gives an evaluation score for each package on each criterion.

Step 4. Total each system's evaluation scores for every criterion within an evaluation area. This gives the relative strength of each system for each evaluation area.

Step 5. Total each system's area evaluation scores across all areas. The result is an estimate of the overall strength of each package, given your relative criteria weights.

Figure 5

DBMS Evaluation Criteria

I Capabilities and Requirements
  1. How much core and overall system resources are required for effective DBMS operation?
  2. Is the system part of (or easily interfaced with) a generalized teleprocessing monitor?
  3. Are integrity and protection features (back-up, audit trail, checkpointing, recovery, etc.) sufficient?
  4. How effective is the teleprocessing interface in selective program back-out?
  5. Does the system give performance statistics (for performance monitoring and reorganization)?
  6. Is the system (easily) complemented by a capable report generator?
  7. Is the system (easily) complemented by a capable query language?
  8. Are sufficient utilities supplied, especially for file conversion, reorganization, and loading/unloading?
  9. Is the system efficient for both batch and on-line processing, or does it handle one at the expense of the other?
  10. How difficult is fine-tuning and ongoing maintenance? What resources are required?

II Flexibility of the Operating DBMS
  1. Is the system modular, in the sense that when one portion of the data base is down, other operating areas remain unaffected?
  2. How well can user access to data elements and records be controlled? Is data independence supported to the data element level?
  3. Is a subschema capability supported? What type of access control and retrieval enhancement does it provide?
  4. Are multiple data sets per data base supported so that only active portions need be loaded?
  5. Are multiple user languages (for instance, FORTRAN and PL/I) supported?
  6. What devices are supported for data base storage?
  7. Is the system designed for concurrent retrieval and concurrent access?
  8. In the absence of the on-line portion of the DBMS, is a copy of the DBMS required for each batch program? Can a single copy support concurrent data base access from multiple batch programs?
  9. Where does support for concurrent access fall?
  10. How good are search capabilities (for instance, is the language easy to use, and is sufficient expression building supported)?
  11. Is the system more efficient for retrieval or for updating? Is performance for the other seriously degraded?

III Standardization of the DBMS
  1. Does the system follow CODASYL specifications? Is the system available on other hardware lines?
  2. How much is the data base locked into the DBMS?
  3. Is the data directory externally readable and/or standardized?
  4. Are data encoded/decoded or compressed/decompressed? Is the feature optional? How much storage space can be saved?
  5. How dependent is the system on COBOL?

IV Investment of Professional Resources
  1. Is the system difficult for the application programmer to use efficiently?
  2. How much actual DBMS implementation is done by the user installation?
  3. How much DBMS support is provided by the vendor?
  4. How much ongoing physical mapping must be done by the user installation?
  5. Is the system well documented?
  6. How difficult is selective or massive data entry?
  7. What type of data dictionary capability is provided? What services are offered? How difficult to use is the data dictionary?

V Design of Storage Structuring
  1. What are the limits on the number of:
     Record or segment types?
     Searchable fields per record?
     Occurrences of a single repeating group?
     Record or segment type per set or hierarchy?
     Interfile relationships?
  2. Is inversion supported? Is the inversion technique actually indexed access or inverted access? Is indexed-random access supported? How difficult is the inversion to use?
  3. How difficult is it to add new fields to the data structure?
  4. How difficult is it to change data structures? What can be changed? What impact does the change have on existing applications?
  5. How "expandable" is the data structuring?
  6. Are variable-length records supported by the DBMS? How strong is this support? Is the feature difficult to use?
  7. What facilities are provided for supporting sequential processing of data base files? What overhead is engendered?
  8. What facilities are provided for supporting ad hoc searching of data bases and for relating previously unrelated files?

Figure 4

- Communications with current users of the system. (The DBMS vendor can be persuaded to supply a list of representative users.)

A log of evidence supporting each rating should be carefully maintained for future reference.

The evaluation should be undertaken by a team consisting of representatives from those areas most affected by the data base project: management, operations and application systems. Ideally, each member of the team should arrive at ratings independently.

One thing to remember in rating a particular DBMS on a given criterion, especially when the evidence consists largely of user comments from other installations, is that every application situation is different; what is good for one organization may not be good for another. Another point to keep in mind is that many organizations have benefited from the expertise of outside consultants, most of whom have been through the selection process many times before.

The results of the evaluation process must be accompanied by a detailed cost/benefit analysis. Items in this analysis should include:

- The price for each package, including the projected costs for installation, maintenance, education, documentation and support. Some DBMS come in a comprehensive package, others come piecemeal; a quoted DBMS price tag can therefore be deceptive.
- The quality of performance and support guarantees. Can the vendor back up the promises he makes?
- Conversion aids. Are they provided, or must conversion programs be written in-house?
- Projected changes in DP technology. Will they make the hardware and software outmoded?

Ronald G. Ross is senior staff consultant for data base systems at Performance Development Corp. in Princeton, N.J. He is the author of many articles and monographs on topics that range from data base administration to trends in data base management systems packages. Typical are "DBMS," An Overview of Data Base Technology from Government Data Systems *and "The Data Base Administrator: What Is His Place?" from the* Journal of Systems Management.

Ross, who is 27, graduated from Rice University with honors and holds an M.S. degree from the Illinois Institute of Technology.

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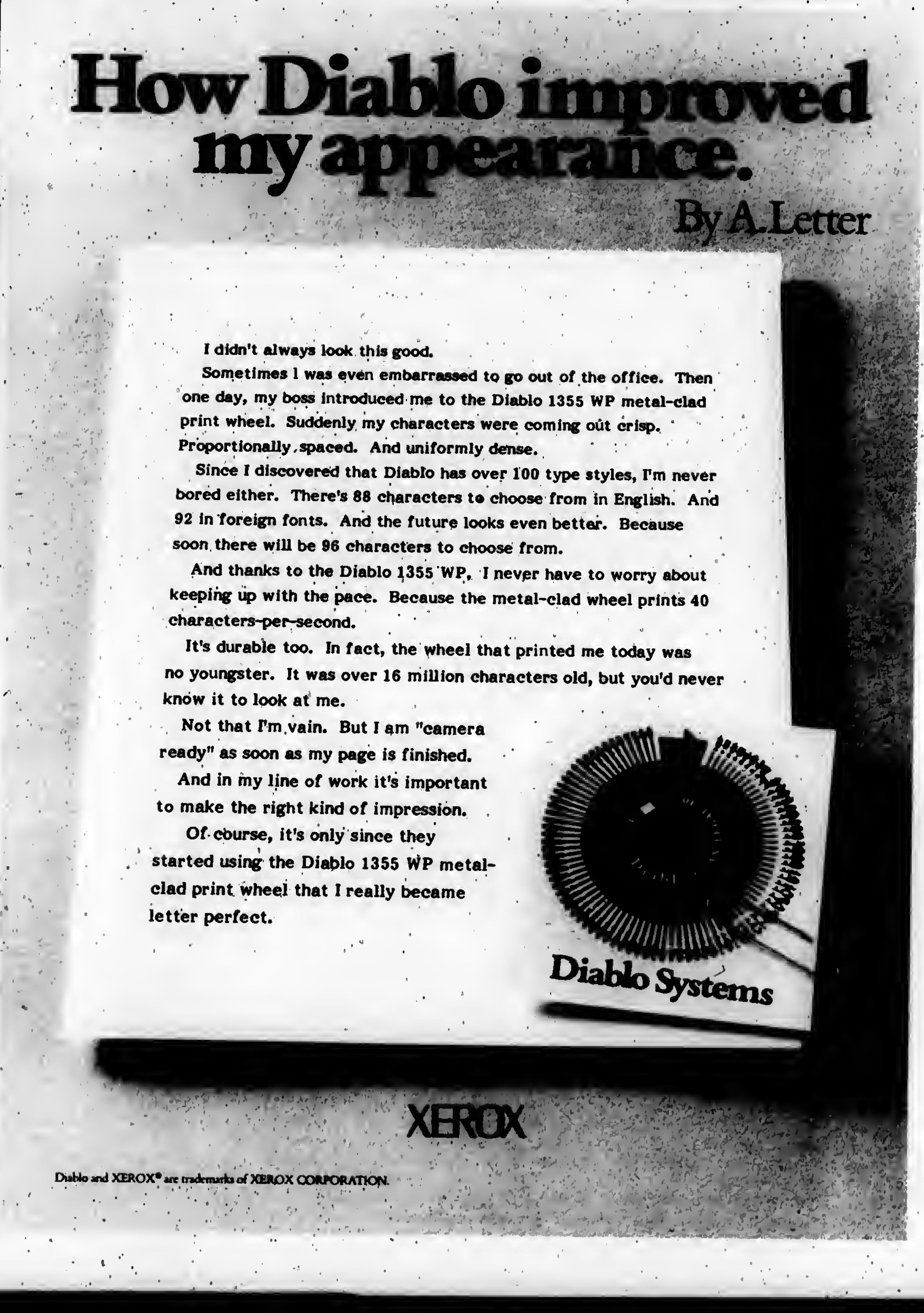

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By A. Letter

I didn't always look this good.

Sometimes I was even embarrassed to go out of the office. Then one day, my boss introduced me to the Diablo 1355 WP metal-clad print wheel. Suddenly my characters were coming out crisp. Proportionally spaced. And uniformly dense.

Since I discovered that Diablo has over 100 type styles, I'm never bored either. There's 88 characters to choose from in English. And 92 in foreign fonts. And the future looks even better. Because soon there will be 96 characters to choose from.

And thanks to the Diablo 1355 WP, I never have to worry about keeping up with the pace. Because the metal-clad wheel prints 40 characters-per-second.

It's durable too. In fact, the wheel that printed me today was no youngster. It was over 16 million characters old, but you'd never know it to look at me.

Not that I'm vain. But I am "camera ready" as soon as my page is finished.

And in my line of work it's important to make the right kind of impression.

Of course, it's only since they started using the Diablo 1355 WP metal-clad print wheel that I really became letter perfect.

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Editorial

Standards: Talk, But No Action

A Presidential task force has now added its voice to others warning that de facto standards in the computer field may be harmful to the growth of the industry [CW, May 15].

Big deal.

For more than a decade, congressional committees, industry groups and other presidential committees have made this observation, but little has changed.

The addition of one more report is unlikely to improve the situation one iota as long as it remains advantageous for computer vendors to maintain a fragmented market — and there is little sign that this will change in the near future.

Manufacturers generally live off their own base of customers, getting most of their business by upgrading their installed systems, rather than taking market share away from other manufacturers.

It is not in their interests to have standardized systems so users will have a wide range of choices when upgrade time rolls around. After all, if the user has invested heavily in programs for a nonstandard system or language, that user will be less likely to change vendors when it comes time to upgrade.

And while all mainframers will say nice things about standards — as they will about apple pie, the flag and motherhood — they really don't want effective standards.

But at the same time, these same manufacturers have an effective stranglehold over the U.S. standards-making process. The manufacturers effectively control the American National Standards Institute, the voluntary arm for setting U.S. standards. Only those firms can afford to send representatives to the drawn-out proceedings of this body.

The mainframe manufacturers in particular control this group and have only recently been challenged by the plug-compatible manufacturers on the issue of the standard I/O channel — but that issue is still being decided by vendors in the industry rather than users.

The other major standards-making body is supposed to be the U.S. government. As the world's largest user of computers, the government was given the responsibility to set governmentwide standards by the Brooks Act in the mid-1960s.

So far, it has been a dismal failure.

The National Bureau of Standards (NBS) is supposed to head this effort but has proven to be particularly vulnerable to vendor pressure and has therefore abdicated its responsibility almost totally.

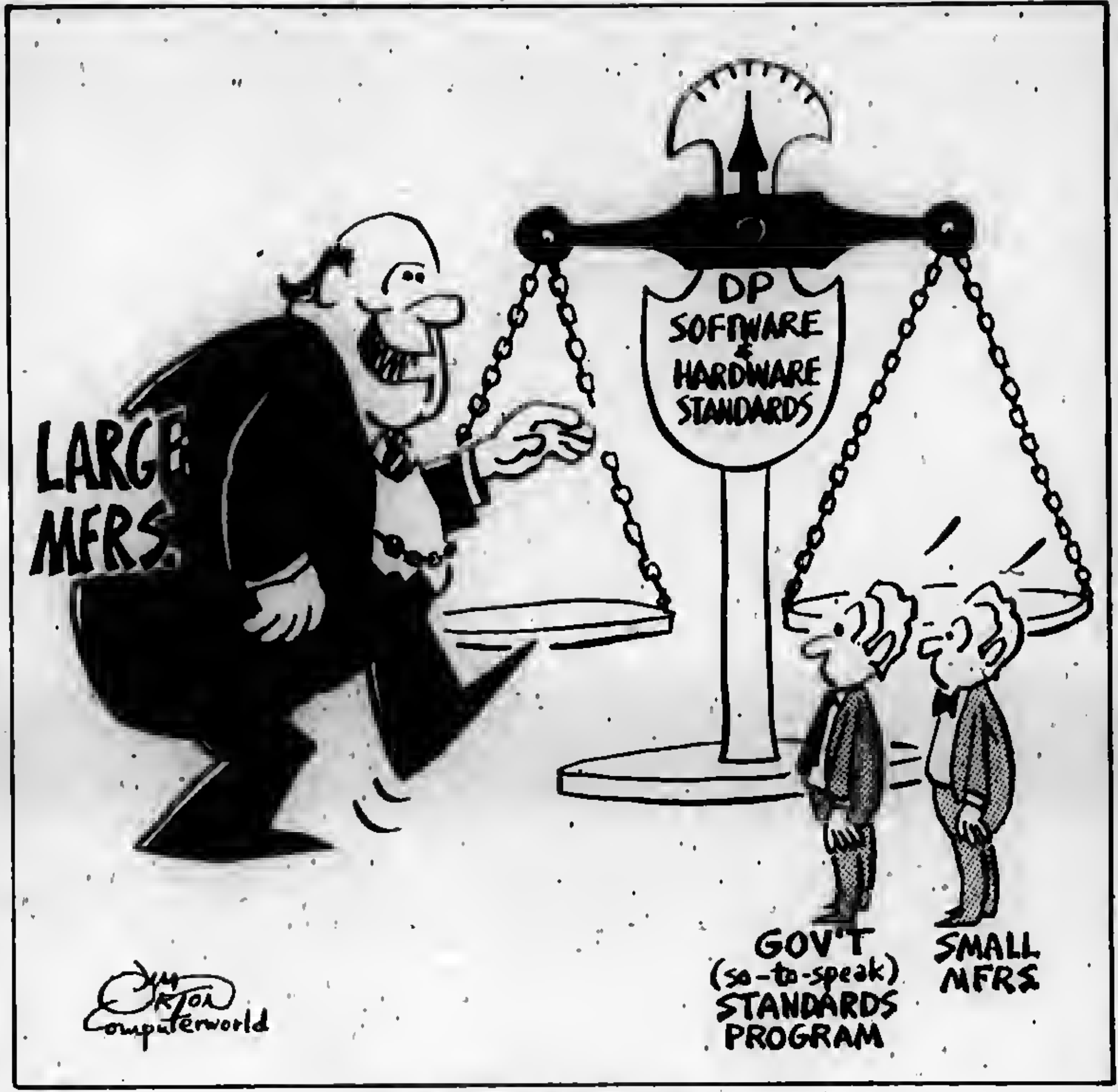
The bureau got the word loud and clear in the late 1960s when Dr. Herbert R.J. Grosch was summarily downgraded from the head of the Institute of Computer Science and Technology for having the temerity to speak out against the nonstandard IBM System/3. Since then, institute directors have been particularly circumspect and rarely say anything but platitudes about government DP standards.

The NBS has asked for a whopping budget increase in order, it says, to promote a more comprehensive standards effort, but unfortunately what the agency needs is not so much more money, but more courage and more principles.

Any full-fledged standards effort is going to raise cries of protest from the mainframers and other manufacturers, and there is nothing in the NBS budget request that indicates it will have the guts to stand up to those pressures.

In 10 years, there will probably be at least two or three other presidential reports decrying the lack of standards and warning of the dangers of de facto standards.

Nothing is likely to change.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Computerworld

'After You, Gentlemen . . .'

Data Past

Eight Years Ago
June 3, 1970

LOS ANGELES — A survey of some major Western cities — Los Angeles, San Francisco, Seattle, Phoenix and Dallas — showed an almost nonexistent job market for the programmer with one year or less experience. Sources in all cities reported employers were requiring two, three or four years' experience including experience on the employer's particular model of computer and his languages.

— — —

GENEVA, Ill. — Errors attributed to faulty keypunching affected the tax bills of 32,000 persons, put the Kane County Computer Center here 2-1/2 months behind in its work, added several months to the session of the county board of review and cost taxpayers an unestimated sum to redo the tax cycle.

Five Years Ago
May 30, 1973

ST. PAUL, Minn. — A bill pending in the Minnesota legislature would put non-Bell competition in jeopardy by giving the state Public Service Commission the power to regulate any supplier that installed or maintained equipment connected to the telephone network, including carrier and noncarrier vendors. If approved, the impact could be disastrous for users of customer-provided equipment including modems and terminals.

— — —

TULSA, Okla. — Action on the IBM counterclaim to Telex's $1.2 billion antitrust suit continued with Telex rebutting charges that it hired IBM engineers to steal trade secret information. A Telex witness said that the firm wanted to hire the best possible people and that those people were working at IBM.

Letters to the Editor

Grossly Unfair to IBM

I think CW was grossly unfair to IBM in the May 1 editorial, "Serious Flaws in Antitrust Laws." Specifically:

1. The real reason(s) the Department of Justice did not ask for interim relief is unknown.

2. That IBM is a monopoly has not been proven.

3. CW said, in effect, that if IBM pursues its legal rights in court, it's called "maneuvering" and "delaying tactics"; if the government pursues its rights in court, it's OK.

4. The articles "An IBM Surprise" and "East vs. West: A Matter of Style," of the May 1 issue, counter your long-trial issue.

5. If IBM is trying to delay, why did it not request that the case be thrown out of court? That, on rejection, would have been good for at least a year.

E.N. Weaver
Radnor, Pa.

Problems With Stock Summary

The "Computerworld Stock Trading Summary" is a compilation of stock prices that generally is useful to those of us following the industry.

However, its usefulness is seriously marred by its failure to take account of such important changes as stock dividends and splits. This makes for some apparently weird stock price changes.

I refer specifically to the May 15 summary, which suggested that Amdahl Corp. stock plummeted 48.7% in the week ended May 10. This indicated 27-point "collapse," of course, did not occur because the change in stock price was effected by a two-for-one split.

I urge CW to take steps to avoid such inaccuracies in the future in order to provide a more useful listing for all its readers.

Robert L. Christensen
Vice-President
Becker Securities, Inc.
New York, N.Y.

Points Out 'Minor Flaw'

There was one minor flaw in the otherwise superb article by Rita Shoor, "Technician vs. User" [CW, May 15].

The "i" in Erisa stands for "Income," not "Insurance." This might suggest a 7th rule: "Listen" (inserted just after Rule 1, "Ask Questions").

David R. Cummings
Bridgeport, Conn.

Progress in San Jose, Too

We in San Jose read with interest "Library Saves $370,000 on System Conversion," [CW, May 1] about the automated circulation system progress in Tacoma, Wash.

When Kevin Hegarty and his colleagues from the Tacoma library visited the San Jose Public Library in March, 1977, we were most happy to share with him the conversion process we had undertaken in 1978 — that of loading available data bases into our minicomputer and seeking matches by entering cataloging numbers or author/title. San Jose has enjoyed a hit rate of at least 80%.

San Jose now uses OCLC, a computer-based shared cataloging service, for cataloging assistance and catalog card production. In order to economize further on time and to increase accuracy, a light pen attachment was added to our OCLC terminals.

Richard E. Rendler
Chief, Public Services
San Jose Public Library
San Jose, Calif.

With Firm's Profits in Mind

Programmer Can Relate to Business Goals

By Jack Stone
Special to CW

Information systems managers over the years have been impressed with the way systems programmers dedicate themselves to technology. On the reverse side of that coin, they have been continually discouraged about how little loyalty is shown by these programmers toward their company.

Certainly when I reflect on the systems programmers I have known, I believe this characterization applies. At least it did until last week, when I met one who feels strongly that he can tie his services directly to the profitability of his company. Although this programmer's situation may be unique, I am going to relate it anyway, in the hopes that management information systems (MIS) managers will be encouraged to find ways of reorienting some of that systems programming dedication toward company goals and objectives.

This systems programmer is employed by a vendor of digital equipment and services. He is currently assigned to one of that firm's internal MIS departments which has a large-scale computing system installed. He is an internal technical consultant, responsible for solving problems of interfacing his company's products to the computing system software. He built a solid reputation for attacking these very complex interface problems with gusto and solving them in short order.

One day, a resourceful salesman called him to solicit his help in a customer account. The customer was trying to write some interface code to support one of the company's products and was having considerable difficulty. The technical staff in the sales department did not have the level of knowledge necessary to solve the problem.

The programmer expressed considerable interest in providing this support, and an arrangement was made whereby the salesman could "purchase" his services.

It was in his dealing with customers, albeit on a highly technical level, that the programmer acquired an entirely new set of attitudes and perceptions about his company. Here is what he had to say during our interview:

Q. How did you view your job prior to expanding your responsibilities to include customer support?

A. My job is that of an expert problem solver in a very narrow, specialized technical field. Frankly, I feel a great sense of pride and achievement when competent technical people come to me for help, because they know that I have superior knowledge in my field.

You can call it an "ego trip," but I don't see it that way. It's just that many systems programmers in a similar capacity find substantial psychic rewards in providing service to other people, sometimes more than those associated in writing, for example, an extension of an operating system program.

The Human Connection

Q. And what was your feeling toward your company?

A. Well, I work for a good, solid company. They pay a competitive salary and offer standard fringe benefits. But what is exciting is that the technology of our computing installation is at the leading edge, and that is where I must be if I am to maintain my technical competence.

It is also important to note that I am very busy in my job and don't really have much time to learn about other operations in our company. And I have to add that our director certainly hasn't seen fit to provide much information or training programs to broaden our perspectives about the business.

Q. How has the marketing support function changed your viewpoint?

A. Well, it has done a lot for me and without much effort on my part. You see, the salespeople I deal with only ask me to solve the same class of problems that I face internally. But now, I can directly relate my effort to a sale that would not have been made without my expert consultation. I can point to profits of the company that resulted from my personal efforts and that is a measure of performance I never had before.

Q. How has the marketing experience affected your attitude toward your company?

A. Well, that's an interesting question. Let me put it this way. Do you remember the ethics question that posed the situation in which a programmer writes a utility program on company time to help him and then takes it with him to a new job? Well, prior to this sales support experience, I would have had no qualms about taking a program I wrote with me and not telling the company, as long as the utility was not a direct assignment of mine. But now, I'm not so sure.

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Produces Two Forms

Method Gives Documents Clarity, Precision

The Taylor Report
By Alan Taylor CDP

Robert Green of Lawyers Word Processing, Ltd. has a different way of showing how DP can help improve legal documents from the method suggested in my Feb. 6 column. He achieves the same virtues of clarity and understandability, but without taking the risk of rewording legal technicalities.

The problem with rewording legal documents such as wills is that the rewording may obscure their meaning. The standard will, like other legal documents, is created primarily by using a "fill-in-the-blanks" concept that has been proven over the centuries. This technique uses pronouns and references to reduce the chances of error by reducing, to the maximum extent, the number of blanks that have to be filled. The resultant language is precise, but it isn't too understandable.

My approach to get understandable and precise language was to use the power of computer logic to effectively look up the contents of various blanks, change them to fit grammatically and then fill in the later document references. These then show what is actually going on without using pronouns, references to the "said parties," or "the conditions of subparagraph C." This allows both accuracy and nonambiguity of reference, as well as readability.

Green has achieved this in a different way. He starts with a single input, such as the questionnaire, and may or may not include various boilerplate paragraphs. However, the technique produces from this, at the same time, one traditional legal document and a readable summary of the provisions of the legal document. The summary is known to be accurate because it comes from the same computer input.

'One-Into-Two' Technique

This one-into-two technique is very effective. While visiting Chicago, I was able to see that this technique can maintain uniformity between two areas of a document, which is, and always has been, the basic problem of legal technology. Yet, the procedure also permits the use of traditional phraseology to give the maximum legal protection, while providing, on the other hand, an understandable version which simply isn't acceptable to the legal areas beause it isn't traditional to provide documentation understandable to the layman.

"One-into-two" was used to prepare a complicated trust-sharing document and a summary. Profit-sharing trusts are perhaps as suitable for this approach as any other document. This is because most of the clauses are approved by the Internal Revenue Service (IRS), which is accustomed to certain formats. There would be nothing legally wrong with submitting other clauses to the IRS in an understandable form — but it would certainly delay the approval process.

The output was two separate documents — one on legal size and the other on 8-1/2 by 11-in. paper. The phrasings in each were equally different, but the accuracy of the relationship of the two documents was totally controlled by computer program.

I haven't gone over the accuracy of the Lawyers Word Processing program. However, it would not be difficult to check. It would simply be a matter of exercising each of the options and producing side-by-side listings of each of the resulting phrases. It would also require checking the unchanged existence of the program, each time it is operated; checking that someone familiar with the program, the hardware and the compiler agrees with the logic illustrated at the source level; and spot-testing.

Currently this checking development has not taken place, at a theoretical level, but the system has been tested by the experiences of many attorneys. Experience is an equally honored method of checking, although I personally prefer using both experience and theory.

However that may be, the one-into-two approach is clearly new and valuable. It may be restricted to the legal profession, because of the fact that part of the output of legal work is documents that can be easily checked as having specific, known reasons, and therefore not given to causing disputes.

If this is so, then it can be argued that the same approach may not be suitable in fields such as education and medicine. But I'm not certain of this.

Indeed, I think the one-into-two approach can be adopted, although for slightly different reasons. Many professionals be they skilled lawyers or skilled engineers, often need to talk simultaneously on two levels of understanding — i.e., to their professional associates and to others who have a particular interest in the immediate situation, but no interest in the profession's technicalities.

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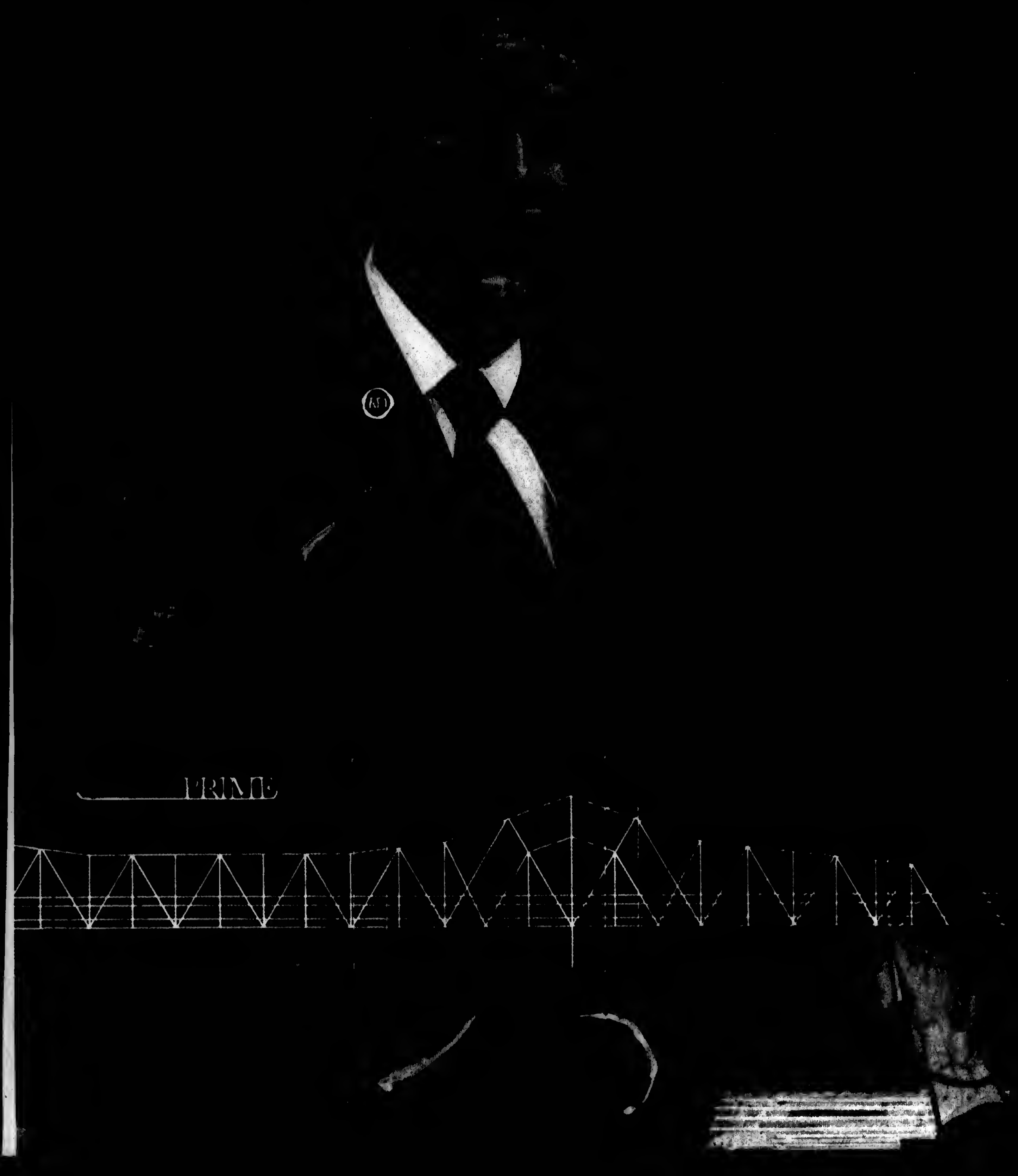
'Electronic Mail Fraud, No Doubt.'

"Conventional computers only give students correct numbers. Computer graphics develops engineering intuition."

Dr. George S. Ansell, Dean of the School of Engineering, Rensselaer Polytechnic Institute, Troy, N.Y.



Engineering educators at Rensselaer Polytechnic Institute, one of the country's top technological universities, believe that interactive computer graphics offers students, especially undergraduates, an intuitive, visual understanding of engineering problems and concepts that conventional computers, with their emphasis on abstract data, have failed to provide.

To put that belief into practice, RPI needed a computer powerful enough to support 36 interactive graphics terminals simultaneously, and versatile enough to meet the needs of multiple engineering and scientific disciplines. They chose dual Prime 500 interactive timesharing computers.

Prime's family of interactive computer systems offers industry standard software including **FORTRAN IV, BASIC, RPG II, COBOL**, and a **CODASYL**-compliant Database Management System. They also have greater memory capacity than any other family of small computers: up to 8 million bytes of high speed main memory, 2.4 billion bytes of disk storage, and 32 million bytes per user of virtual memory.

Prime computers are also true multi-user systems; one computer can handle up to 64 simultaneous users in such diverse activities as **RJE** communications, forms processing, on-line data entry, computational time sharing, and database management. And the **PRIMOS** Operating system allows any user to use any language at any time.

For the detailed story of how Prime is helping RPI, and for more on how we might help you, contact Joseph A. D'Angelo, Director, Market Planning, Prime Computer, 40 Walnut Street, Wellesley Hills, Mass. 02181.

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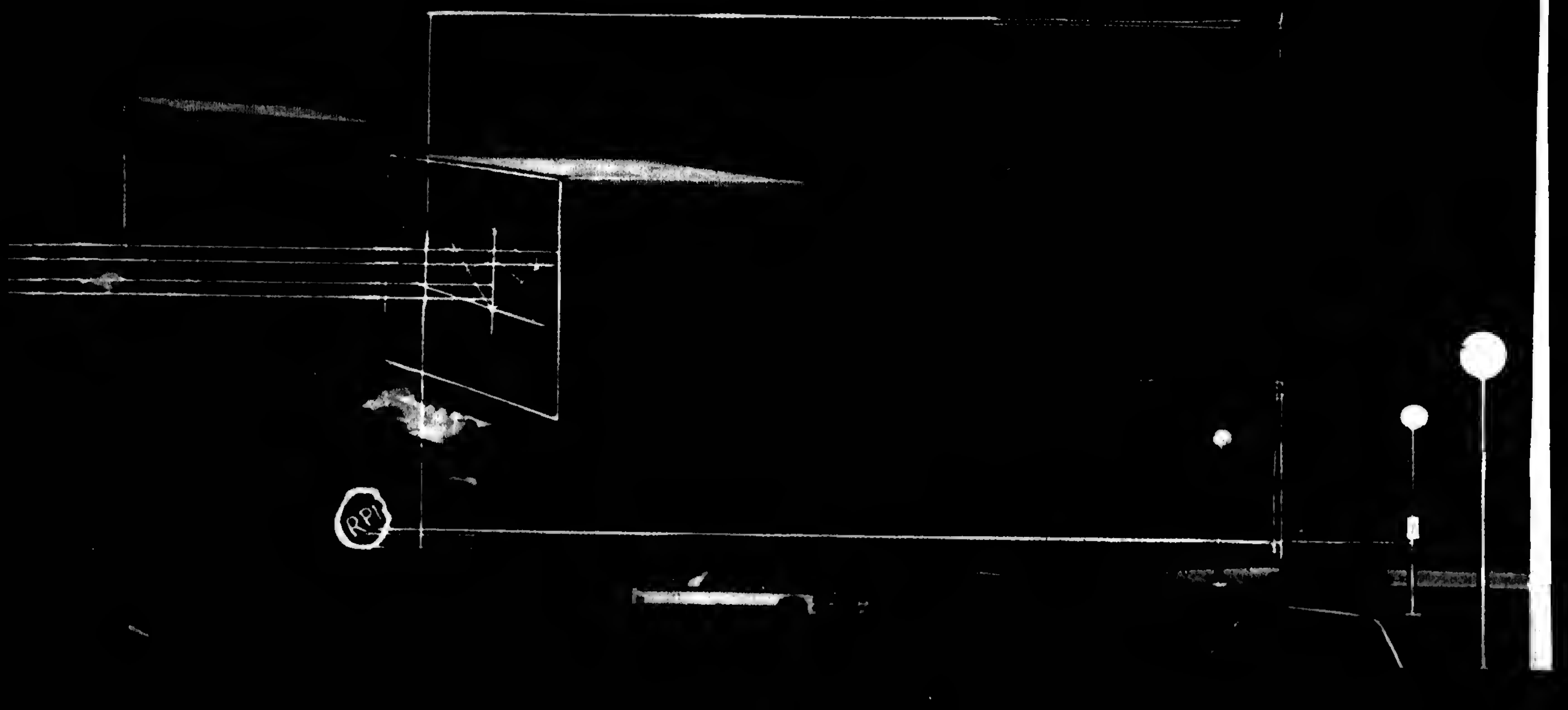

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Ecoma Attendees Told

Performance Measures Not Good Enough

By Don Leavitt
CW Staff

LONDON — While computer performance evaluation (CPE) and measurement are gaining acceptance in many installations, CPE studies have generally been started in response to a specific problem. That's not good enough, according to Carl Van Tassel.

The U.S.-born director of Paris-based Tesci-Software admitted to the recent meeting of the European Computer Measurement Association (Ecoma) the hit-or-miss approach to CPE "sometimes provides striking results."

"However," he added, "we believe that all studies would benefit from a structured approach which would improve the results, even for the spectacular success stories."

The structured approach to performance management is based on four basic ideas and not one of them is — or should be — surprising, Van Tassel said. In the first place, he noted, different people require different information in order to judge how well a data center is functioning.

In the second place, "performance measurement should be performance-oriented," he reminded the delegates. Most performance measurement activities gather statistics on resource utilization — percentage usage of a channel, multiprogramming level, etc. — but they should be focusing on terms to which the user and management can relate.

In general, user and management satisfaction is a function of the cost of a given level of service, and that, according to Van Tassel, can be measured by such things as percentage of deadlines met, average and maximum turnaround or response time and the accuracy of results or number of reruns.

'Larger Than Machine Room'

Once the CPE team recognizes the need to produce statistics in user-meaningful terms, the third idea behind performance management becomes obvious. The performance problem is larger than the machine room, he pointed out.

It is of little use to optimize the computer if the data capture or forms handling operations are the real bottlenecks. "The user is not happy if his job is given top priority on the computer, but he waits several hours for his printed output," Van Tassel said.

The entire DP department should be viewed as a pipeline through which work flows, and any major disturbance or bottleneck reduces the capacity of the entire pipeline, he said, adding it is also necessary to verify that the flow is continuous and that the priorities associated with the jobs are respected throughout the pipeline.

Even though the same level of sophistication may not be required at each point in the system, at least basic measurements are necessary at all levels to ensure that the real problems — which may have absolutely nothing to do with the computer itself — are detected, he warned.

Management Commitment

For his fourth point, Van Tassel reiterated the idea that creation of a performance management system requires a commitment and the active participation of management far more than does a simple performance measurement study. That participation is needed both in the definition of the objectives of the system and in providing a means for its development.

The first step in creating the system is to get a general overview of what's happening now. This considers both resource utilization and costing and user satisfaction. Even the first pass at measuring usage may reveal some corrective actions that can be taken and some savings that can be realized, he said.

Having previously noted that there is more to performance management than concern for the computer and its peripherals, the speaker reminded his audience that optimization of the center is certainly part of the total plan he had in mind.

Performance management of the data center itself focuses on such things as scheduling and capacity analysis, he said. Scheduling of some form is in place in every center but good balancing of all the requirements of each job, in terms of resources and external constraints, is a highly complex task.

He noted it becomes extremely difficult to measure the performance of a center if the user does not indicate what his service needs really are. Therefore, user and management have to get together to establish just what service levels are expected or required. From there, performance management can become a reality, Van Tassel said.

'Adabas' Moves to PDP-11

BOSTON — Available only for IBM 360/370 users until now, the Adabas data base management system (DBMS) from Software AG will be available for Digital Equipment Corp. PDP-11s as well by early next year, according to a spokesman.

In the meantime, several enhancements to the mainframe-oriented DBMS will be released this summer, he told an Adabas users conference here last month. Both the Adabas Data Dictionary System and the Adacom batch report writer are due out in July while Natural, a natural programming language, is expected to be ready in September..

Developed for the DEC PDP-11 models 34 through 70 under RSX-11 and the IAS operating systems, the mini-based DBMS is driven by a data dictionary system. It includes an ad hoc query language described as a subset of Natural and supports applications written in Basic, Cobol, Assembler and Fortran, along with conversational teleprocessing.

Described as entirely reentrant, multithreaded and priority dispatched, the system is in Alpha testing and scheduled for general release in January 1979 for an introductory cost of $40,000.

The Adabas data dictionary provides 20 standard reports designed to meet the data-entry cross-reference needs of data base administrators, application programmers and end users, the spokesman said. Utilities are provided to interface with other Adabas components, he added.

The dictionary will be available to all Adabas users who have Adamint as a standard feature of their system. It is currently being tested under DOS, VS1 and MVS, the company said.

Natural provides both programmer and end user with facilities for updating, inquiries and reporting in both a batch and on-line mode. The language supports full logical relating of data as well as looping and iterations, the spokesman asserted.

Set for release in late summer, Natural will cost $24,000. More information is available from Software AG, 11800 Sunrise Valley Drive, Reston, Va. 22091.

Data Base Standards Topic of NCC Talk

ANAHEIM, Calif. — "Data Base Standards: Is Codasyl an Acceptable Choice?" will be the topic of discussion in a 45-minute presentation by Kent A. Ochel, executive vice-president of MRI Systems Corp., on Tuesday, June 6 at 11 a.m. in the Buena Park Room of the convention center.

Ochel plans to give up this segment of his company's commercial seminar time, he explained, because the basic question of standards is so important and has raised so much interest in the professional and trade press lately.

The session is open to all at NCC.

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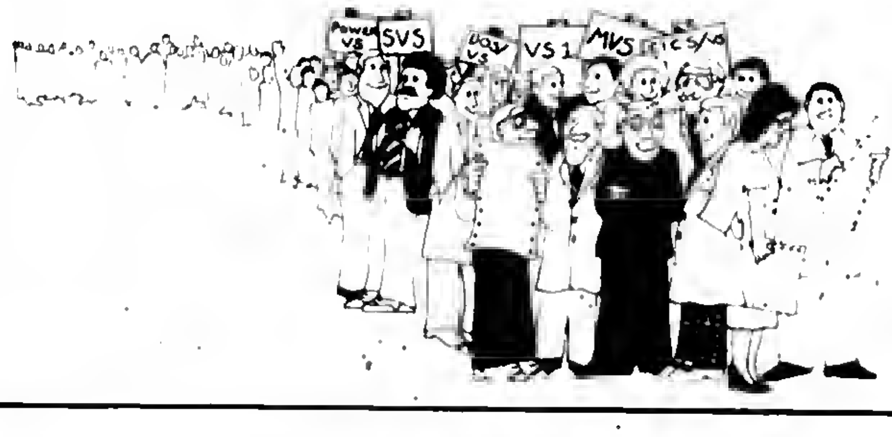

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'Pathfinder' Tracks Program Logic

STOCKHOLM, Sweden — The Pathfinder package from DataAnalys AB is said to analyze the flow of transactions through an ANS Cobol program so that programmers and their managers can determine if all possible alternative logic paths have been executed.

Use of the package should assure the project manager that a given set of test data covers all existing paths. Pathfinder would also show if a program contains coding that is not executed by authorized transactions, a DataAnalys spokesman said.

With Pathfinder, the user can optimize program logic through trying to minimize execution time by measuring and analyzing the frequency of all entered paths. All these functions can be carried out without any extra manual work, he claimed.

He explained that Pathfinder accepts the user's Cobol program (directly or through a program library routine) and analyzes the source code to locate and flag every node of all existing paths. The test support package also inserts a communications area in the user's program.

Normal compilation then takes place, and the resulting object program is linked together with the Pathfinder Execution Supervisor and Dynamic Reporting Module. The linked program is then passed forward for execution, DataAnalys said.

During execution, Pathfinder reports are produced both dynamically and for printout at end of run. If abnormal termination occurs, the DataAnalys spokesman continued, Pathfinder intercepts, generates its own reports and passes control back to the operating system.

Implemented on IBM 360/370 equipment and presumably adaptable to most mainframes with ANS Cobol facilities, Pathfinder is available for $3,000 from Skeppsbron 18, S-111 30, Stockholm, Sweden, or from affiliated offices in Helsinki, Finland; Den Haag, Holland; Dusseldorf, Germany; and Paris, France.

Programmer Tools Linked To Unix Operating System

GREENSBORO, N.C. — Coupling the Bell-developed Unix operating system for Digital Equipment Corp. PDP-11s with a range of tools for development projects of varying sizes, the Programmer's Workbench (PWB/Unix) is now available through Western Electric.

In addition to the facilities of Unix itself — a multiprogrammed, time-sharing operating system for the DEC minis — the PWB/Unix package includes, for example, a word processing system with editing, text formatting, spelling and typographical error-detection capabilities, a Western Electric spokesman said.

That part of the Workbench can provide commands to control a variety of style and ordering needs in document preparation of program books, letters and legal briefs, he explained.

Other facilities include remote job entry (RJE) support to submit jobs to and get results from an IBM mainframe. A source code control system (SCCS), described as an integrated set of commands, was designed to help programmers control changes to source code and to files of text.

Unix requires a minimum 48K on a DEC PDP-11/40, 45 or 70 with memory management, disks and upper and lower case Ascii support. PWB/Unix is available for a one-time charge of $30,000 for the first CPU and $10,000 for each additional installation, from the Software Licensing Manager, Western Electric, P.O. Box 25000, Greensboro, N.C. 27420.

'UCC Three' Adds Backup

DALLAS — Disk-based data sets can be moved to tape automatically to make better use of disk space with the DASD data set migration/backup enhancement for the UCC Three — Automatic Direct Access Management (Adam) package from University Computing Co. (UCC).

With the enhancement, the user can free a significant portion of an installation's DASD space currently consumed by infrequently used data sets and can create backup copies of critical data sets for recovery purposes, a spokesman noted.

Flexible criteria are provided for the automatic selection of data sets for migration/backup, he said, but specific requests may also be made so that individual data sets outside the normal criteria can be saved. All data set types, including Vsam, are supported, the spokesman added.

UCC Three analyzes DASD usage, status and space availability and provides a flexible method of deleting data sets not protected by the system. The system also gathers data in real time concerning DASD space consumption and directs the allocation of new data sets.

The previously available Volume Reconfiguration feature copies data sets from one volume to another to minimize the number of free space extents, to yield a better fit and to consolidate multiple extents for individual data sets, he continued.

UCC Three runs on any OS-based IBM 360/370. Written in ALC, it costs $15,000 or $640/mo or more depending on features and operating system, the company said from 8303 Elmbrook, P.O. Box 47911, Dallas, Texas 75247.

Harris Systems Gain 'Basic-V'

FORT LAUDERDALE, Fla. — Two separate reentrant language processors — one an interpreter, the other a compiler — are included in Harris Computer Systems Basic-V. Both are consistent with ANS Basic 78, a spokesman said.

The interpreter processes and analyzes each line for syntactic errors as it enters the system. This allows changes to be made quickly, he explained.

The compiler is used once the program has been developed and, hopefully, debugged through use of the interpreter.

Compiled programs also have the ability to CALL externally compiled subroutines. This means programs written in Basic-V can access Total data base management routines or utilities such as Harris' Vulcan Indexed Sequential Package (Visp), the spokesman added.

The package costs $5,000 and it can be ordered from Harris Computer Systems, 1200 Gateway Drive, Ft. Lauderdale, Fla. 33309.

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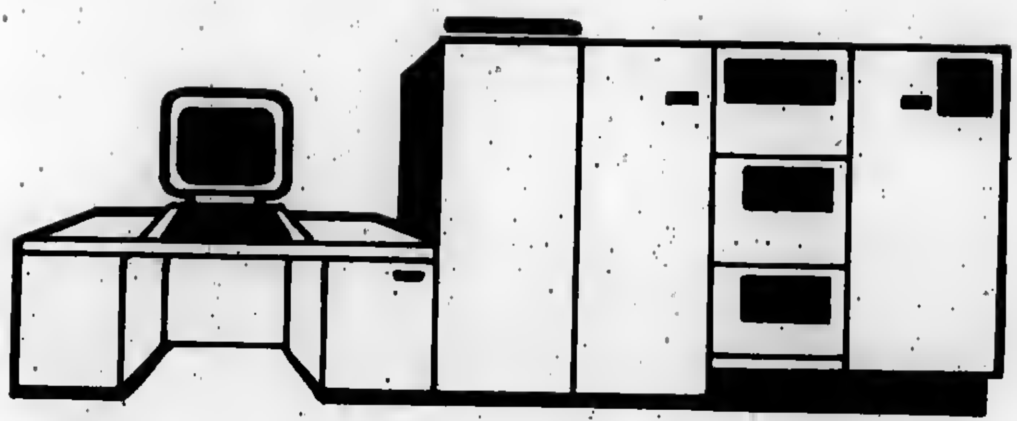

1 The completion of its Corporate Computer Center with an IBM 370/125 and an IBM Series/1 dedicated solely to support and development.

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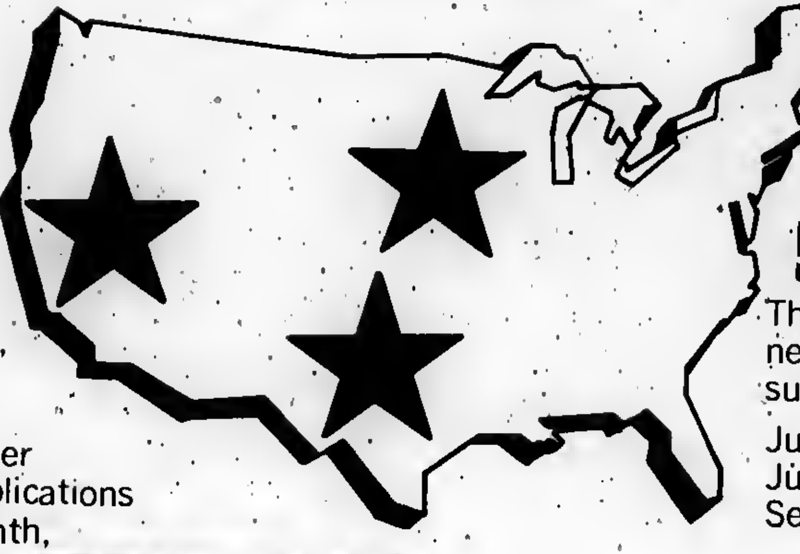

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Picking an RJE Vendor — Part 2

Each Firm's 'Track Record' Must Be Evaluated

By Richard J. Poje
Special to CW

When choosing a firm to provide remote job entry (RJE) services, the vendor's track record should be analyzed in terms of financial stability, system availability, turnaround for the type of work likely to be processed by the customer and necessary rerun rate, regardless of cause.

Financial stability may be difficult to evaluate since many vendors are privately held or are part of larger organizations and do not publish their financial data. A credit check can generally be performed, however, and it often reveals as much as or more than the vendor's balance sheet.

The selection of a remote computing service vendor is not necessarily simple. In his previous column, Poje — who is president of Phoenix-Hecht Inc., Chicago — discussed cost, flexibility, security and control as considerations. But there are others, as he explains here.

Site inspections and careful reviews of vendor control systems can also be extremely helpful; they provide an immediate indication of the vendor's investment in and commitment to the RJE business.

As a rule of thumb, the easier it was for the vendor to enter the business, the easier it will be to leave it.

System availability, turnaround and rerun rates should be easier to quantify since quality vendors will have this information close at hand, will be eager to review it with prospective buyers and will back it up with customer references.

Subjective Analysis

Some subjective analysis will be necessary because each user's needs are slightly different, but the data itself should be readily available. For instance, a vendor's mean turnaround may be 30 minutes, but that may be the average of two minutes for third-shift program complications and six hours for a first-shift production job with heavy resource requirements.

A customer with first-shift production needs may well be disappointed under these circumstances and find it necessary to pay steep premiums for high-priority access in order to complete necessary work. Likewise, a vendor may advertise 99+% system availability, but have a production job which uses 10 of its 12 mountable disk drives for several hours daily. This reduces effective system availability for all customers with mountable disk requirements.

The vendor's installation standards manual should be a help in evaluating such situations, and all quality vendors have such documentation for use by customers and prospects.

The needs of potential RJE customers are diverse and frequently extend beyond requirements for computer time and communications network availability. The vendor's ability to provide such services — specifically interactive time-sharing or conversational RJE, technical support, user training, programming, consulting, data entry and computer output microfilm — is an important consideration in the selection process.

This is true even if the need for such services is not immediately apparent in the customer's organization. DP requirements have a way of changing rapidly, and both present and future needs must be weighed in selecting an RJE vendor.

Look for Packages

Almost without exception, major RJE vendors have been expanding their application libraries, and the use of "packaged systems" can mean substantial savings — both in terms of time and money — for RJE customers.

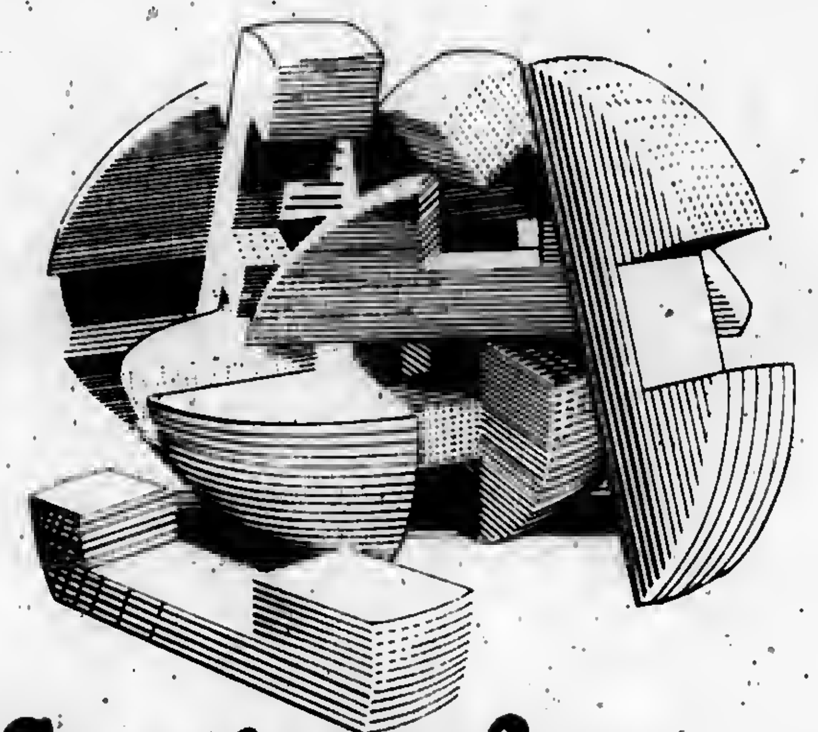
The so-called "scientific packages" — for statistical analysis, structural analysis and engineering design — are by far the most commonly available applications, but business oriented systems are gaining in popularity.

Payroll/personnel/labor distribution, accounts receivable, sales analysis, accounts payable and general ledger are the most common, but they are by no means universally available.

Programmer aids such as report writers, data management systems — and sophisticated utilities are also increasingly popular. These packages offer the RJE customer an alternative to expensive in-house development and a hedge against the uncertainties of the DP labor market.

Many RJE package users have found

(Continued on Page 34)



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NATIONAL **–SPECIAL LEAR SIEGLER ISSUE–**

INFORMER

May 29, 1978

AT LAST! THE TRUTH CAN BE TOLD!

SHOCKING REVELATIONS PROVE, BEYOND A DOUBT, LEAR SIEGLER'S PLANS TO DOMINATE THE NCC!

Lear Siegler, Inc., reeling under enormous pressure brought to bear on its mysterious Project X, has finally consented to declassify its hush-hush undertaking.

Overwhelming outcries of the past several weeks have made Project X's continued secrecy impossible, and the INFORMER's relentless war against it was, apparently, too big a burden to shoulder.

At a press conference held late yesterday, a group of high-ranking LSI officials and Project X engineers unveiled the fruits of their months-long clandestine labor. Project X's sealed doors were opened, and the wonder devices were seen and described in detail for the first time. It was an awesome sight, seeing the mechanisms in all their glory, there where they had their mysterious origins. INFORMER reporters noticed several involuntary gasps from others unprepared for the display.

Originally designed to guarantee complete mastery of this year's NCC (National Computer Conference), Project X was, from the beginning, shrouded in secrecy and bedeviled by persistent rumors. Our intrepid undercover reporter, working perilously close to exposure deep within LSI HQ, risked detection constantly in his efforts to leak Project X data. Only through the greatest vigilance and determination was he able to prolong his subterfuge and continue to supply us with information.

Now, however, his perseverance has culminated in success, and Project X is a mystery no longer. Our unflagging campaign against the project, coupled with public outcry, has accomplished what the government was not prepared to do, and the secrecy is over.

Within the pages of this week's INFORMER, the fabulous devices of Project X are reviewed in detail. Now, at last, here is the full story on Project X and the culmination of its labors.

The INFORMER wishes to publicly applaud its diligent, selfless staff of reporters, field operatives, and agents who, through their unceasing efforts, made this moment what it is—the disclosure of Project X.

COMPLETE DETAILS WITHIN

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LEAR SIEGLER

ADM-31 Proves 2 Pages Are Better Than One

The ADM-31 is a low-cost, high-reliability desktop CRT with full editing, formatting and *two pages of display.* Not as an option, but as standard equipment. Which means the ADM-31 affords twice the display potential of terminals costing up to twice as much. And that's a pretty clever idea.

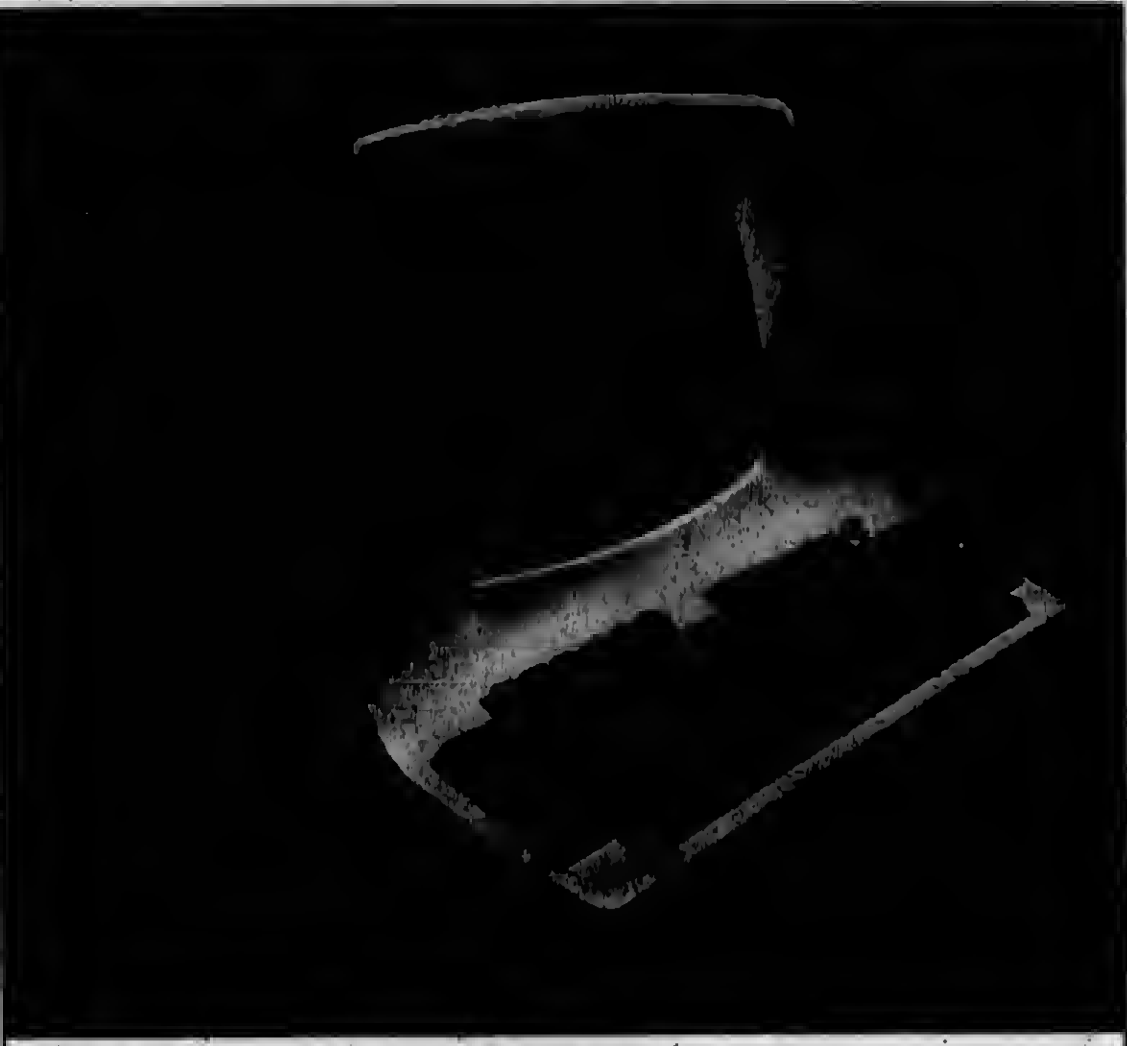
The ADM-31 is completely self-contained, with a keyboard, control logic, character generator, refresh memory, and interface. What's more, it incorporates a microprocessor which augments its reliability while making it even easier to use. Block transmission and *protected fields* are standard. And the terminal also comes with a printer port option, if you require printouts along with your readouts.

The ADM-31's amazing 90-key keyboard is actually capable of more functions than are now available on the ADM-1. What's more, the keyboard itself is integrated with the main logic, and is capable of generating all 128 ASCII characters (upper and lower case, numerics, punctuation, and control). Among other things, it features an integral numeric pad, with period, comma, tab, minus, and numerals arranged in a familiar calculator format. And it also includes a caps lock key (to lock the keyboard into upper case display).

The ADM-31's editing capabilities let you clear the screen, or use a destructive cursor for a character change. Read and load cursor permits sensing of the current address, and direct, absolute addressing to any X-Y coordinate. The controls let you skip protected fields, backspace, forespace, move up, down, return, home, and new line. And you can store the Control Characters, and they'll display as a reverse image.

The ADM-31 comes with *character insert/delete,* line insert/delete, erase to end of line/field/screen, and back tab. All standard equipment. The ADM-31 can also clear to protected spaces, clear to unprotected nulls, and set and reset copyprint.

Who says a machine can't edit?



Project X's new ADM-31 desktop CRT, seen here with 90-key keyboard and Caps Lock Key. PROJECT X PHOTO

Project X's amazing new ADM-42 is a semi-intelligent terminal designed for a host of computer-related tasks. PROJECT X PHOTO

ADM-42 All But Thinks For Itself

The ADM-42 is a semi-intelligent terminal that gives the user flexibility of format, security, editing, interface, and transmission. Like the ADM-31, it features a full two-page display as standard equipment. And it also comes with an optional extended memory capable of adding data space in 2-page increments up to a maximum of 8 pages.

The terminal boasts a bright, easy-to-read, 2000 character display, a full 128 ASCII character set, 16 function keys for 32 separate commands, and five separate cursor control keys. You can also order an optional Programmable Function Key feature that lets you define the function keys. An alternate character generator with line drawing set is also optionally available.

The ADM-42's status displays on-screen disclose a wide range of information at a glance, and special symbols indicate the entry of all control characters in memory. The ADM-42's Field Protect Mode also allows rapid data entry into forms or instruction pages.

Like the ADM-31, the ADM-42's displayed data is formatted in 24 lines per page, with 80 characters per line. In addition, it offers something the ADM-31 doesn't. It has an 80 character 25th line, established and reserved exclusively for status indicators, or special messages.

An additional special capability of the ADM-42 is Field Blanking/Underline. You or the computer can designate areas of the display as blanked fields, and the designated areas are then blanked from the display. Or an Underline attribute may be substituted for Field Blanking by switch control.

With Field Blinking, you or the computer can designate areas of the display as blinking fields. These areas of the display will then blink on and off.

And with Reverse Field, you or the computer can designate areas of the display as reverse images. These areas of the display will then reverse on and off.

The ADM-42, like all LSI products, is upward compatible. That means when you upgrade to the ADM-42, you don't worry about rewriting your software, or replacing any other peripherals. Just plug the ADM-42 into the system you've been using all along.

You'll discover this terminal is a truly efficient, cost-effective step upward that'll enhance your system out of all proportion to its price.

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REVEALS ALL!

Ballistic Printer™ Tougher In The Long Run

The 300 Series Ballistic Printer is a low-cost, 180 cps printer with a built-in microprocessor that gives you 15 switch-selectable form lengths, 15 perforation skip over formats, and full horizontal and vertical tabulation control. Space and blank character compression. Interface control for serial, parallel, or polling and addressing operations. Plus a non-volatile forms retention system that retains these programmable settings when power to the printer is turned off.

The 300 Series has a character buffer that's optionally expandable to 2048 characters. With the 2048 buffer, the printer can fully buffer a 1920 character CRT screen of data without waiting for the screen to transfer to the printer on a line-by-line basis. And the buffer affords quick dumps of full 1920 character CRT screens.

Like all LSI Ballistic Printers, the 300's dependability and negligible duty cycle restrictions originate with its ingeniously simple, patented Ballistic print head. It actually operates without moving cores attached to its print wires. Instead, it uses small armatures that propel its matrix wires in free flight to the platen.

The 300 Series comes with a full 96 ASCII character set, with up to 128 printables optionally expandable to two sets of 128. The printer has, in addition, an elongated character capability, and 10 pitch with 12 and 10/16.5 dual pitch options.

This printer isn't built just simply. It's built simply to last.

Project X's 300 Series Ballistic Printer must be seen to be believed.

PROJECT X PHOTO

VDP-1000 A Complete Small Data System

The VDP-1000 actually features many attributes commonly associated with larger systems costing many times more.

Attributes like BASIC, COBOL, and ASGOL programming languages for business and system applications. A virtual memory operating system (VMOS) that lets you develop stand-alone or segmented programs without regard to physical memory size. And up to 40 megabytes of disk storage capacity. You start with a choice of two disk systems and three languages, and configure your system from there.

The basic VDP-1000 consists of a 16-bit CPU, 32K, 16-bit words of dynamic RAM, the world-renowned Dumb Terminal,™ a 180 cps, bidirectional 300 Series Ballistic Printer, and either a 10 megabyte cartridge or 1.25 megabyte floppy disk. All of the electronics, CPU, memory, and disk come in a full-size, wood-grain desk that leaves the surface clear for the console and printer. And there's also convenient work area for the operator.

Once you have the basic system, you add additional storage as you need it. Or want it. Up to four 10 megabyte disk drives or 5 megabytes of floppy capacity. You can upgrade the console with a choice of five smart terminals. And you can add a second or even a third programming language as your needs change or multiply.

The VDP-1000 is exactly the system to meet your needs exactly.

Project X's incredible data system gives you all the features you need, at a price lower than you'd expect.

PROJECT X PHOTO

VDP-410 An Intelligent Building Block

Project X's new VDP-410 does just about anything you want it to do.

PROJECT X PHOTO

Meet the VDP-410.

It's a low-cost, 16-bit CPU with enough speed and ports to support a variety of peripherals. It provides OEMs with the flexibility to configure a multitude of systems. From communications controllers without external storage capabilities, to sophisticated time-sharing systems with a string of terminals, printers, and disks, the VDP-410 feels right at home in any and all of them.

The 410's DMA channel provides easy expansion. You can even get a cable and an expansion chassis with five slots for 15" cards and a hefty power supply. LSI also offers a disk controller and 10-megabyte disk that complements its entire line of terminals and printers.

The basic system consists of a CPU with 200 nanosecond instruction cycle time, and 16-bit, 32K word memory with a 250 nanosecond access time, and I/O capabilities for communication with three external devices. The CPU, by the way, also includes an expansion port with serial/parallel I/O capabilities.

The VDP-410's instruction set, memory organization, and I/O architecture are compatible with hardware made by Data General and other manufacturers. Operating systems, file management systems, and programming utilities are available from leading software houses as standard packages, so it doesn't take any custom configuring to please the VDP-410.

The VDP-410's instruction set is Nova* compatible, and provides memory access, arithmetic, logical, and I/O functions. It's augmented with load/store-byte, inclusive/exclusive OR, exchange accumulators, multiply/divide, and block mode. And this offers the OEM an incredibly powerful instruction set for tasking and data management.

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Service Checks Motivation

KANSAS CITY, Mo. — The Selindex software recently added to the United Computing Service (UCS) program library has been described as a system designed to measure and analyze personnel development factors such as motivation, leadership, creative initiative and executive strength.

The program's statistical foundation is an extensive data base compiled from hundreds of actual job performance composites. Additionally, Selindex, Inc. — the package's developer — provides optional validation studies applicable to specific industries and in accordance with professional standards, UCS said.

The subject of the study completes a questionnaire by making responses on a scale from zero to 100. Certain responses are codified.

Selindex reads the raw scores, computes the indexes and produces a detailed analysis report predictive of potential in the areas of sales and management. A distortion indicator analyzes and quantifies response consistency, the spokesman noted.

The entire procedure requires less than 30 minutes to complete, but it is said to have correlation coefficients ranging from .65 to .90 when matched against concurrent predictive performance studies.

The international UCS network is based at 2525 Washington, Kansas City, Mo. 64108.

'Doc-F' Produces Reports, Source Library Documents

ALLENTOWN, Pa. — The Doc-F package from Software Consulting Services is a text formatter written entirely in ANS Cobol. Its 34 commands allow users to position, justify and paginate text, according to a spokeswoman.

The program is said to process any user-prepared file of text with case and formatting information and produce a formatted document, normally on the user's line printer. Any combination of upper and lower case input and output devices is supported, she said.

Automatic page heading and numbering as well as footnoting and auxiliary file merging commands make the system "extremely versatile," the spokeswoman added, noting that the package is currently being used for such things as producing reports, maintaining source library documentation and generating form letters.

Source code to allow Doc-F to be used as either a stand-alone executable program or a callable subroutine is available for a one-time license fee of $900. Software Consulting Services is at 901 Whittier Drive, Allentown, Pa. 18103.

Check Vendor's Entire Record

(Continued from Page 30)

their savings so substantial that, in effect, their use of the remote resource has been free — direct savings have exceeded direct costs. On this basis alone the availability of packaged systems — indeed, the size and scope of the vendor's entire software library — should be carefully analyzed and heavily weighed in selecting a source for RJE service.

Don't Ignore Cost

While cost is not the only factor to consider in evaluating RJE vendors, it is not to be ignored. All vendors use some form of pricing based on resource usage, and no two pricing formulas are directly comparable, at least on paper. Benchmarking is about the only way to relate one vendor's formula to another, but even that is only the start.

A well prepared multijob benchmark will test the vendor's formula under several conditions, most commonly the CPU-bound job, the I/O-bound job, the program compilation and high/low operator intervention jobs.

A benchmark, however, tells only a portion of the story. Minimum charges for job steps and JCL errors, storage charges and the costs of most "nonjob"-oriented work are often not included in pricing formulas, although they may represent a significant portion of the user's total billing.

Discounts for high-volume or off-shift use are often handled outside of billing algorithms, as are premiums for high-priority access, and some costs may be buried completely. For instance, everyone has a sorting routine, but some routines, particularly those supplied by hardware manufacturers, are considerably more resource-intensive than others.

One vendor's sort may be two or three times as costly as another's and, since sorting is a major DP function, this difference can be expensive. The prudent RJE purchaser will look beyond the vendor's pricing algorithm to determine the true cost of services and will use the total cost of a vendor's service rather than the resource usage formula as the basis for price comparison.

Vendor selection should be based on the user's own needs and objectives. RJE vendors are no more alike than the companies which use them.

Compare costs, but while comparison shopping, also evaluate a potential vendor according to your requirements for service, security, control, reporting and special programs.

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Telenet Chairman Reports

Private Packet Nets Attracting Users

By Ronald A. Frank
CW Staff

LAS VEGAS — Private packet networks offer. an alternative for the user who does not want to use a public packet net, according to Dr. Lawrence Roberts, chairman of the board of Telenet Communications Corp.

Telenet has provided several private packet nets, mostly for common carriers, on a turnkey basis. But several users have expressed interest, and the first of these will be initiating a private network within the next two months, he said here at the recent International Communications Association (ICA) conference.

Although at present, private packet nets are now priced much less than other options, this alternative is attractive to users because it provides complete network control and saves the user from having to bother with maintenance.

CW at ICA

Turning to recent events in packet standards, Roberts said the recently approved X.5 standard of CCITT will provide for a standardized method of interfacing packet nets. A worldwide numbering plan called X.25 has also been completed so that public packet destinations will be uniformly identified by a 14-digit total address, he said.

Up to now, most terminal support on the Telenet network has been for asynchronous devices, but beginning this year, IBM 2780 and Hasp will be supported. And in 1979, 3270-type CRTs will be supported on the network, he said.

Next year, Telenet will also initiate support for Systems Network Architecture/Synchronous Data Link Control terminals. Support of non-IBM protocols is not planned, but if a user wanted to contribute toward the cost of the necessary software development, this would be possible, he said.

A user contemplating the installation of a packet network switch today has several alternatives. Bell Northern Research has introduced the SL-10; the Sesa switch developed for the Transpac network in France; and the TP-4000, available for use on the Telenet network. Nippon Electric Co. is also expected to introduce a packet network switch soon, Roberts predicted.

Typical cost for this equipment is about $25,000 plus $600-to $1,000/line, depending on software and hardware requirements, he estimated.

The X.25 standard has proved to be an effective method of interfacing directly to packet nets. But users who want to connect noncompatible devices such as those that use Ascii or Ebcdic, the packet assembler/disassembler (PAD) capability provides a solution, he said.

An application for the Bell Data Network will be filed soon, Roberts predicted. But it will be about four years before an AT&T packet net gives Telenet any real competition, he said. It is possible that Bell might offer a pricing advantage on short-haul local

(Continued on Page 38)

Communications Management Seen Becoming New Discipline

By Ronald A. Frank
CW Staff

LAS VEGAS — Telecommunications managers are leading their companies into the new world of electronic business communications (EBC), according to William G. McGowan, chairman of the board and chief executive officer of MCI Communications Corp.

Delivering the keynote address at the annual conference of the International Communications Association (ICA) here, McGowan said telecommunications management is being industrialized into a brand new industry known as EBC.

Three major forces — industrialization, technology and government — are all coming together to shape EBC. Functional boundaries between computers and communications are disappearing to be melded into a stream of digital impulses, and government is interacting with both the technology and industrial processes, he told ICA attendees.

CW Photo by R. Frank

William McGowan

In a very real business sense, EBC is already becoming a principal business activity of every business enterprise in America and the efficiency of a company's EBC determines its position among its competitors, he

(Continued on Page 38)

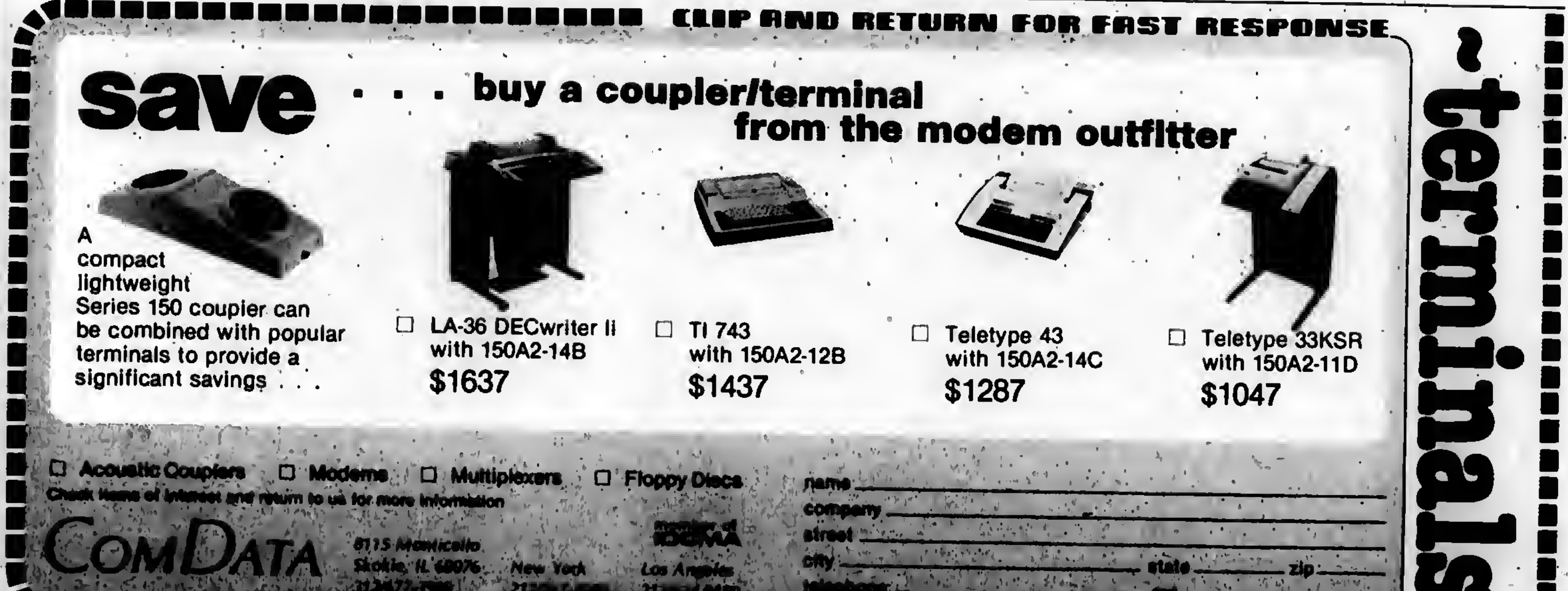
FCC May Decide on Inquiry II At June Meet, Attorney Says

LAS VEGAS — The Federal Communications Commission (FCC) may make a decision on the Second Computer Inquiry when it considers the issue at a meeting on June 8, according to James Smith, staff attorney with the FCC's Common Carrier Bureau.

One of the mairt problems in trying to define the boundary between communications and data processing is that it is difficult to determine how much processing power can be built into a terminal before it changes from a communications unit to a DP device, Smith said here recently at the International Communications Association conference.

The Common Carrier Bureau staff has sent its recommendations to the commission for it to consider when it meets on the inquiry. Although he would not comment on the contents of the staff report, Smith said there

(Continued on Page 38)



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We consider that we are finally giving birth after ten long years."

Charles E. Sporck
President

"I assure you, National Semiconductor did not caper into the computer market on a whim. For the past decade, we've been a leader in creating the technology that makes computers work.

In 1973, we became a visible systems supplier—with the sale of electronic point of sale systems. We're now the second largest supplier in the world. With more than 13,000 terminals and over 1000 computers in more than 1,400 store sites. And a full-time field service force of more than 250 people.

Three years ago, we introduced IBM 370-compatible add-on memory. Today, National ships more large scale 370 add-ons than anyone except IBM.

National has built add-in memories for some of the most popular minicomputer models as well.

We are now shipping our industry standard Series/80 microcomputers at the rate of 12,000 systems a year.

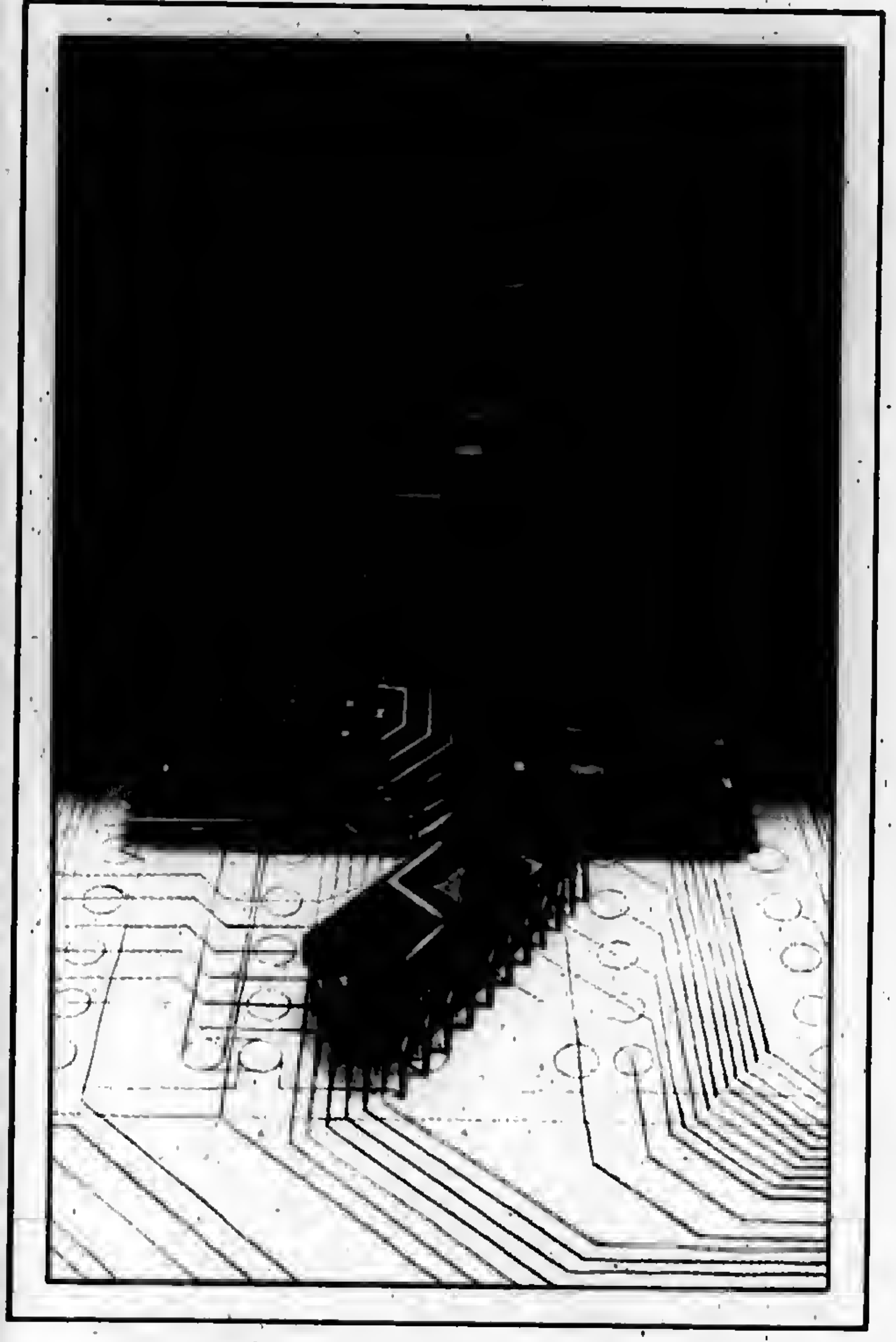
Two years ago, we unveiled our first IBM-compatible computer. To date, over 100 systems have been installed in ten.

countries. We are now shipping more IBM-compatible computers than all other competitors combined.

I think this demonstrates that National Semiconductor has quietly, deliberately become a prime mover in computer hardware and systems. Annual computer revenues already put us in the top 15 of all U.S. general purpose computer manufacturers—and we're climbing. Certainly, we haven't come this far without being acutely aware of the market's needs.

A clear, levelheaded look.

If we had not penetrated the systems market of our own accord, technology would have eventually forced the business on us. Our semiconductor components are rapidly becoming total "systems on a chip."



But before jumping into the market altogether, we gave ourselves the luxury of a clear, levelheaded look at the terrain.

Because we have no equity in particular methodology or design, we remain free to appraise the market and develop a product that uniquely solves a problem.

And, by applying current semiconductor technology and production expertise, we deliver better performance at a lower price than other suppliers.

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National Semiconductor is deeply committed to applying its systems technology to real user problems. We are not interested in simply creating another different computer.

By making software-compatible hardware, we protect a customer's investment in standardized software.

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National Semiconductor is in the computer systems business for keeps—as a broadbase supplier able to handle everything from manufacture through distribution, delivery, service and support. That's why we have an active, full-fledged service force of over 250 people set up to respond to customer needs.

We're willing to pinpoint our experience in research and development to further advance systems technology. In fact, over the next several months we'll be taking the wraps off some of the most significant new products in our history. Breakthrough products like the System/400, perhaps our most important advance in systems technology to date.

The System/400 is the first minicomputer designed to perform all the functions of large IBM computers. It means users will be able to run existing industry-standard software on a system at a fraction of the cost of a large computer.

If you'd like to know more about the future of National Semiconductor, Computer Products, or about System/400 specifically, write me personally: Charlie Sporck, President, National Semiconductor Corporation, Drawer 1, 2900 Semiconductor Drive, Santa Clara, California 95051."

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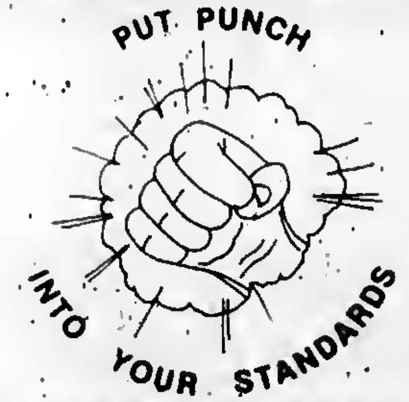

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HIS Adds Level 6 Software To Expand Communications

WALTHAM, Mass. — Honeywell Information Systems, Inc. has introduced three Level 6 communications software modules to provide its multifunctional minicomputers with additional capabilities. Two of these modules include programs that enable the Level 6 to function concurrently with a variety of host computers as a Hasp workstation or 2780/3780 remote batch terminal, according to the firm.

In addition, the company has signed agreements enabling it to market Henco, Inc.'s Info 6 file inquiry and update system to Level 6 minicomputer users.

All three modules are compatible with the Gcos 6 software announced last October, HIS said.

The Level 6 Hasp workstation facility and the 2780/3780 remote batch terminal facility allow the user to transfer data between a Level 6 and a variety of host processors with no change to the host processor's software, a company spokesman said.

Info 6 is a conversational data inquiry/update system. Using English-language commands, customers can reportedly perform normal DP functions without utilizing conversional programming techniques. Info 6 runs as an application under the Level 6 Gcos 6 Model 400 operating system and may be executed concurrently with other applications, the firm said.

License fees for these software modules are $2,200 for Hasp, $1,640 for the 2780/3780 remote batch terminal module and $3,800 for Info 6. The two communications modules will be available in the third quarter of 1978; and Info 6 is available immediately, HIS said from 200 Smith St., Waltham, Mass. 02154.

Private Packets Attracting User

(Continued from Page 35)

loops when and if its network becomes operational.

If that happens, Telenet would have several options to get these facilities from other carriers.

When batch usage starts to be significant, it will be economical to include satellite facilities such as Satellite Business Systems or American Satellite links into the Telenet system, he said.

Current costs make it more economical to provide interactive-type services with terrestrial facilities while batch and higher volume traffic can be justified with satellite links, he said

New Discipline Described

(Continued from Page 35)

said. The more efficiently information flows, the more accurately and effectively corporate decisions can be made.

Just as companies have come to realize how crucial DP is to the conduct of their business, so EBC deserves their attention. As corporations begin to realize the contributions that telecommunications is making to corporate success, the needed budgets and staff resources will begin to flow in that direction, McGowan predicted.

A variety of common carriers have emerged to sell services to the EBC user. Specialized value-added, general-purpose and satellite carriers are all eager to satisfy a user's EBC requirements.

It takes trained managers to evaluate these different offerings to cross-check benefits and itemize trade-offs, he said.

Today telecommunications managers are responsible for 80% of their companies' telecommunications budgets. One hundred percent of the telecommunications budget is subject to the influence, advice and guidance of these same managers.

Change compounded by competition has put a brand new emphasis on telecommunications management. It has accentuated the manager's skills in anticipating, planning and controlling to make things happen instead of merely allowing them to happen, McGowan said.

As users such as ICA members take advantage of these opportunities, they will be industrializing telecommunications into EBC. This task will include both the user and the supplier as well as top management, which must be made aware of the enormous changes in telecommunications that will daily and deeply affect the future growth and direction corporations will take.

More and more companies realize they can prosper only with expertise in EBC. Telecommunications managers are the catalytic agents necessary to balance communications supply and demand within predetermined dollar constraints to lead their firms into the world of EBC.

If users can manage their vendors and make them prove that their services can make company operations more efficient and if users can make government respond to encourage diversity and innovation, then the shift to EBC will be successful, McGowan concluded.

FCC Decision Seen Coming

(Continued from Page 35)

were several options available to the FCC.

One approach would be to adopt the report as a decision of the carrier bureau chief. This has been proposed in a petition by the Computer and Business Equipment Manufacturers Association because it would provide a framework for interested parties to comment, he said. Another possible approach would be for the commission to further refine its proposed definition of communications processing.

One of the complicating factors associated with the inquiry is the 1956 Consent Decree which limits AT&T to providing regulated communications services. Although the FCC has no direct jurisdiction over the decree, some accommodation might be made based on the recommendations of the FCC.

To Help 'Shape Environment'

ICA Votes to Participate More in Regulatory Affairs

By Ronald A. Frank
CW Staff

LAS VEGAS — One of the most influential telecommunications user groups has voted to become more involved in regulatory issues. The vote concerning participation in regulatory affairs was taken at the annual conference of the International Communications Association (ICA).

At issue were changes to the ICA bylaws proposing the elimination of the complex procedure under which the ICA board of directors could take a position on regulatory issues only under limited conditions.

Speaking to the conference before the vote, outgoing ICA president. F. Thomas Hogan of Monsanto Co. said that historically the ICA has been very hesitant to become involved in regulatory matters. However, the user organization is "operating in an evolving environment that we should help to shape."

For this reason, it would be in the best interest of users for the ICA to become involved with the regulatory community, particularly in matters of interstate nature, Hogan said.

Since the Carterfone decision, there have been more and more developments and decisions that have great impact on the ability of users, specifically telecommunications managers, to function in the best interests of their individual companies. Some of the issues that have had a direct impact on ICA members in the past or will have in the future include specialized carriers, the interconnection of customer-owned equipment, the Bell Bill, rewriting the Communications Act of 1934, satellite communications, Satellite Business Systems (SBS), MCI Telecommunications, Inc.'s Execunet and a number of dockets now pending before the commission.

CW at ICA

This latter category includes the Computer Inquiry II, Wats, MPL and Series 1000 telegraph services, Hogan said.

In recent years the ICA has attempted to interface with the Common Carrier Bureau of the Federal Communications Commission, the Office of Telecommunications Policy and the telecommunications committees in both the House and the Senate. "This has been extremely frustrating for those involved, since we can only act as a fact-gathering group and cannot take a position in the name of ICA," Hogan told the attendees.

Participation in regulatory affairs does not mean lobbying. Instead, it is an opportunity for users to make their views known. In addition to taking a position, the ICA would be able to respond with impact data, users' concerns, statistical information and alternative concepts, he said.

A change proposed in the ICA bylaws would permit the organization to take a position quickly to reflect the users' viewpoint without noting the specific company composition of the ICA or those wishing to take such a position, he explained.

Products Bow at Conference

LAS VEGAS — Several vendors unveiled products at the recent conference of the International Communications Association (ICA) here. The following firms were among those exhibitors.

Codex Corp. of Newton, Mass., introduced an addition to its Circuit Quality Monitoring System (CQMS) it said has the capability to automatically sequence through each modem in a network for diagnostic purposes.

Called the Automatic CQMS, the unit costs $8,750 or $300/mo on a two-year lease. It can monitor up to 64 modems from one console and detect such problems as phase hits, phase jitter, harmonic distortion and dropouts, Codex said.

The DMW Group announced a software package that enables users to analyze corporate phone bills for a variety of management and engineering purposes. The package is written in Cobol and can be installed on in-house CPUs, accessed via the Tymshare network or processed on a service bureau basis.

Called Telecost, the package analyzes Bell System Station Message Detail Recording (SMDR) tapes or similar output data from non-Bell electronic PBXs. Telecost is priced at $10,000 to $12,000, depending on options, with 120-day support. The DMW Group is at 2975 Hickory Lane, Ann Arbor, Mich. 48104.

MI^2 Corp. showed its Design 300/1200 data set that can operate at 300- or 1,200 bit/sec over dial-up or private lines.

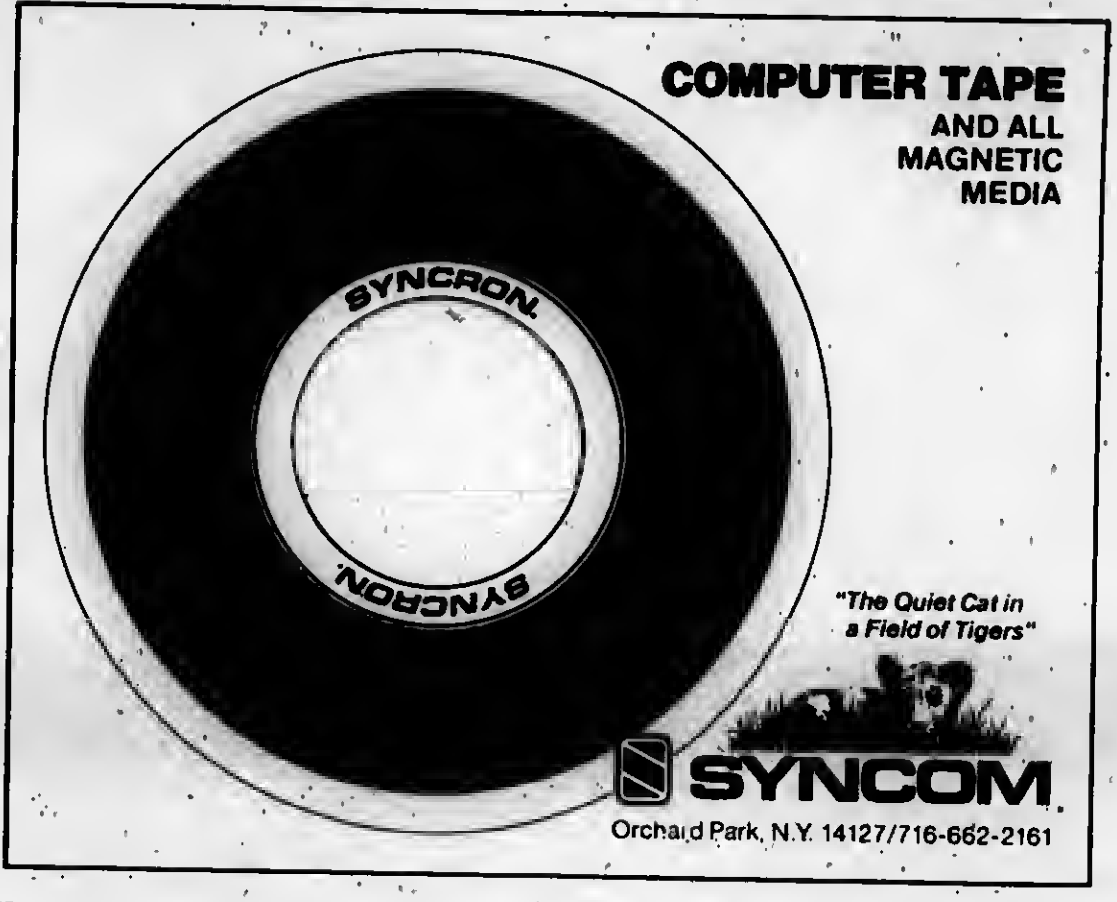
The unit costs $895 from the vendor at 1212 Kinnear Road, Columbus, Ohio 43212.

Officers Picked To Lead ICA In Coming Year

LAS VEGAS — Edward Vennum of LTV Corp. was elected president of the International Communications Association (ICA) for the coming year at the group's annual conference here recently. Vennum succeeds F. Thomas Hogan of Monsanto Co., who became a member of the board of directors.

Elected vice-president was Wylie Deaking of TRW, Inc., while Lloyd Isaacs was elected second vice-president. George Fallat of Dupont was elected treasurer of the users' group, while Walter Heide of McGraw-Hill became secretary.

Other users elected to the board of directors include Phillip Evans of Ashland Oil and Raymond Reamer of IBM.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Each system has been configured to take full advantage of the increased disk capacity and each one offers total system performance at prices never offered before.

Here are just three good examples. Remember, there are 27 more where these came from.

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EXAMPLE #2: A NEW DATASYSTEM.

Now you can get a Datasystem 325 package with the new 10 megabyte RL01 disk subsystem. Bigger and faster— and what's more, it's less expensive. That's right. Datasystem 325 featuring Digital's LSI-11 central processor, 64K bytes of main memory, and the VT52-N terminal is now the biggest bargain ever.

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Workstation, Printer Extend TRW Bank System

LOS ANGELES — TRW Communications Systems and Services has expanded its transaction-processing system by introducing a modular financial workstation specifically designed for the thrift industry.

According to the firm, the workstation gives the institution more options in setting up teller windows, extending on-line operations to other locations and lowering costs per workstation.

The company also announced a 180 char./sec line printer for report printing at remote locations is available.

TRW's Series 1500 modular workstation is made up of several components that can be configured to perform as a teller terminal, administrative terminal, new accounts terminal, loan officer's terminal or telephone operator's inquiry terminal. Its basic elements are a CRT display, a transaction keyboard and a microprocessor-based controller.

Three keyboards are available, allowing the institution to select the most appropriate for each workstation, the firm said. Each keyboard has an optional, built-in magnetic stripe card reader that can be used in conjunction with a personal identification number (PIN) entry pad.

A validation and receipt printer can be added to the workstation; TRW's passbook print station operates as a module of the Series 1500, the firm said.

The Series 1500 CRT coupled with the intelligent controller make possible three types of prompting techniques: tutorial, component entry and menu, according to a spokesman.

Tutorial is a step-by-step user-programmable process that leads the teller through a transaction in English phrases, displaying what has been done and what to do next.

Component entry allows the operator to first enter the data, then identify it by using a function key. The menu technique asks the teller questions and then lists possible answers to describe the transaction during entry.

The CRT screen displays up to 480 characters (12 lines with 40 char./line) and a dual-page feature permits automatic recall of an additional 480 characters, according to the spokesman.

The Series 1500 offers a choice of three keyboards in meeting the transaction requirements of each workstation, the firm said. Each keyboard features a 10-key numeric pad, programmable function keys and a supervisor key lock switch and can be shared by two tellers.

Each keyboard also has an optional integrated magnetic strip card reader which reads Track 2 data and normally works in combination with a PIN pad, the spokesman noted.

The modular workstation's local, microprocessor-based controller controls the display, keyboard, plastic card reader, PIN pad and receipt printing modules and can work in conjunction with passbook print stations, which can be shared by up to eight tellers. Its intelligence permits self-standing, off-line operation and supports communications between each workstation and TRW's terminal processor, the firm claimed.

Journaling Capability

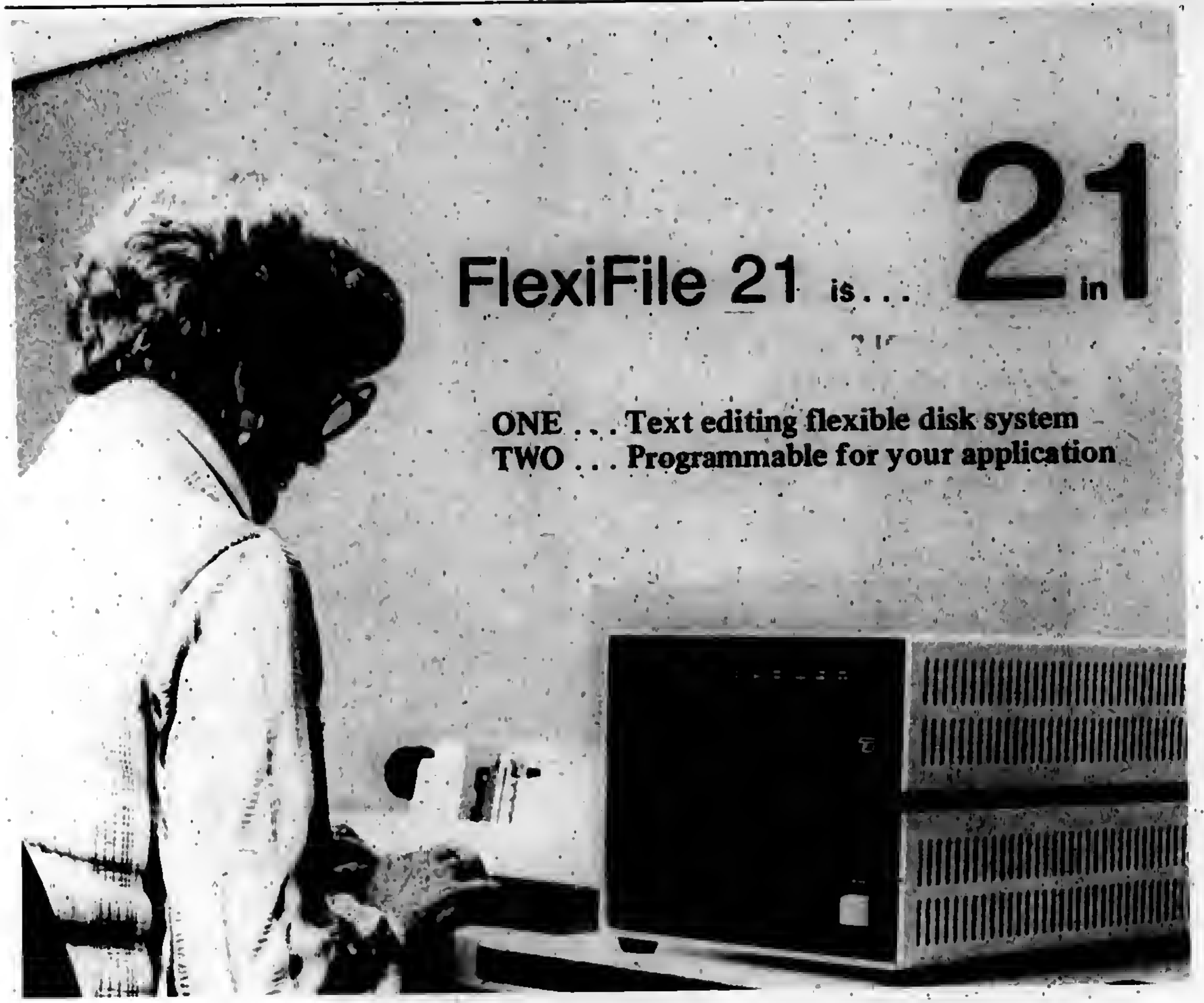
A TRW terminal processor capability has been added for electronic journaling, in which all transaction data is captured on a 10M-byte disk that can store a day's transactions from up to 40 terminals.

If communications with the central computer is interrupted, the disk continues to capture all transaction data.

The purchase price of a basic Series 1500 terminal consisting of controller, keyboard and CRT display is $2,600. A typical main office plus three-branch transaction system including 18 terminals, shared receipt and passbook printing capabilities, magnetic stripe reading and PIN pads plus terminal processor sells for $117,000 and leases for $2,200/mo.

Purchase price for the system line printer is $7,000 with a monthly lease rate of $132.

Deliveries of the Series 1500-based transaction-processing system will begin in July. TRW is located at 9841 Airport Blvd., Suite 620, Los Angeles, Calif. 90045.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Bits & Pieces

Guide Lists Services For Business Managers

CHERRY HILL, N.J. — The Management Information Corp. (MIC) has introduced a brochure, "Personal Information Services for the Business Manager," described as a valuable guide for businessmen in "every aspect of DP." The guide is free.

The booklet contains a listing of publications and services geared to DP managers. Among the services described in the brochure are monthly newsletters containing evaluations of data entry equipment, small business systems, data communications and distributed processing equipment and applications software packages. The list includes reports that investigate the management of data entry personnel, usage and concepts of data communications for the businessman, an analysis of how small businesses use computers and how to purchase a software package.

The guide also contains information on data entry management and supervision seminars that are held on a regular basis throughout the year.

Users interested in obtaining the brochure should contact MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

Cybernetics Proceedings Published

NEW YORK — The proceedings of the Third International Congress of Cybernetics of Systems, Bucharest Romania, have been published by Springer-Verlag New York, Inc.

The three-volume set has information on all official and "other" meetings and contains papers from seven sections of the conference.

General subject areas include economic cybernetic systems and management; systems and models; industrial cybernetics; cybernetics and environment; communication, education and informatics; artificial intelligence; and neuro- and bio-cybernetics.

Each of the conference sections in the books is supplemented with additional papers and editor's comments concerning the section.

The set costs $150 from Springer-Verlag at 175 Fifth Ave., New York, N.Y. 10010.

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Philips Test and Measuring Instruments, Inc. is offering a catalog containing information, technical specifications and illustrations of its test and measuring instruments. It can be obtained from Department C, 85 McKee Dr., Mahwah, N.J. 07430.

Data Entry Managers Gaining Leverage With Users, MIC Says

By Frank Vaughan
CW Staff

CHERRY HILL, N.J. — The subservient role of the data entry department in relation to both the DP department and its users has been quite demoralizing to the data entry manager. The insistence, by most firms, upon improved productivity and increased accuracy has been unrealistic in view of the department's traditional status, according to a report published here.

"The People Side of Data Entry," by Management Information Corp. (MIC) noted that the emergence of the key-to-disk system has enabled the manager to both operate more efficiently and spot errors made by operators and users alike. With documented facts, the manager has had increased leverage in relationship to user departments. Furthermore, the department's ability to provide functions such as printing, data base retrieval and DP has given the department more authority.

With the trend toward distributed DP, user and data entry tasks are merging. The entry of data at its source means the data entry system is becoming an internal part of user activities, and data will be generated by clerical rather than data entry operators, the report noted.

The data entry manager must be able to realize the latest trends and what is required to meet new challenges, the report said.

According to the report, during a recent seminar for data entry managers and supervisors, 10 areas of concern were most often mentioned.

- Personnel motivation. Operators treated as professionals will behave as such, the report said. For too long, the people involved in data entry have been kept off to the side and therefore felt excluded not only from the rest of the company, but even from the other DP activities.
- Better productivity. First, managers should determine the current productivity level, the report said. Next, they should review the entire operation: flow charts, decision tables (how many decisions, how often), condition of source documents, work schedules, training levels, machine utiliza-

(Continued on Page 45)

First 3032 in Operation

Master Sergeant Thomas O. Kenton and Kathryn Gromen, systems programmers at the Air Force Data Services Center in the Pentagon, have been operating the first installed IBM 3032 processor. The Air Force received the plug-compatible CPU this March [CW, March 27] and it is being used primarily to prepare and process intricate simulation models for the Studies and Analysis function of the Air Staff.

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Data Entry Managers Gaining Leverage With Users, MIC Says

(Continued from Page 43)

tion, quality of output and the like.

- Communications among employees. Perhaps the most important point, according to the report, is for managers to realize they have not communicated if their audience does not perceive something in the same way they do. The same word/phrase/cliche can mean quite different things to different people. If managers want to be sure they are conveying a particular concept, they should seek feedback.
- Motivation of senior employees. Senior employees may be more sensitive and resistant to change, whether it be the installation of new equipment or a new incentive plan. One reason for this is the fear they might not be able to adjust to the new situation. To overcome this attitude, managers should let them be a part of the decision-making process before the change is made. All changes — whether good or bad — are traumatic; it takes hard work, patience and understanding to make the change positive, the report noted.
- Operator Training. There is a learning curve associated with every new job, every change to a current application, every new person (experienced or not) and in every new situation. Training is a constant requirement; the question is whether to have a formal training program or a "sink or swim" one, MIC said.
- Equipment selection and upgrading. Do not base equipment selection on current requirements but rather on anticipated requirements for the next few years; the report advised. Servicing will be a critical point after installation and shouldn't be neglected during the selection process.
- Controlling quality and timeliness of user department input. The five major items in the relationship between the data entry department and the various user departments are quality of documents supplied by users, timely delivery of documents, handling of questionable data and errors in documents, timely completion of jobs by data entry and quality output by data entry.
- Problems with union shops. Union shops and government installations usually have a rather rigid working environment in which managers have limited flexibility. For example, unless a manager is running short of help, the operation will run out of work from time to time. A union or civil service employee cannot be sent home without pay. Managers have to have as little fat as possible in regular staffing.
- Workload distribution among operators, work scheduling. The three basic tasks are to establish personnel capabilities, set job standards and determine priorities. Various approaches discussed, according to the report, were to have the supervisor distribute all work, to use a scheduling/control clerk or to set up a first in/first out system under control of the individual operators.
- Proper support from top management. While corporate management generally understands the CPU's ability to run programs, the evolution of data entry systems beyond the keypunch days is misunderstood. It is time for corporate management to realize that inaccurate data produces wrong information, the report said.

Other topics include hiring and personnel turnover.

"People Side of Data Entry" costs $15 from MIC at 140 Barclay Center, Cherry Hill, N.J. 08034.

'I'm Here About That Keypunching Job.'

Dataroyal Has Smart Printer

NASHUA, N.H. — Dataroyal, Inc. has designed an intelligent printing system with a 120 char./sec keyboard send/receive (KSR) printer for applications such as data logging, factory data collection and label printing.

The IPS-7300 includes a movable CRT/keyboard station and an 8-bit programmable microcomputer, the firm said. The system has a gas discharge display and a 64-character, Ascii-compatible keyboard.

Through the keyboard of the movable input station, operators can communicate with the host microcomputer to enter data, access data from files or receive instruction messages, according to a spokesman.

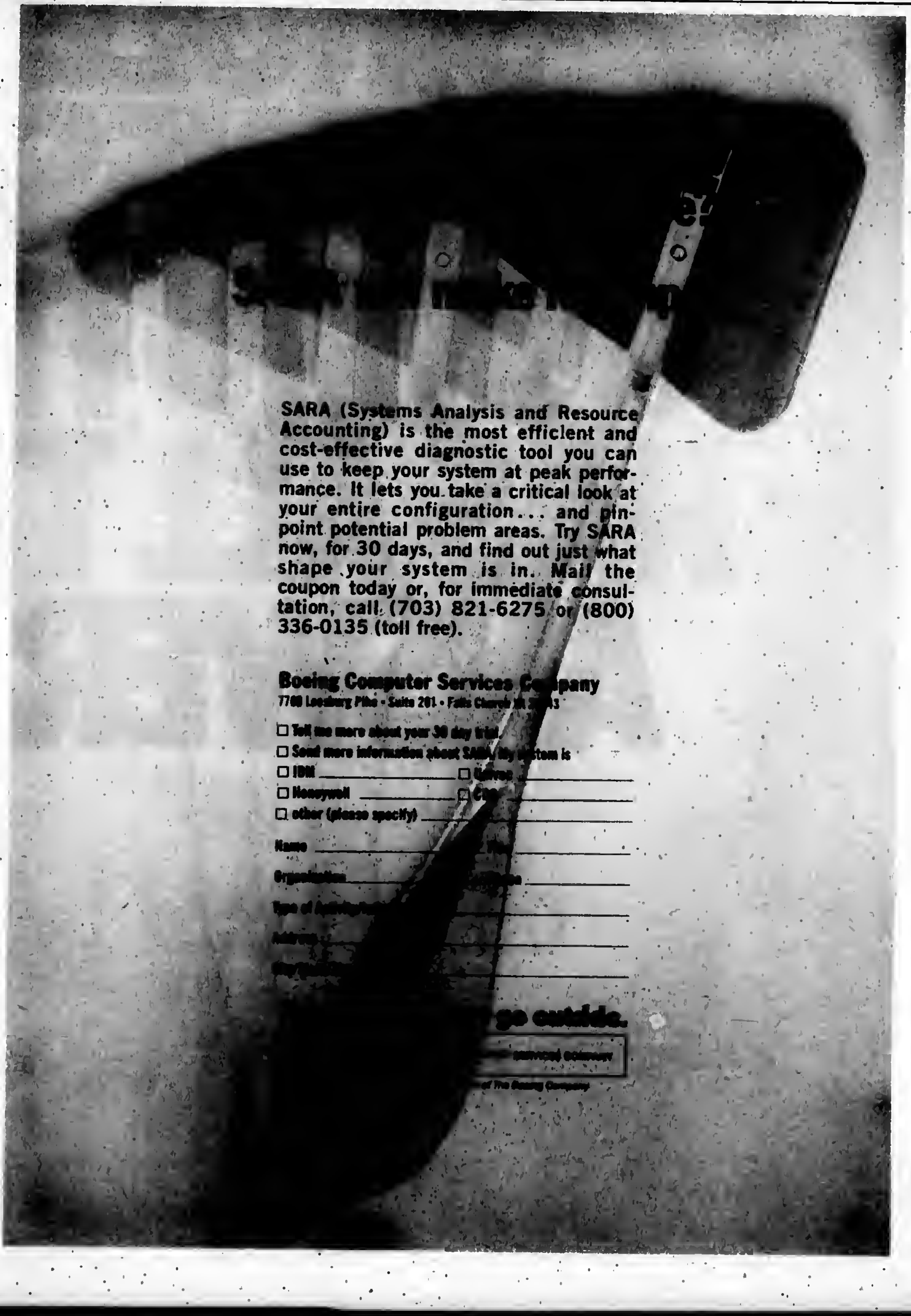
The microcomputer incorporated into the unit supports variable character capabilities as well as relieving the host computer of software control duties, the firm claimed.

It reportedly has the processing power to operate in a stand-alone environment or in a local or remote mode in an on-line system.

Basic Configuration

The basic configuration includes the onboard microcomputer with eight I/O registers and 10,000 bytes of semiconductor memory, a 32-character display, keyboard and an RS-232 asynchronous communications interface. A 20mA current-loop interface is available as an option, the spokesman added.

It costs $5,500 in single quantity and $3,135 in OEM quantity from Dataroyal at Main Dunstable, Nashua, N.H. 03060.



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Power Supply Has 42 Models

MELVILLE, N.Y. — Lambda Electronics has introduced a series of power supplies designed for military, industrial and OEM applications.

The LN series is made up of 42 models in five different package sizes. The units have single output voltages of 5V, 6V, 12V, 15V, 20V, 24V and 25V and are microprocessor-compatible, according to a spokesman.

Overvoltage protection is standard on the 5V models and is available as an option on all other models.

The units can be used with or without covers, depending on the nature of the application, and are convection-cooled, eliminating the need for external heat sinking or forced air, the firm claimed.

Isolation resistance is 10M ohms and isolation voltage, input to output, is 4,000V, the spokesman added. The tracking accuracy on dual-tracking models is 3% absolute voltage difference, with a .2% change for all conditions of line, load and temperature, he said.

The power supplies are reportedly fungus-proof and have a current rating of up to 22A. A provision is included with the units for remote sensing to reduce the effect of power output lead resistance on dc regulation.

Prices for the units begin at $75 from Lambda at 515 Broad Hollow Road, Melville, N.Y. 111746.

Second Annual Dema Meet Set for San Diego in Fall

SAN DIEGO — The Data Entry Management Association (Dema) will hold its second annual conference Oct. 30- Nov. 1 at the Sheraton Harbor Island Hotel here.

The conference theme is "Data Entry Today and Tomorrow." The gathering will concentrate on the human side of data entry and distributed data entry, according to a spokesman, and include seminars, panel discussions and workshops.

Some of the sessions will cover communication and motivation, data conversion implementation, the mixed-media environment, voice data entry, keyboarding techniques, data entry in Europe and the Middle East, data entry incentive programs and career paths in data entry.

Other topics include applications for a data tablet; OCR — new ideas and better utilization; how to evaluate vendors; education and training of data entry personnel; programming techniques for the manager; and on-line control and management.

Dema members attending the conference will have an opportunity to participate in the organization's annual business meeting.

The conference will cost $250 for members and $285 for nonmembers. Team discounts are available for groups of three or more from the same company.

Additional information and registration details are available from Dema at 16E Weavers Hill, Greenwich, Conn. 06830.

Fenwal Localizes Fire Protection

ASHLAND, Mass. — A high-speed Halon 1301 fire suppression system designed to protect both large-volume areas and several contiguous areas has been introduced by Fenwal, Inc.

The central storage system is comprised of floor-mounted storage cylinders with high flow rate valves, smoke detectors, a control panel and a unique pneumatic valve-control system, according to a spokesman.

In the event a fire is detected in one of the protected areas, the system opens selector valves to provide a direct pipeline from Halon 1301 storage cylinders to the fire area. Simultaneously, the pneumatic system releases the Halon 1301 from one or more of the storage cylinders to suppress the fire, he explained.

Each Fenwal system is custom designed with computerized piping calculations to provide the correct concentration of Halon 1301 in the protected areas. A reserve system can be included to provide backup protection, the spokesman said.

Halon 1301 is an odorless, colorless, electrically nonconductive gas that has been proven an effective medium for extinguishing fires. In addition, it is not harmful to people when used as specified, leaves no residue and will not attack or react with equipment components, he noted.

Systems are individually priced, with factors including the size and shape of the facility, the number of detectors, geographic location, local fire codes and regional labor costs. Estimates are available from the firm at 400 Main St., Ashland, Mass. 01721.

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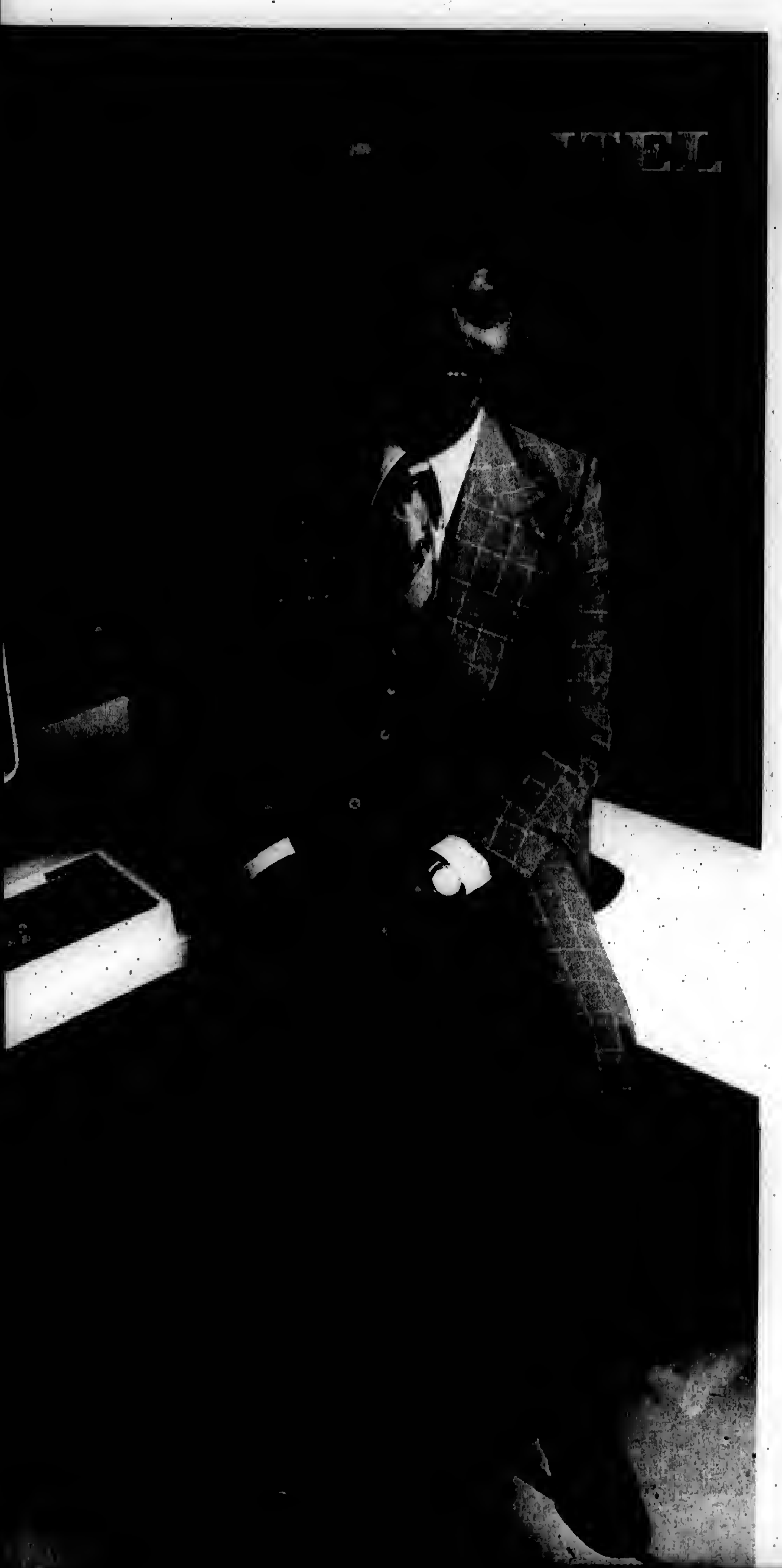

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Near Philadelphia, Next Year

Backup Site Planned for IBM Users

KING OF PRUSSIA, Pa. — Shared Standby Systems, Inc. (SSS) has announced it plans to construct and equip a computer backup facility here for large-scale IBM users temporarily forced out of their own installations by disasters.

The company is a wholly owned subsidiary of Shared Medical Systems, Inc. (SMS), a major processor of billing data for hospitals, and plans to be operational by July, 1979.

SSS' plans for equipment at the site currently include an 8M-byte, 12-channel IBM 3033; a mix of 7- and 9-track 800-, 1,600- and 6,250 bit/in. Model 3420 tapes; 3330 and 3350 disk drives; and 1403, 3211 and off-line 3800 printing systems.

In addition, the facility is slated to house IBM 3705 teleprocessing controllers, Model 3277 CRTs and 3284/-3286 hard-copy consoles.

Customers can make provision for obtaining special equipment, either for their own use or to be shared with other customers, SSS noted.

Software will be MVS running under JES2, a spokesman said, and will include IBM's Time Sharing Option (TSO) running under Tcam.

SSS has also made provision for backup telecommunications services. Facilities will include a 1,000 sq-ft space containing the 3705s, a communications patch and test facility and 1,200 bit/sec telephone company line pairs in two buried cables from the central office a mile away, the spokesman said.

These pairs are said to be suitable for virtually all forms of communications, including Digital Data Service 56K bit/sec, voice-grade channels to 9,600 bit/sec and satellite terrestial loops.

Telephone company representatives, commenting on backup facilities for nondial-up lines, particularly broadband services, stressed the need — and the costs involved — for preplanning and preinstallation of redundant facilities.

Two Client Categories

To use the service, customers must contract with SSS in advance, paying a basic monthly fee whether or not they experience a disaster. When a disaster occurs — defined by the SSS contract as any unscheduled interruption of the customer's DP service, regardless of cause, which is "reasonably" projected to last longer than 24 hours — the client can move its operations to the SSS site, paying for the actual use of machines and other supplies and equipment.

Two classes of users are recognized in the contract: a Type 1 user, who is entitled to a virtual machine allocation on the 3033 equivalent to an IBM 370/158-III and the use of 50% or less of the peripherals, and a Type 2 user, who is entitled to use of the complete system.

Type I users will pay a basic fee of $3,500/mo for the right to use the facility, while Type 2 users will pay $5,500/mo, according to the company.

To protect clients from having to compete with each other in the event of simultaneous disasters, the company will not accept two or more organizations with facilities in the same building, nor will it accept more than 80 clients.

In addition, the contract between SSS and a client establishes a procedure to negotiate the use and sharing of facilities among clients in the event of such multiple disasters.

When a client requests use of the SSS site, the contract between SSS and a client specifies, a disaster certification group will inspect the client's system or facility to verify a disaster has actually occurred. This team is made up of one SSS representative and two client representatives elected by the clients.

Although a client is entitled to move in immediately after notifying SSS it has suffered a disaster, it must leave if the disaster certification team concludes that no disaster has occurred, according to the spokesman.

The contract calls for a disaster notification fee, which the client must pay when notifying SSS of a disaster, of $10,000, and a usage fee for Type 1 users of $3,000 per day of occupancy. Type 2 users are billed at $3,500 per day.

There is also a fee for false notification, set at five days' usage, regardless of customer type.

SSS includes some computer usage in its basic fees to clients. Type 1 users are entitled to 15 minutes of free CPU usage monthly, the company said, while Type 2 users get 30 minutes free monthly.

Users are also given the opportunity to test their disaster contingency plans: Type 1 users are entitled annually to six free shifts (at eight hours per shift) to test their disaster plans, while Type 2 users are entitled to nine such free shifts. Customers must provide all operational staffing during the testing.

Although no customers have yet signed contracts with SSS, the spokesman said, the firm has "12 to 15" letters of intent. Customer confidentiality is being preserved in signing customers, he added from 650 Park Ave., King of Prussia, Pa. 19406.

Static Electricity Drained by Mat

MOUNTAIN VIEW, Calif. — A conductive rubber floor mat that reportedly provides "greater conductivity, durability and other advantages" over earlier electrically conductive floor mats has been introduced by Wescorp here.

The mat was designed for use in an environment where the microcircuits in electronic equipment could be damaged by static electricity generated by an equipment operator. Operators can generate up to 50,000V, more than enough to damage or destroy a microcircuit, the firm said, noting the mat drains static electricity before it can build up to harmful levels.

Features of the mat reportedly include flexibility, to conform to the shape of a floor; ribbing, to prevent slippage; freedom from bending or curling; rapid drainage of static charges; and thick cushioning.

A standard 4- by 8-ft Conducto Mat with a built-in snap fastener for attaching a ground strap costs $95 from the firm at 1155 Terra Bella Ave., Mountain View, Calif. 94040. The mat is also available in rolls.

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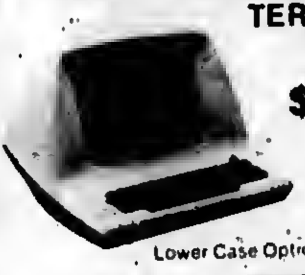

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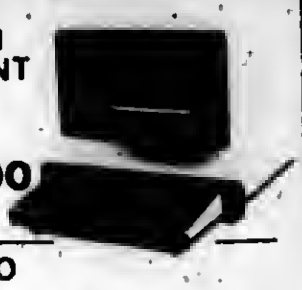

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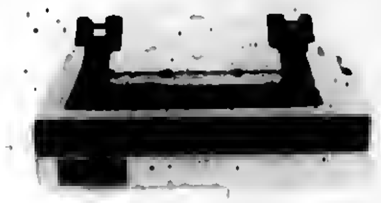

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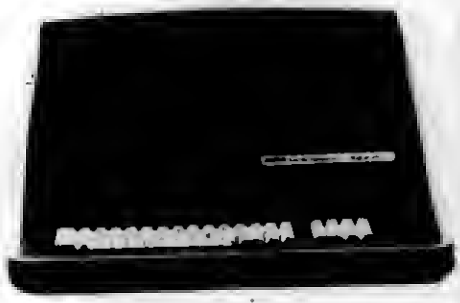

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DG Extends CS Line at High, Low Ends

By Jeffry Beeler
CW Staff

NEW YORK — A family of sofware-compatible small business systems ranging in performance from the microcomputer to the large mini levels became available recently when Data General Corp. announced lower and upper extensions to its Commercial Systems line.

The CS/20, a low-end complement to the company's existing CS/40 family, consists of one integrated desktop model that provides performance comparable to that of an IBM 5110, according to a DG official.

The CS/60, meanwhile, consists of three models that extend upward from the CS/40 series and equal the power of a 370/138, the spokesman added.

With the earlier members of the Commercial Systems line, the CS/20 and CS/60 models are said to form a series of upward- and downward-compatible small business systems that use an interactive version of Ansi '74 Cobol as a common programming language.

Hardware Enhancements

In addition to broadening its small systems line, DG recently announced enhancements to its CS/40 models. These hardware additions include a 50M-byte disk drive unit and a 180 char./sec. printer plus 240 line/min upper and lower case printers, company officials added.

Comparing relative performance within the Commercial Systems family, a Data General official estimated that a CS/20 compiles 60 line/min to 120 line/min, compared with 300 line/min to 600 line/min for the CS/40 series and 800 line/min to 1,100 line/min for the CS/60 models.

Typical sites of CS/20 installations will include "corner retail stores," law and medical offices and other organizations with four to 25 employees and annual revenues ranging from $100,000 to $1 million, a DG source said.

At those locations, the desktop unit will usually serve as a standalone system. It can also function, however, as an intelligent data entry unit or, in larger firms, as part of a distributed processing network, company officials explained.

By contrast, the CS/60 series — which consists of the Models 3, 5 and 6 — primarily suits large organizations, where it can serve as a dedicated or distributed system supporting as many as 12 interactive applications simultaneously, the spokesman added.

Built around a Micronova processor with 64K bytes of main memory, the CS/20 reportedly provides a 1,920-character display terminal and a movable keyboard. A maximum CS/20 configuration incorporates four 315K-byte flexible disk drive

(Continued on Page 54)

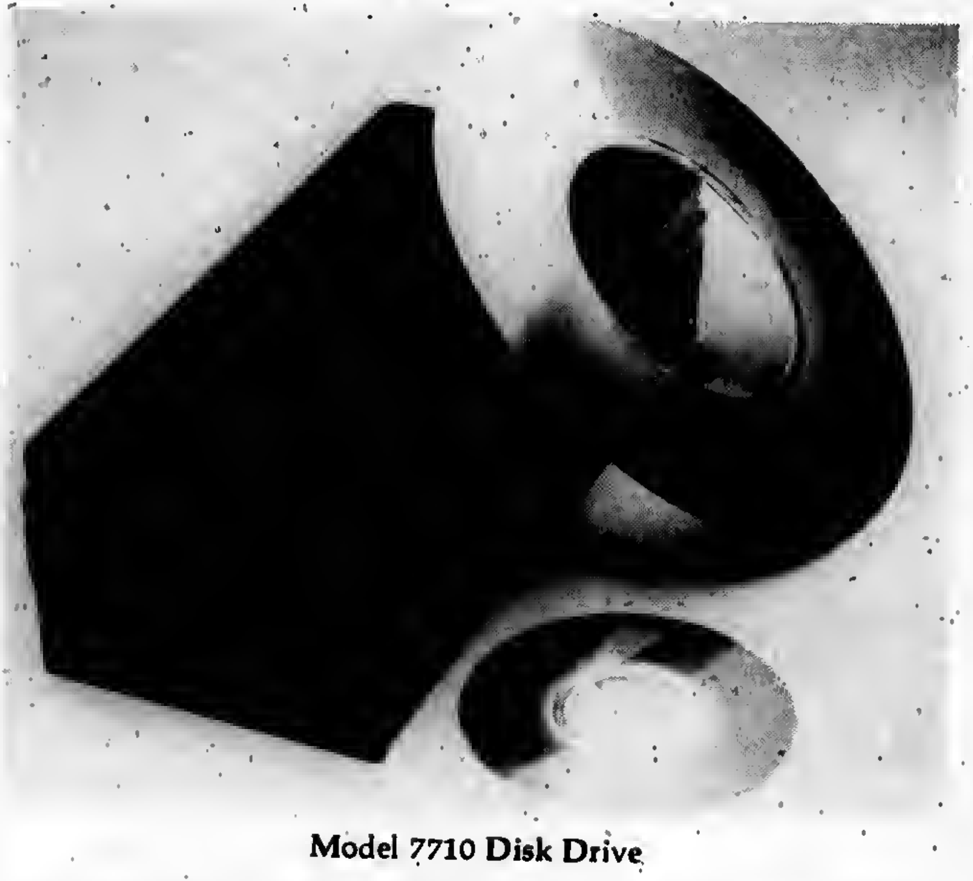
DG CS/60 Business System

Winchester Disk Unit Sports Midget Medium

CUPERTINO, Calif. — Disks almost half the size of the conventional 14-in. media have reportedly been placed in a Winchester-type storage system that fits into a standard floppy disk drive mounting aperture.

The Model 7710 uses 200mm recording media to store 11M- to 75M bytes in a 5- by 8.5-in. sealed package, according to International Memories, Inc. (IMI), the product's developer.

(Continued on Page 52)



Model 7710 Disk Drive

Spec Service Helps Users Rate, Pick Small Systems

FAIRFIELD, Conn. — Bowers Engineering Co. has announced a "packaged" specification service to help prospectivee users of small business systems evaluate potential vendors and choose the hardware, software and support best suited to their needs.

Bowers intends the service primarily for users who are planning to acquire their first small business computer, data collection hardware or minicomputer-based control system, company officials said. Other prospective clients of the service reportedly include users who already have medium- or large-scale systems but who are considering either automating a new application with a mini or distributing their centralized DP workloads.

Working with a client's management and operating personnel, the service is said to cover all phases of minicomputer evaluation and selection including definition of the users' business needs, preparation of bid specifications, selection of prospective vendors, solicitation and evaluation of proposals, final vendor selection, contract negotiation and monitoring of contract performance.

The small business computer specification service is available for fixed fees from Bowers Engineering at 1214 Post Road, Fairfield, Conn. 06430.

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Digital Systems Cuts Prices On Galaxy 5 Configurations

WALKERVILLE, Md. — Price reductions averaging 22% have been announced for four of Digital Systems Corp.'s Galaxy 5 multiple-processor systems.

A Model 140 system consisting of two CPUs, a 128K-word main memory and two direct memory access (DMA) channels now costs $55,485, according to Digital Systems officials.

A Model 150 with three processors, a 256K-word memory and three DMA channels currently sells for $82,875, the company spokesmen said.

The price of the Model 160 configuration, which incorporates four CPUs, a 512K memory and three DMA channels, has dropped to $114,220, they added.

The largest member of the Galaxy 5 series — the Model 170 with four processors, 1M byte of memory and four DMA channels — now costs $186,760, Digital Systems noted.

Spokesmen for the company credited the price cuts, which become effective immediately, to their decision to replace the 4K semiconductor random-access memory chips used in earlier Galaxy 5 models with 16K chips.

Digital Systems can be contacted at Box 396, Walkersville, Md. 21793.

LSI-11 Gets Bus Interface

AUSTIN, Texas — Measurement and test systems can reportedly be implemented on the Digital Equipment Corp. LSI-11 with an interface that connects the processor to the IEEE Standard 488-1975 bus.

National Instruments Corp.'s GPIB11V-1 interface plugs into a double-height slot and provides hardware compatibility with any LSI-11 system including the LSI-11/2, PDP-11/03 and PDP-11V/03, according to the product's developers.

Suitable in either a single- or multiple-controller environment, the interface is said to provide hardware for decoding general-purpose interface bus (GPIB) commands used to implement talker, listener and controller functions.

Support sofware includes drivers, utilities, diagnostics and an interactive control program, National Instruments officials said. Users can assemble the driver program, including interrupt service routines, as a Fortran, Macro or Basic callable subroutine package for stand-alone use or as a handler under DEC's RT-11 operating system, the spokesman added.

Because the driver and utility programs use the same call syntax as National Instrument's GPIB11-1 interface for the DEC PDP-11, a PDP-11 user can reportedly run GPIB programs with either a PDP-11 or an LSI-11.

An interactive control program with the interface aids debugging and instrument checkout, company officials reported.

The product costs $695. It is also available in quantity discounts from National Instruments at 8330 Burnet Road, Austin, Texas 78758.

Unit Sports Midget Medium

(Continued from Page 51)

Intended for small business systems that otherwise would use 14-in. Winchester-type disks or multiple floppy disk drive units, the Model 7710 is said to incorporate four oxide-coated recording surfaces. Three of those surfaces store user data, while the fourth holds prerecorded information for the drive's track-following servo system, IMI officials said.

The disks, which rotate at 3,600 rev/-min, store 5,868 bit/sec and provide 350 track/surface with 300 track/in., the spokesman noted.

The drive unit itself transfers 648k byte/sec and accesses in an average of 50 msec with 8.3 msec latency and 10 msec track-to-track access times, they added.

A linear voice-coil actuator reportedly positions the unit's standard Winchester-type read/write heads, and a brushless dc motor drives both the spindle and a closed-loop, filtered air system that protects the disks, actuator and heads.

The Model 7710's controller, meanwhile, incorporates a Signetics, Inc. 8X300 bipolar microprocessor and fits on a 7- by 10-in. printed circuit board in the drive's base, IMI said.

The controller interfaces to a host processor through an IEEE 488 standard bus and to the disk drive through a disk bus consisting of 24 signal lines.

Prices for a standard Model 7710 range from $1,500 to $2,900 in OEM quantities. Without a controller, the unit costs less than $2,000; with an optional, built-in controller it is priced at about $3,000.

IMI is located at 10381 Bradley Drive, Cupertino, Calif. 95014.

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For Chemical Products Firm

Minis Serve Field Offices Abroad

DALLAS — Unable to centralize DP operations at its European field offices, a specialized chemical products maker based here has opted for the next best alternative — a distributed processing network built around a series of minicomputers.

Officials at National Chemsearch Corp. credit the distributed network with speeding order reporting and accounting procedures at its international field offices.. They also credit the system with supplying the firm's top executives with the information they need to accurately assess domestic and international market conditions.

In the network, the computers provide National Chemsearch with on-site DP support for general business processing tasks like order entry, accounts receivable and cash monitoring. Raw data from the company's international sales representatives enters the minis, two of which serve as central processors at the firm's European branch offices, through a series of on-line workstations.

The data first undergoes some initial "massaging" and then is fully processed by the computers at the end of each working day. From the resulting information, an IBM 370/148 at the company's European headquarters generates month-end summary reports.

Because Chemsearch and its subsidiaries sell their products to customers throughout the world, fast and reliable DP has always been a top priority for the company, sources here said.

Moreover, the market that Chemsearch deals in is characterized by a high volume of relatively small orders generated by many field sales representatives. As a result, Chemsearch must maintain very detailed accounting and billing records in addition to a substantial inventory, company officials explained.

Domestic Operations

In its domestic operations, Chemsearch's accounting and data communications programs are highly centralized, with all field facilities transferring data directly to an IBM 370/148 at company headquarters here. By standardizing its accounting routines, the firm has minimized the amount of on-site processing performed by its U.S. branch offices.

All raw sales data goes here for processing on the central mainframe, after which it returns to the branch offices for order filling and shipping. At the end of the processing cycle, the system generates management reports for the field locations and summary accounting reports for distribution in the corporate headquarters.

In Europe, however, a welter of bewildering government and business regulations have made centralized operations impractical and, in some instances, impossible, Chemsearch spokesmen explained.

To cope with these conflicting requirements, the company instead began planning a distributed processing network that not only would extend data entry and DP capabilities across national borders but would also communicate with its central computer systems either here or at its European headquarters.

After months of consultation and evaluation, the firm chose Datapoint Corp. batch transaction and time-sharing systems over the rival configurations it considered. Company officials opted for the Datapoint equipment in part, they said, because it posed no serious user training problems and because its business programming language proved relatively easy to implement.

Built around 48K-byte Model 5500 business processors, the network incorporates a series of Datapoint's 1,920-character Model 3600 workstations with hardwired conections to the CPUs. The workstations typically serve as data input terminals for source data being transferred to the CPUs' cartridge disk systems, a company official said.

One of the data entry and processing systems operates at Chemsearch's European headquarters, while several of the company's subsidiaries are similar configurations to receive mail reports and orders that are processed at shipment sites throughout the continent, corporate officials said.

In the near future, Chemsearch plans to install additional data entry and processing systems elsewhere in Europe as well as in Latin America, the spokesmen added. Three of these upcoming systems will communicate directly with the company's central mainframe here through intercontinental phone lines.

Users Get Selection Assist

(Continued from Page 51)

units and a 60 char./sec Dasher TP1 printer, DG officials said.

The desktop unit is also said to provide a 4,800 bit/sec communications option with 2780 and 3780 communications capability.

The CS/60 series models, meanwhile, offer an assortment of configurations based on the Eclipse S/130, company spokesmen said. A Model 3 configuration incorporates a 64K-byte CPU, 20M- to 80M bytes of cartridge disk storage and one to four interactive terminals, they added.

Model 5 supports a 128K-byte processor, 20M-byte disk unit and as many as 17 terminals, while the Model 6 accommodates up to 256K bytes of main memory, 17 terminals and a choice of 50M, 96M- or 190M-byte diskette unit, a DG official said.

Like the CS/20, the three CS/60 models come with a synchronous communications option, though it operates at twice the speed of the smaller system's option, the official noted.

Software for both the CS/20 and the CS/60 series provides interactive screen handling extensions, Isam file management and system utilities, DG said. In addition, the CS/60's software includes enhancements like multiple-terminal support capability, linkages that pass data to called programs and the availability of four alternate keys for Isam file management, the company added.

A basic CS/20 configuration with 64K bytes of MOS memory, two 315K-byte flexible disk drive units and a display terminal with keyboard costs $10,945.

A typical CS/60 Model 6 configuration with 256K bytes of main memory, an 800/1,600 bit/in. tape drive, 380M bytes of disk storage, eight interactive Dasher display terminals, an 180 char./sec Dasher LP2 bidirectional printer, a 300 line/min printer, RJE80 communications capability and Hasp II workstation support costs $151,920.

Volume deliveries of both the CS/20 and CS/60 are scheduled to begin in September from DG at Route 9, Westboro, Mass. 01581.

Itel to Lease DG CS/20, 60

NEW YORK — Hardware, software, maintenance and financing for Data General Corp.'s CS/20 and CS/60 series became available from a single source when the company recently signed Itel Corp.'s Business Systems Division as a nationwide third-party distributor for the small business systems.

Through its 45 sales representatives in 10 cities, the Itel division will lease the equipment to customers whose annual revenues range from $50,000 to $25 million, division president Stephen Gerbsman explained. Itel, which had earlier gained distribution rights to DG's CS/40 line, will also supply the CS/20 and CS/60 to major hardware wholesalers and to distributed systems users among the nation's Fortune 1,000 firms, Gerbsman said.

By leasing from Itel, users will be able to tap the library of application software the company has developed for some 15,000 customers in industries like distribution, manufacturing, banking, insurance, finance and communications.

Mini users will also reportedly be able to perform their applications off-line in the company's regional data centers.

Disk System Emulates RK-11

SMYRNA, Ga. — Single-board control is reportedly available with an LSI-11/PDP-11/03-compatible disk system from Equipment Resources, Inc.

The Model ER1010 provides 5M bytes of fixed disk plus 5M bytes of removable storage, emulates the Digital Equipment Corp. RK-11 disk system and plugs into the two DEC processors through one quadslot board, according to Equipment Resources officials.

Transparent to DEC's RT-11 operating systems, the disk system also has a built-in power supply, occupies 8.75 in. of vertical rack space and can be temperature-stabilized 90 seconds after a cold start, the spokesmen added.

An off-the-shelf model with cabling and formatted disk pack costs $6,900 from Equipment Resources at 1175-4 Fleming St., Smyrna, Ga. 30080.

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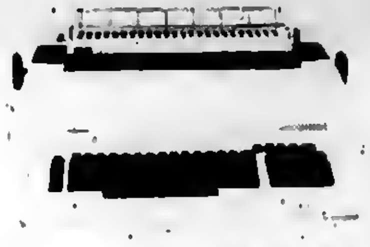

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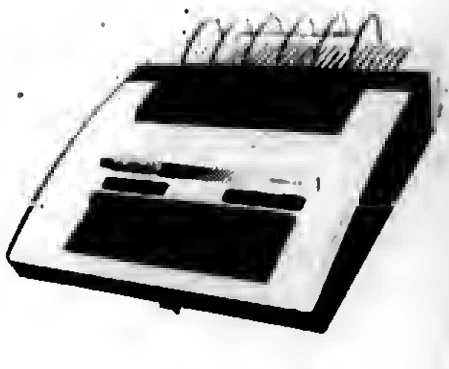

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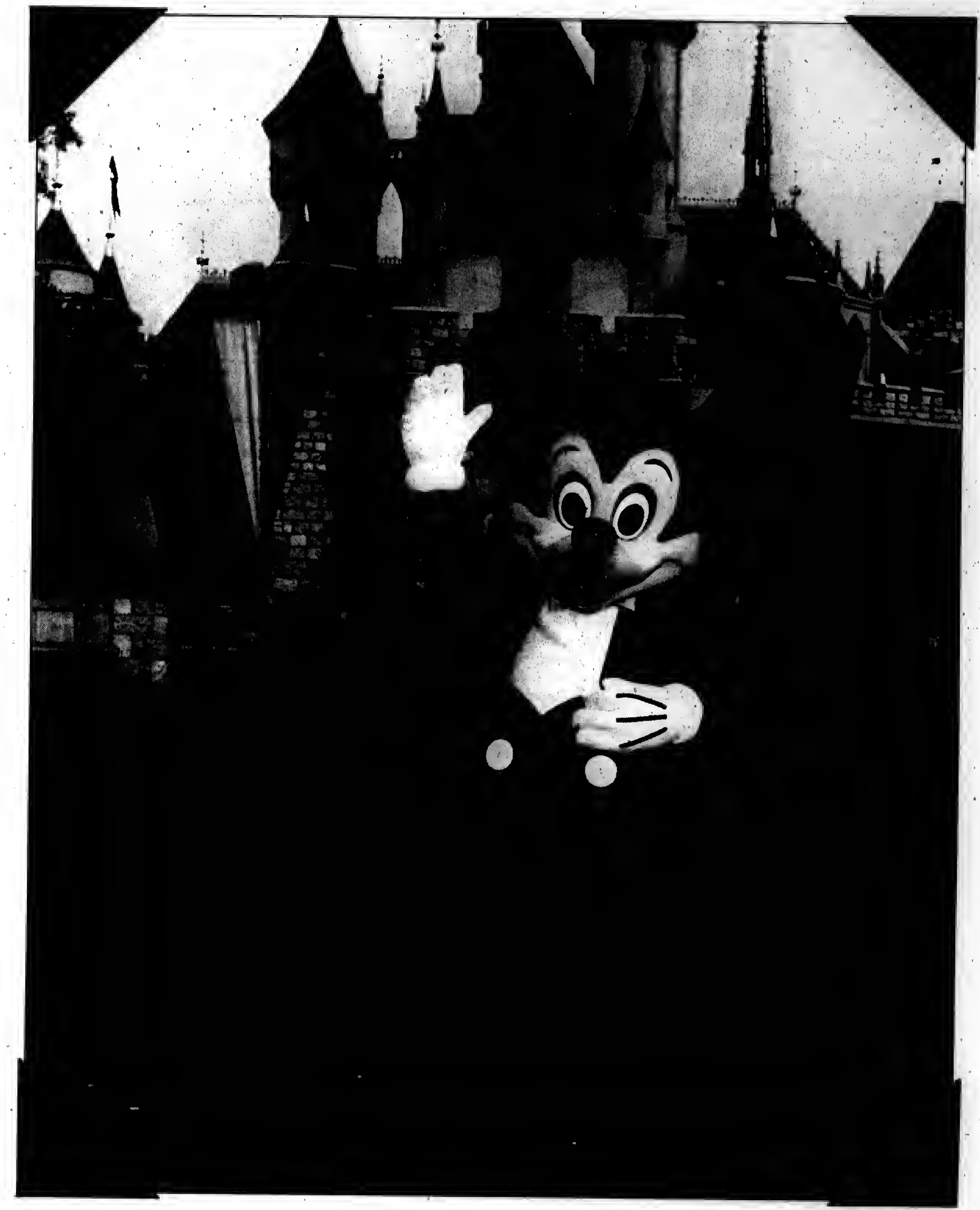

On the Inside

- Where to Go
- What to See
- Who'll Be There

300 Exhibitors Signed Up

More Than 40,000 Expected to Swamp NCC

By Marcia Blumenthal
CW Staff

Shown clockwise from left are Sen. Ernest F. Hollings, Dr. Joel A. Snow, Dr. Stephen W. Miller (center), Dr. Cuthbert C. Hurd, Harold J. Haynes, Dr. Leonard Y. Liu, Dr. Sakti P. Ghosh, Dr. Theodore J. Williams and Ryal R. Poppa.

ANAHEIM, Calif. — An estimated 40,000 visitors and 300 exhibitors are expected to flock to the Anaheim Convention Center for the 1978 National Computer Conference opening June 5.

To accommodate the multitude of booths and the mammoth crowds, part of the parking lot adjacent to the Convention Center was enclosed, carpeted and air-conditioned. But that space was still not adequate so the personal computer exhibits will be housed at the nearby Disneyland Hotel.

The role of computers in helping alleviate the national energy problem will be the conference theme, unifying all the keynote sessions.

Democratic Sen. Ernest F. Hollings of South Carolina and Dr. Joel A. Snow, associate director for research and policy for the Office of Energy Research in the U.S. Department of Energy, will be the keynote speakers at the opening plenary session on Monday, June 5 at 9:30 a.m.

Hollings has been active in formulating energy policy in the Senate, and he currently serves as chairman of the Senate Subcommittee on Communications. Snow will speak on the application of computers to research programs being undertaken by the Department of Energy.

Luncheon Speakers

Several other speakers are scheduled to address various luncheons and sessions throughout the week. On Tuesday, June 6, Harold J. Haynes, chairman of the board and chief executive officer of Standard Oil Co. of California, will assess the current energy crisis and describe proposed industry solutions to the energy problem. He will also outline some approaches to more efficient utilization of existing energy resources.

At the conference luncheon on Wednesday, Dr. Theodore J. Williams, president of the American Federation of Information Processing Societies, Inc. (Afips), the NCC sponsor, will assess the growing importance of hierarchical and distributed computer systems in industrial process monitoring and control, with special emphasis on their importance in conserving existing energy resources.

"Such control systems will be absolutely necessary in coordinating plant operations to permit the maximum productivity with the minimum of energy usage," Williams believes.

Besides his Afips post, Williams is professor of engineering and director of the Purdue Laboratory for Applied Industrial Control at Purdue University.

Ryal R. Poppa, chairman of the board of Pertec Computer Corp., will be the featured speaker at the conference's Personal Computing Luncheon. Poppa will explore the trend toward the widespread use of personal computers to manage energy in the home and in business.

Lively Symposium Expected

A special symposium on "Developing Energy and Computing Technology," chaired by Dr. Cuthbert C. Hurd, will be held Tuesday at 8:30 p.m. Hurd, a computing science pioneer and an entrepreneur in the energy field, noted NCC '78 is the first time the conference has a unifying theme.

According to Hurd, speakers at that symposium from industry, government, finance and other disciplines will evaluate the keynote addresses made during the first two days of the conference.

Expecting the symposium to be a lively event, Hurd predicted debate will center on criticism of private industry for not doing enough to help solve the energy problem.

Hurd estimated it will take about $100 billion to develop the kinds of energy resources and companies needed to relieve the energy problem over the next 25 years. He compared this new challenge to that met by the computer industry, which has become a $100 billion industry during the past 25 years.

With the same willingness to invest, an energy industry to alleviate the energy crunch will surface.

Under the direction of NCC chairman Stephen W. Miller, the conference is expected to draw 40,000 people and will feature about 100 technical sessions and exhibits by 300 organizations.

Miller, manager of program development in the Information Science and Engineering Division of SRI International, was pivotal in arranging the 1975 NCC in Anaheim, which marked an all-time record in total paid registrants and exhibitors.

As of May 17, preregistrations for this year's conference stood at 1,800 compared with 1,400 at the same time last year, according to Afips, which also reported that total attendance last year topped 36,500 people.

Dr. Leonard Y. Liu, director of systems architecture and standards for IBM, is a program co-chairman, responsible for the overall planning and implementation of the professional program for NCC.

The second co-chariman, Dr. Sakti P. Ghosh, a senior research staff member in the Computer Science Department of IBM Research laboratory, is coordinating all activities planned by the program committee.

In addition to the keynote sessions, technical sessions and exhibits, special events such as the awarding of the 1978 Harry Goode Memorial Award have been scheduled. This year the award will be shared by Dr. Gordon E. Moore and Dr. Robert N. Noyce, president and chairman of the board, respectively, of Intel Corp.

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Anaheim, Here We Come

A Bit of History

ANAHEIM, Calif. — This city, host of the 1978 National Computer Conference, was settled in 1857 by German colonists who were looking for a place to grow wine grapes.

A blight in the late 1800s wiped out the burgeoning wine industry, however, and led to the cultivation of oranges in their place, turning the area into a bustling citrus center.

But all that changed in 1955, when Disneyland opened its gates, bringing tourism to the forefront of local industry.

When Disneyland opened, there were only five hotels and two motels in the area — with a total capacity of 87 rooms. Now there are more than 130 hotels and motels with more than 10,000 rooms.

With the tourism boom, the city built Anaheim Stadium, where the California Angels baseball team plays, in 1966 and a year later opened the Anaheim Convention Center, which the city claims is the largest on the West Coast.

Anaheim has changed considerably from the time when the original surveyor described it as "27 miles southeast of Los Angeles on the crossroads of wagon trails between San Pedro, San Bernardino and Salt Lake City."

Eats: Snacks to Gourmet

ANAHEIM, Calif. — Anaheim boasts no fewer than 230 restaurants, according to the city's visitor and convention bureau. Among them are a host of familiar U.S. chains and fast food outlets such as Howard Johnson's and McDonald's, so no one need starve.

Since their familiar marquees will attract interested NCCers, those eateries are not listed in the restaurant guide, which begins on Page P/6.

The area offers a wide variety of other spots — mostly informal — regardless of your mood or budget. They range from a quick snack to a gourmet dinner and specialize in American, French and continental, Italian, Mexican and Spanish, Oriental, smorgasbord and sea foods.

To be sure of a table, reservations are recommended.

The Overland Stage and Territorial Saloon, with a hefty selection of entrees and an excellent salad bar, deserves a star. The Overland is right at the Inn at the Park on S. Harbor Blvd. in Anaheim.

For more adventurous souls — or those with time enough to drive half an hour or so — both Newport Beach and Laguna Beach offer some delightful alternatives.

Worthy of special mention is the Pleasant Peasant at McArthur Square in Newport Beach, which serves moderately priced, French-style food. Also in Newport Beach is Ambrosia — a more expensive but lovely spot.

Those with a yen for Italian food might want to try the Villa Nova on the Pacific Coast Highway in Newport.

Another Italian spot that gets raves from the local residents is Matteo's at Pacific Coast Highway and McArthur, also in Newport Beach.

Gulliver's, which features English-style rib roasts and steak and kidney pie and is located across the street from the Orange County Airport, also is highly recommended.

For seafood, the Crown House at Pacific Coast Highway and Crown Valley Parkway in Laguna Beach is a favorite with locals. Delaney's is another, with restaurants in Newport, El Toro and Anaheim.

And for an "exotic" experience, try the Marrakesh on West Coast Highway, also in Newport Beach.

For those who dream of crispy tortillas and the heat of Jalapena peppers, some of the best of the California variety are found in and around Anaheim. The Red Onion, at 1801 Katella Ave., in Anaheim, is a good place for them.

In nearby Santa Ana, Villa Taxco on East First St. also is recommended.

Fun, Sightseeing Minutes Away

ANAHEIM, Calif. — While Disneyland is the main entertainment attraction here, Anaheim and the surrounding area also boast a number of other theme parks and other entertainment opportunities. A car is best to reach them, but bus tours are offered daily.

Anaheim, has become one of the meccas of vacationers since Disneyland opened in 1955. The area also boasts such attractions as Knott's Berry Farm, the Movieland Wax Museum and Lion Country Safari.

For the more peripatetic, there are of course all the attractions of Los Angeles to the north and San Diego to the south, while the border towns of Mexico a bit further down the coast also beckon.

In addition to the theme parks located close to Anaheim itself, the Pacific Coast is just 12 miles to the west, where the delightful towns of Newport Beach and Laguna Beach can be found.

Among the theme park attractions, Knott's Berry Farm is probably the best known outside of Disneyland itself.

This 150-acre amusement park originally was a rhubards and boysenberry farm, but during the Depression Walter and Cordelia Knott began serving chicken dinners in their home in order to make ends meet.

That venture grew into an amusement complex which now features more than 100 different rides and attractions, including a narrow-gauge railroad and an Old West ghost town with the "Timber Mountain Log Ride."

There are several Old West stores, a saloon and a jail in this part of the park, and outlaws and good guys have a several-times-a-day shootout on the main street while can-can dancers entertain in the saloon.

The more modern part of the park is designed around a Roaring '20s theme and features such rides as a double-loop corkscrew rollercoaster, a parachute drop and flying airplanes.

A '20s car display is also featured and there is entertainment in the Good Time Theater, the Cloud Nine Ballroom and the Starlight Pavilion.

Rounding out the park is the Fiesta Village, where visitors can stroll along the Mission Trail, make purchases in the open stall market or just relax by the Flamingo Pond —all accompanied by mariachi music.

Also in the villages are such rides as the "Tijuana Taxi," the "Happy Sombrero" and the "Mexican Whip."

Knotts is presently operating on spring hours, meaning it is open from 10 a.m. to 6 p.m. weekdays, 10 a.m. to 11 p.m. on Friday and Saturday and 10 a.m. to 9 p.m. on Sunday. Straight admission is $4.25 and admission plus a 10-ride book of tickets costs $5.95.

About 13 miles south of Disneyland, in Irvine, visitors can safari through lion country. But there are more than just lions at Lion Country Safari, since park residents include elephants, rhinos, cheetahs, giraffes, zebras, hippos and African antelope plus ostriches and exotic birds.

Visitors drive their own cars through the park among the animals or take a river ride or a train through the junior part of the park.

Dining at the park's restaurant or picnicking in a forest grove is possible.

The admission runs $4.95 for adults and $2.95 for children, with those four years and younger getting in free. The park is open from 9 a.m. to 6 p.m.

Right next door to Knott's Berry Farm and 10 minutes from Disneyland, visitors will find the Movieland Wax Museum in Buena Park.

The museum has models of more than 238 movie stars in 83 movie scenes on display. It is open from 9 a.m. to 10 p.m. weekdays, but stays open to 11 p.m. on Friday and Saturday.

And if you get the time, the Queen Mary is docked at Long Beach Harbor. Built in 1936, the Queen is described as "art deco opulent". Take the Long Beach freeway to the Queen Mary Exit. The ship is open for tours daily from 10 a.m. until 6 p.m.

Disneyland: Fantasy Trip

ANAHEIM, Calif. — While many National Computer Conference attendees may feel that "Fantasyland" is on the floor of the Convention Center here, it's really just up the street — along with six other theme areas that make up Disneyland.

The park, which has entertained more than 165 million visitors since it opened 23 years ago, consists of 76.6 acres of rides and entertainment surrounded by another 107.3 acres of parking space and is connected to the Disneyland hotel on one side.

The park was built in one year at a cost of $17 million. When it opened in 1955, it featured 22 rides in five different lands. Since then, however, the amount invested has risen to $188 million and there are now more than 50 attractions.

Nostalgia inspired Main Street, U.S.A., the first land visited by arriving guests. Here is an idealized composite of the nation's small towns as they were at the turn of the century. It's the era when the gas lamp was about to be extinguished by its electric successor.

Main Street is the avenue leading to all Disneyland adventures. It is flanked by a tribute to its founder, "The Walt Disney Story," which features "Great Moments with Mr. Lincoln," and an old-fashioned emporium and Main Street Station, the boarding point for the grand circle tour of the park on the four trains of the Disneyland Railroad.

The next stop is Adventureland, featuring the mysterious corners of Asia and the South Seas.

Nestled in a vine-covered South Seas Island hut, 225 loquacious birds, multihued flowers and tiki gods are brought to life through "Audio-Animatronics" for a musical serenade in the Enchanted Tiki Room.

Nearby, you can board boats for a journey through the murky, crocodile-infested waters of the jungle cruise.

Oblivious to the jungle nearby, guests climb to the lofty Swiss Family Treehouse, commune of the shipwrecked family, while in a bustling bazaar nearby, shoppers may purchase products and gifts from around the world.

Iron-trellised balconies, narrow winding streets, sidewalk cafes, an assortment of shops, wandering Dixieland jazz minstrels, a haunted house and an adventure on the Spanish Main are the ingredients of New Orleans Square.

By boarding bayou bateaux (boats), guests sail into an era when pirates ruled the high seas. A band of buccaneers plunder and burn a city during the conclusion to the "Pirates of the Caribbean" adventure, another "Audio-Animatronics" presentation.

Situated on the outskirts of the Square is Disneyland's Haunted Mansion, inhabited by 999 ghosts, ghouls and goblins who carry on an incessant search for Occupant No. 1,000.

Plying the Rivers of America

(Continued on Page P/8)

	WEDNESDAY A.M.		WEDNESDAY P.M.		THURSDAY A.M.		THURSDAY P.M.	
	8:15-9:55	10:05-11:45	2:00-3:40	3:50-5:30	8:15-9:55	10:05-11:45	2:00-3:40	3:50-5:30
CALIFORNIA I	IMAGE PROCESSING & REMOTE SENSING Introduction & Leading Applications **Donald T. Lauer** 45	Techniques & Programming Considerations **John J. Quann** 54	Image Processing System Design **George McMurtry** 62	Panel on Satellite & Other Data Characteristics **Fred C. Billingsley** 70	DATA PROCESSING MANAGEMENT & ADMINISTRATION Security Assessment Techniques **James I. Cash, Jr.** 79	Contribution of Planning to Information Systems Productivity **Charles Tucker** 87	EDP Auditing-Member of the DP Community **Joe Antal** 95	Organizational Factors in the Allocation of Computing Resources **Rob Kling** 103
CALIFORNIA II	DATABASE MANAGEMENT SYSTEMS Making the Decision to Go Database **James McKenney** 46	Getting Ready for Databases **John Lyon** **William Wilson** 55	End User Facilities **Henry C. Lefkovits** 63	Installation & Use of Database Systems **George G. Dodd** 71	SPECIAL PURPOSE TERMINALS Voice Interface to Computer Systems I **George Glaser** 80	Voice Interface to Computer Systems II **George Glaser** 88	Special Purpose vs. General Purpose Terminals **Donald J. Birmingham** 96	Future Developments of Special Purpose Terminals **Rein Turn** 104
CALIFORNIA III	COMPUTER ARCHITECTURE Impact of Standardization on Architecture **Tse-yun Feng** 47	Large Scale Computer Architecture **Charles R. Vick** 56	Special Purpose Machines I **K.S. Fu** 64	Special Purpose Machines II **K.S. Fu** 72	EFTS—ELECTRONIC FUND TRANSFER SYSTEMS Current Developments in EFTS **Stephen J. Kohn** 81	Technical & Social Issues **Russell H. Dewey** 89	Legal Issues in EFTS Developments **Robert Zimmer** 97	NEW APPLICATIONS Application of Minicomputers to Library Systems & Services **Laura J. Rainey** 105
CALIFORNIA IV	EVOLUTION OF NEW HARDWARE TECHNOLOGY VLSI: The New Semiconductor Revolution **Frederico Faggin** 48	What's Ahead in Computer Memory & Storage Technology **Lewis M. Terman** 57	The Future of Peripheral Devices **Gil Gates** 65	Opportunity for New Technology Companies **Vir A. Dhaka** 73	SOFTWARE DEVELOPMENT METHODOLOGY Programming Methodology **Susan Gerhart** 82	Software Verification, Validation, & Testing **Edward F. Miller** 90	User Experience with New Software Methods **Victor R. Basili** 98	Software Maintenance **Edward Yourdon** 106
ORANGE COUNTY 18	PERFORMANCE MEASURE & EVAL End User Performance Considerations **Shirley W. Watkins** 49	AUTOMATIC PROGRAMMING Advanced Specification Techniques **Cordell Green** 58	Advanced Implementation Techniques **Thomas Standish** 66	Whither Automatic Programming **Robert Balzer** 74	ARTIFICIAL INTELLIGENCE Artificial Intelligence as a Scientific Field **Raj Reddy** 83	Question the Experts **Peter Hart** 91	Artificial Intelligence in Science & Medicine I **Saul Amarel** 99	Artificial Intelligence in Science & Medicine II **Saul Amarel** 107
SANTA ANA I	OFFICE AUTOMATION The Future of Office Automation **David L. Holzman** 50	Computer-Based Document Distribution **Gwen C. Edwards** 59	DISTRIBUTED SYSTEMS Panel Discussion **David J. Farber** 67	Design Methodology for Distributed Processing **E. Douglas Jensen** 75	DISTRIBUTED SYSTEMS Local Data Networks **Ira W. Cotton** 84	Software/Applications/Programming Languages for Distributed Environment **Eric Manning** 92	Installing Distributed Systems **George M. Crandell, Jr.** 100	The Proposed Computer Graphics Standard **James George** 108
SANTA ANA II	LEGISLATION & ITS IMPACT Personnel **James P. Chandler** 51	Communications **Philip S. Nyborg** 60	DATA PROCESSING MANAGEMENT & ADMINISTRATION Organizational Repsonse & Information Technology **Richard L. Nolan** 68	Why is DP Management So Difficult? **Frederick Finch** 76	FORMAL METHODS IN PROGRAMMING & MICROPROGRAMMING Microprogramming Tools **George 8. Leeman, Jr.** 85	Micro-Code Correctness, Optimization & Specification **Bruce Shriver** 93	When Will Formal Methods be Practical? **Karl N. Levitt** 101	
GARDEN GROVE III	COMPUTER CAREERS & EDUCATION CC&E: Requirements & Alternatives I **Richard H. Austing** **Michael Mulder** 52	CC&E: Requirements & Alternatives II **Richard H. Austing** **Michael Mulder** 61	How Does the Computing Professional Keep Up? **Terry J. Frederick** 69	What is Professionalism? **Donald B. Medley** 77	COMPUTER CAREERS & EDUCATION Designing & Debugging Careers for Women in the Computer Industry **Thelma Estrin** 86	Computers in Early Education **Orlando S. Madrigal** 94	Accreditation **Gerald E. Wagner** 102	
ANAHEIM	SOFTWARE METHODOLOGY Software Design & Analysis **Donna Dunaway** 53			PIONEER DAY SWAC **Harry D. Huskey** Reception to follow 78				

CONFERENCE LUNCHEON

12:00 noon, Wednesday, June 7
Featured Speaker: Dr. Theodore J. Williams, President, The American Federation of Information Processing Societies, Inc.

DINNER/THEATRE PARTY

6:00 p.m., Grand Hotel
Cocktails, Dinner, Theatre
Sebastian Playhouse Production
Fiddler on the Roof

PROFESSIONAL DEVELOPMENT SERIES

Requirements Analysis and Definition
Peter Freeman, SofTech, Inc.

Computer Systems Capacity Planning and Performance Evaluation
Dr. Jeffrey P. Buzen, BGS Systems, Inc.

An Overview of Distributed Processing
Marshall D. Abrams, Ph.D., Integrated Computer Systems, Inc.

Managing and Motivating the DP Professionals
Richard C. Grote, Performance Systems Corporation

Hows and Whys of Effective Computer Negotiations
Kenneth C. Brindle, International Computer Negotiations, Inc

PERSONAL COMPUTING LUNCHEON

12:00 noon, Thursday, June 8
Featured Speaker: Ryal R. Poppa, Chairman of the Board and Chief Executive Officer, Pertec Computer Corporation

PROFESSIONAL DEVELOPMENT SERIES

Business Protection from Computer Crime and Accidental Loss
Donn B. Parker, SRI International

Cryptographic Protection in Computer Systems
Principal Instructor: Richard E. Lennon, Systems Communications Division, IBM

Designing the Database System Project
Leo J. Cohen, Performance Development Corporation

Hands-On Microcomputer Software/Hardware Workshop
Eric R. Garen, Integrated Computer Systems, Inc.

Software Design Techniques: Structured Methodology — Truths and Fallacies
Gopal K. Kapur, Kapur & Associates, Inc.

CONFERENCE AT A GLANCE

The 1978 National Computer Conference will feature an unparalleled array of program sessions, featured addresses, plus a special symposium on computing and energy.

The role of computers in helping to alleviate the national energy problem will be a major theme of NCC '78. On opening day, prominent members of the Administration are expected to assess energy problems and issues. Then on Tuesday, June 6, Harold J. Haynes, chairman of Standard Oil Company of California, will analyze the current energy situation and proposed solutions by industry. That evening Dr. Cuthbert C. Hurd, a computer pioneer and energy entrepreneur, will chair a special Symposium on Developing Energy and Computing Technology.

Wednesday, June 7, will feature an AFIPS Presidential Address by Dr. Theodore J. Williams with emphasis on the role of computerized industrial process monitoring and control systems in achieving minimum energy usage. The following day, June 8, Ryal R. Poppa, chairman of Pertec Computer Corporation, will discuss trends in personal computing including how expected advances in hardware and software may contribute to improved management of home and business energy systems.

OPENING PLENARY SESSION 9:30 a.m., Monday, June 5
Leading members of the Administration will assess Computers and Energy

INDUSTRY LUNCHEON 12:00 noon, Tuesday, June 6
Featured Speaker: Harold J. Haynes, Chairman of the Board and Chief Executive Officer, Standard Oil Company of California

ENERGY SYMPOSIUM 6:30 p.m., Tuesday, June 6
Developing Energy and Computing Technology:
Chairman: Dr. Cuthbert C. Hurd, a computer pioneer and energy entrepreneur

CONFERENCE LUNCHEON 12:00 noon, Wednesday, June 7
Featured Speaker: Dr. Theodore J. Williams, President, The American Federation of Information Processing Societies, Inc.

PERSONAL COMPUTING LUNCHEON 12:00 noon, Thursday, June 8
Featured Speaker: Ryal R. Poppa, Chairman of the Board and Chief Executive Officer, Pertec Computer Corporation

MONDAY A.M.

OPENING PLENARY SESSION

9:30 a.m., Monday, June 5
Leading members of the Administration will assess Computers and Energy

MONDAY P.M.

		2:00-3:40	3:50-5:30
CALIFORNIA I	HOME & HOBBYING COMPUTING	The Current Situation & the Forseeable Future **Jim C. Warren, Jr.** 1	Personal Hardware, Software and Applications **Carl T. Helmers, Jr.** 9
CALIFORNIA II			
CALIFORNIA III	COMPUTER MODELS IN SOLVING WORLD'S ENERGY PROBLEM	Energy Decision Analysis **Robert Korsan** 2	Computer Modeling in Energy Technology **Julius Chang** 10
CALIFORNIA IV	DATA PROCESSING MANAGEMENT & ADMINISTRATION	Time Management for the DP Professional **James F. Towsen** 3	Motivation of the DP Professional **J. Daniel Couger** 11
ORANGE COUNTY 18	DATABASE MANAGEMENT SYSTEMS	Distributed Database Technology **Robert W. Taylor** 4	Database Design Methodology **Vincent Y. Lum** 12
SANTA ANA I	DATA NETWORKS	International Data Networks **Barry Wessler** 5	Nationwide Packet Switching Networks **Lawrence G. Roberts** 13
SANTA ANA II	DESIGN AUTOMATION & COMPUTER GRAPHICS	Computer Aid for Automatic Layout of Integrated Circuit Masks **Charles W. Gwyn** 6	Automated Design of Digital Systems **William M. vanCleemput** 14
GARDEN GROVE III	PERFORMANCE MEASUREMENT & EVALUATION	Mathematical Analysis of Computer Performance **Hisashi Kobayashi** 7	Computer Performance Management **Philip J. KMat** 15
ANAHEIM	OFFICE AUTOMATION / COMPUTER ARCHITECTURE	OFFICE AUTOMATION Word Processing: A Revolution or an Evolution? **Evelyn Berezin** 8	COMPUTER ARCHITECTURE User Impact on Architecture **Stephen S. Yau** 16

CONFERENCE RECEPTION

6:30 p.m.
Grand Ballroom
Disneyland Hotel Convention Center

GENERAL INTEREST SESSIONS

Monday, June 5 through Thursday, June 8
1:30 p.m. and 3:30 p.m.
Special sessions of interest to family members.
Disneyland Hotel

Separate Registration Will Be Required For Each Seminar

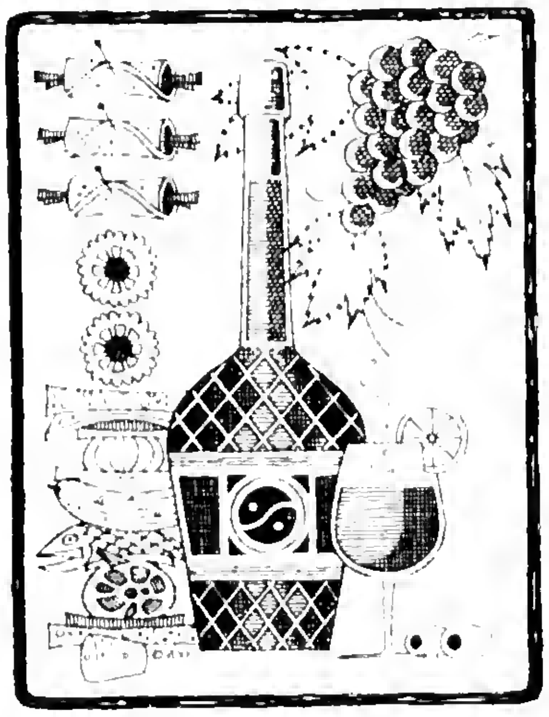
TUESDAY A.M. / TUESDAY P.M.

TUESDAY A.M. 8:15-9:55	TUESDAY A.M. 10:05-11:45	TUESDAY P.M. 2:00-3:40	TUESDAY P.M. 3:50-5:30
LEGISLATION & ITS IMPACT Computer Crime **Donn B. Parker** 17	COMPUTER ARCHITECTURE Impact of Semiconductor Technology on Computer Architecture **Gordon Moore** 24	Architecture Evolution I **Samuel H. Fuller** **Daniel E. Siewiorek** **C. Gordon Bell** 31	Architecture Evolution II **Samuel H. Fuller** **Daniel E. Siewiorek** **C. Gordon Bell** 38
DESIGN AUTOMATION Mature Design Automation Systems **Waldo Magnuson, Jr.** 18	Peripheral & Multiprocessors in Simulation **Walter J. Karplus** 25	SIMULATION Large Scale Simulation: Can Large Scale Models Alleviate World Resource Problems? **John McLeod** 32	Microprogramming & Simulation **Gary J. Nutt** 39
PROGRAMMING & OPERATING SYSTEMS Protection in Operating Systems **R. Stockton Gaines** 19	History of Programming Languages **Jean E. Sammet** 26	COBOL—A Status Report **Paul Oliver** 33	Data Encryption **Peter Denning** 40
DATABASE MANAGEMENT SYSTEMS Data & Program Conversion **Alan Merten** 20	Programming Language Interfaces to DBMS **Sham Navathe** 27	LEGISLATION & ITS IMPACT Legal Aspects of Software Protection **Michael S. Keplinger** 34	Privacy **Oliver. R. Smoot** 41
DATA NETWORKS International Computer Communications Regulations **George J. Lissandrello** 21	Satellite Data Communications for Public Service Sector **John Witherspoon** 28	OFFICE AUTOMATION Hardware Architecture for Office Automation **Larry J. Little** 35	Organizational Software for the Automated Office **Thomas M. Lodahl** 42
COMPUTER MODELS IN SOLVING WORLD'S ENERGY PROBLEM Computers in Oil Exploration **Pierre L. Goupilloud** 22	Energy Modeling Panel **William F. Rousseau** 29	PERFORMANCE MEASUREMENT & EVALUATION Computer Performance Technologies **Stephen R. Kimbleton** 36	Computer Performance Modeling **Jeffrey P. Buzen** 43
HOME & HOBBY Computers for the Mass Consumer Market **David A. Lien** 23	Computers & Their Applications **Kimio Ibuki** 30	RECENT PROGRESS IN JAPAN Overview of Recent Progress in Japan I **Toru Mikami** 37	Overview of Recent Progress in Japan II **Toru Mikami** 44
INDUSTRY LUNCHEON 12:00 noon, Tuesday, June 6 Featured Speaker: Harold J. Haynes, Chairman of the Board and Chief Executive Officer, Standard Oil Company of California		ENERGY SYMPOSIUM 6:30 p.m., Tuesday, June 6 Developing Energy and Computing Technology, Chairman: Dr. Cuthbert C. Hurd, a computer pioneer and energy entrepreneur	

PROFESSIONAL DEVELOPMENT SERIES

An Overview of Word Processing
Amy D. Wohl, Datapro Research Corporation
Women and Management Update — Skills for Winning With
Dr. Dru Scott, Dru Scott Associates, Inc.
How to Get Started With Microcomputers
Eric R. Garen, Integrated Computer Systems, Inc.
Developing Managerial Skills
Donn L. O'Neil, Ph.D., National Learning Institute, Inc.
Information Systems Architecture — A Management Perspective
Cory K. Foster and Ocie M. Gamble, Cincom Systems, Inc.

Restaurants



AMERICAN

Anaheim Depot Restaurant. 991-1970. 1055 W. Ball Road, Anaheim, MC, BA, AE.

Anaheim Hyatt House. 772-5900. 1700 S. Harbor Blvd., Anaheim. All major credit cards.

Anaheim Stadium Club Restaurant. 634-9001. 2000 S. State College Blvd., Anaheim.

The Cannery Restaurant. 675-5777. 3010 Lafayette Ave., Newport Beach. BA, MC, AE.

Carl's Charboiler Family Restaurant. 774-1680. 1168 W. Katella Ave., Anaheim. BA, MC.

Carl's Jr. Restaurant 638-9790. 2119 S. Harbor Blvd., Anaheim.

Chalet Pancake & Steak House. 533-3387. 721 W. Katella Ave., Anaheim. BA, MC.

Chao's Chinese & American Restaurant. 776-1880. 1560 S. Harbor Blvd., Anaheim. All major credit cards.

Charley Brown's. 634-2211. 1751 S. State College Blvd., Anaheim. AE, MC, BA.

Crescendo. 956-1410. 1721 S. Manchester, Anaheim. BA, AE, MC.

Gulliver's. 833-8411. 18482 McArthur Blvd., Irvine.

Grand Hotel. 772-7777. #1 Hotel Way, Anaheim. AE, CB, DC, MC, BA.

Hamburger House. 535-0222. 1770 S. Harbor Blvd., Anaheim. BA, MC.

The Inn at the Park. 750-1811. 1855 S. Harbor Blvd., Anaheim. AE, BA, CB, MC.

Jolly Roger Inn. 772-2722. 620 W. Katella Ave., Anaheim. BA, MC, DC, CB, AE.

Knott's Berry Farm Restaurants. 827-1776. 8039 Beach Blvd., Buena Park. BA (Visa), MC.

Lindel's Restaurant-Delicatessen-Bakery. 772-9210. 1783 W. Lincoln Ave., Anaheim. BA, CB, DC, MC.

Longfellow's — The Chicken, Steak and Chocolate Cake Place. 634-4905. 710 E. Katella Ave., Anaheim. AE, DC, CB, MC, BA, Visa.

Loose Caboose. 634-9565. 801 E. Katella Ave., Anaheim. BA, MC, DC, CB.

Marri's Pizza. 533-1631. 1194 W. Katella Ave., Anaheim.

Plush Fox Inn. 956-3250. 950 Ox Road, Anaheim. All major credit cards.

Sheraton-Anaheim. 778-1700. 1015 W. Ball Road, Anaheim. All major credit cards.

Slender Touch Dieter's Restaurant. 533-3204. 1671 W. Katella Ave., Anaheim.

Taurean Inn. 691-0801. 660 N. Beach Blvd., La Habra. All major credit cards.

Tom Jones Ltd. 633-3280. 512 E. Katella Ave., Orange. AE, BA, CB, MC.

BUFFET/SMORGASBORD

Hansa House Smorgasbord. 750-2411. 1840 S. Harbor Blvd., Anaheim. BA, MC.

CONTINENTAL/FRENCH

Ambrosia. 673-0200. 501 30th St., Newport Beach. All major credit cards.

Chanticlair. 752-8001. 18912 Mac Arthur Blvd., Irvine. AE, CB, DC, BA, MC.

Chez Cary Restaurant. 542-3595. 571 S. Main St., Orange. All major credit cards.

La Fayette Restaurant. 537-5011. 12532 Garden Grove Blvd., Garden Grove. BA, AE, CB, MC.

Petite Auberge. 556-0556. 3800 S. Plaza Drive, Santa Ana.

The Pleasant Peasant. 955-2755. 4251 Martingale Way, Newport Beach.

Silver Fox Supper Club. 776-9310. 1168 S. State College Blvd., Anaheim. All major credit cards.

Villa Chianti. 772-7777. The Grand Hotel, #1 Hotel Way, Anaheim. AE, CB, DC, MC, BA.

Villa Fontana. 547-0911. 21 Town & Country, Orange. BA, MC.

DINNER THEATRES/-SUPPER CLUBS

Harlequin, a Dinner Playhouse. 979-7550. 3503 S. Harbor Blvd., Santa Ana. BA, MC.

King Henry VIII Tavern. 527-1510. 823 S. Beach Blvd., Anaheim. BA, AE, CB, DC.

Kono Hawaii. 531-1232. 226 S. Harbor Blvd., Santa Ana. All major credit cards.

Laff Stop Comedy Nightclub. 751-7867. 2122 S.E. Bristol, Newport Beach. AE, CB, DC, MC.

Sebastian's Dinner Playhouse at the Grand. 772-7710. #1 Hotel Way, Anaheim. AE, MC, BA.

Silver Fox Supper Club. 776-9310. 1168 S. State College Blvd., Anaheim. All major credit cards.

ITALIAN

Marri's Pizza. 533-1631. 1194 W. Katella Ave., Anaheim.

Matteo's. 673-8267. 2325 East Coast Highway, Corona del Mar.

Villa Chianti-Grand Hotel. 772-7777. #1 Hotel Way, Anaheim. All major credit cards.

Villa Nova. 642-7880. 3131 West Coast Highway, Newport Beach.

KOSHER STYLE

Lindel's Restaurant-Delicatessen-Bakery. 772-9210. 1783 W. Lincoln Ave., Anaheim. BA, CB, DC, MC.

MEXICAN/SPANISH

Acapulco Mexican Restaurant. 956-7380. 1410 S. Harbor Blvd., Anaheim. BA, AE, MC.

Casa Manana. 635-9320. 1204 S. Harbor Blvd., Anaheim. All major credit cards.

Disneyland Park-Casa de Fritos. 533-4456. 1313 S. Harbor Blvd., Anaheim, BA, MC.

The Red Onion. 634-1888. 1801 E. Katella Ave., Anaheim. BA, MC, AE.

Villa Taxco. 547-9129. 2201 E. 1st St., Santa Ana.

ORIENTAL/POLYNESIAN

Chao's Chinese & American Restaurant. 776-1880. 1560 S. Harbor Blvd., Anaheim. All major credit cards.

Disneyland Park-Tahitian Terrace. 533-4456. 1313 S. Harbor Blvd., Anaheim. BA, MC.

Happy Garden Restaurant. 636-6721. 11761 S. Harbor Blvd., Garden Grove. All major credit cards.

Kono Hawaii. 531-1232. 226 S. Harbor Blvd., Santa Ana. All major credit cards.

Mikayo Restaurant. 541-3303. #33 Town & Country, Orange. AE, BA, MC.

Sampan Restaurant. 533-1071, 533-1261. 420 S. Brookhurst St., Anaheim. AE, BA, CB, DC, MC.

Twin Dragon. 772-4400. 1550 S. Harbor Blvd., Anaheim. All major credit cards.

SEAFOOD

Crown House. 496-5773. 32802 Pacific Coast Highway, Laguna Niguel.

The Cannery Restaurant. 675-5777. 3010 Lafayette Ave., Newport Beach. BA, MC, AE.

Loose Caboose. 634-9565. 801 E. Katella Ave., Anaheim. BA, MC, DC, CB.

Delaney's. 675-3145. 630 Lido Park Blvd., Newport Beach.

Tale of the Whale. 673-4633. 400 Main St., Balboa. AE, BA, CB, DC, MC.

Villa Fontana. 547-0911. 21 Town & Country, Orange. MC, BA.

(Continued on Page P/8)

MDB gets your IBM Series/1 together with more than 30 different line printer models, over 100 different terminals (TTY/RS232 type), or wire wrap for your special requirements.

MDB interfaces provide peripheral variety for the IBM Series/1 computer system. No longer limited to the manufacturer's models, you can select from the almost unlimited peripheral devices available in the minicomputer market. User flexiblity is the benefit of MDB interface products.

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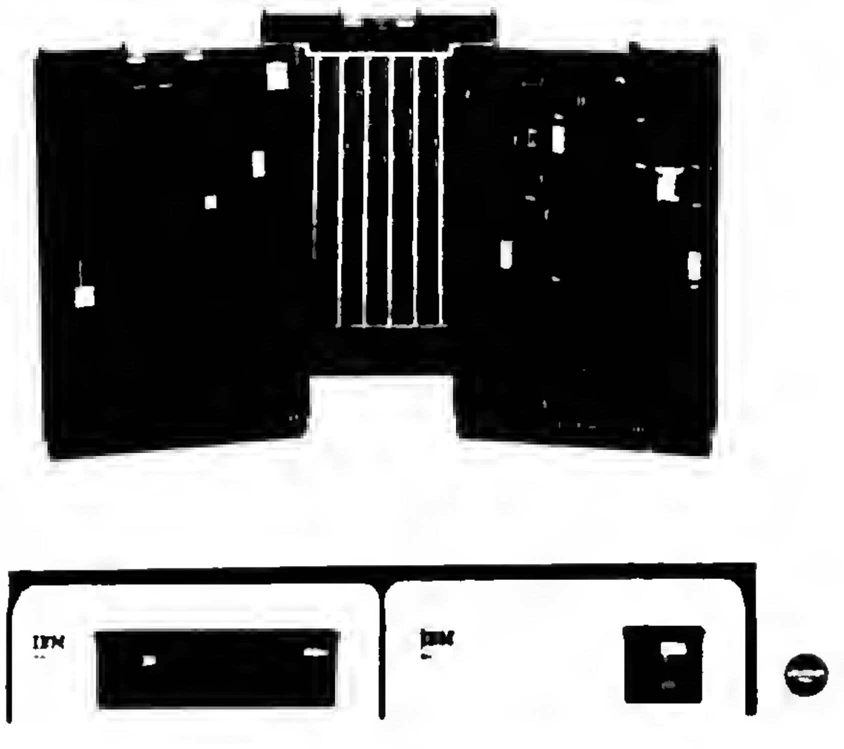

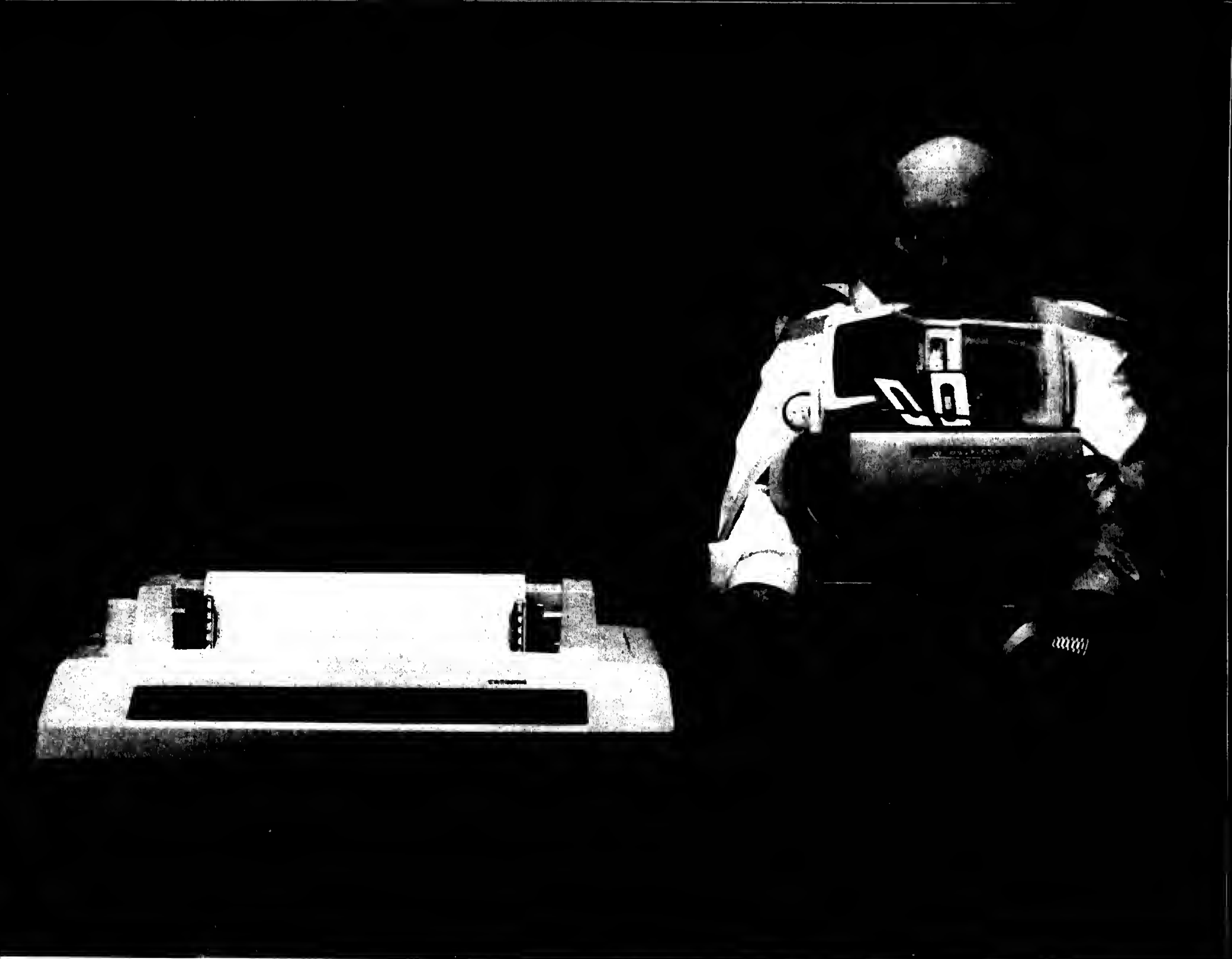

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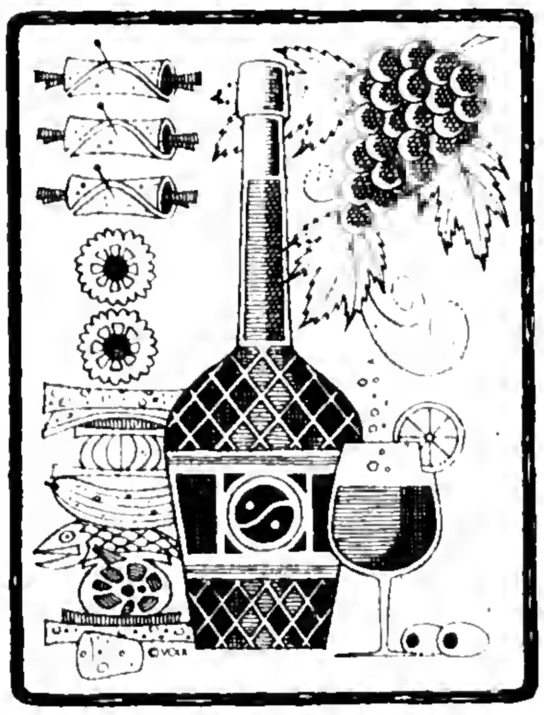


(Continued from Page P/6)

The Warehouse Restaurant. 673-4700. 3450 Via Oporto, Lido Village, Newport Beach. BA, MC, AE, DC.

NIGHT LIFE

Anaheim Depot Restaurant. 991-1970. 1055 W. Ball Road, Anaheim.

The Cannery Restaurant. 675-5777. 3010 Lafayette Ave., Newport Beach.

Cantina Lounge-Disneyland Hotel. 778-6600. 1150 W. Cerritos, Anaheim.

Captain Greenhorn — Quality Inn. 750-3131. 616 Convention Way, Anaheim.

Charley Browns. 634-2211. 1751 S. State College Blvd., Anaheim.

Crescendo. 956-1410. 1721 S. Manchester, Anaheim.

Happy Yeomen-Sheraton Anaheim. 778-1700. 1015 W. Ball Road, Anaheim.

Kono Hawaii. 531-1232. 226 S. Harbor Blvd., Santa Ana.

Laff Stop Comedy Nightclub. 751-7887. 2122 S.E. Bristol, Newport Beach.

Loose Caboose. 634-9565. 801 E. Katella Ave., Anaheim.

Overland Stage and Territorial Saloon. 750-1811. Inn at the Park, 1855 S. Harbor Blvd., Anaheim.

Pirate's Den — Jolly Roger Inn. 772-2722. 620 W. Katella Ave., Anaheim.

Plush Fox Inn Restaurant. 956-3250. 950 Ox Road, Anaheim.

Reflections Lounge — Grand Hotel. 772-7777. #1 Hotel Way, Anaheim.

Sampan Restaurant. 533-1071, 533-1281. 420 S. Brookhurst, Anaheim.

Showplace Lounge — Anaheim Hyatt. 772-5900. 1700 S. Harbor Blvd., Anaheim.

Ship's Lounge — Anaheim Holiday Inn. 750-2801. 1850 S. Harbor Blvd., Anaheim.

Silver Fox Supper Club. 778-9310. 1168 S. State College Blvd., Anaheim.

Tom Jones Ltd. 633-3280. 512 E. Katella Ave., Orange.

Top of the Park — Disneyland Hotel. 778-8800. 1150 W. Cerritos, Anaheim.

The Warehouse Restaurant. 873-4700. 3450 Via Oporto, Lido Village, Newport Beach.

EXOTIC

Marrakesh. 645-8384. 1100 West Coast Highway, Newport Beach.

Disneyland: A Fantasy Trip

(Continued from Page P/3)

are voices from the past. The majestic Mark Twain river-boat paddles past plantation docks, the square-masted sailing schooner "Columbia" unleashes a cannonade at Fort Wilderness, the Mike Fink Keelboats shoot the rapids and swift, guestpowered Davy Crockett canoes navigate the river course..

On Tom Sawyer's Island, there's the mystery of exploring Injun Joe's Cave, the precarious walk across the ever-shifting barrel bridge and the climb to the top of Tom Sawyer's tree house.

In the center of Disneyland is its most famous symbol, Sleeping Beauty Castle, gateway to Fantasyland — the realm of storybook characters brought to life, of villains and vixens who always surrender eventually to heroes and heroines of fiction and legend.

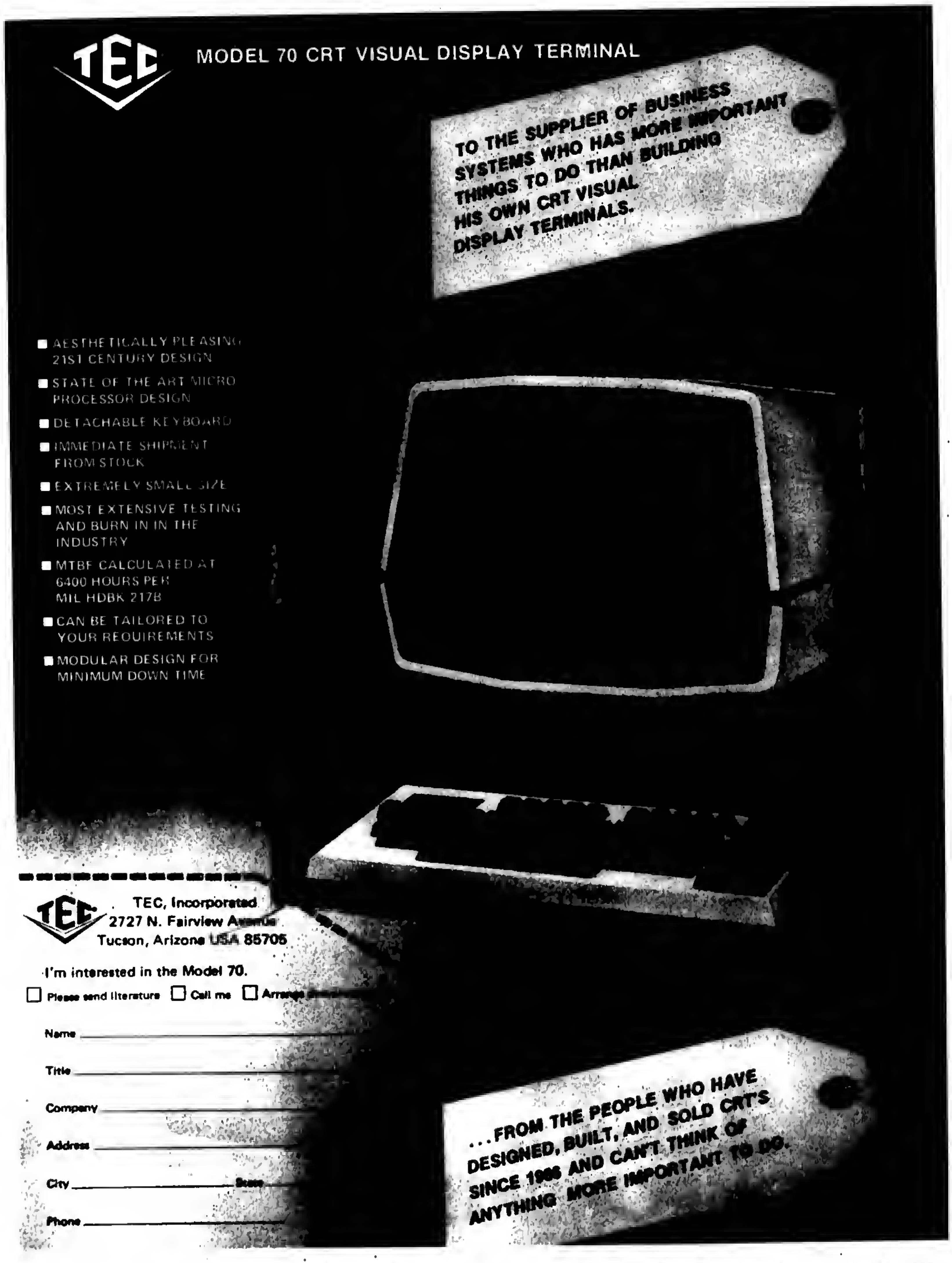
In a nearby diamond mine, the Seven Dwarfs, led by Snow White, whistle while the evil witch brews a potion in her bubbling cauldron. Flying galleons escorted by Peter Pan whisk guests away to Never-Never land, while other adventurers chug down cobblestone streets of Merry Old England reliving Mr. Toad's wild driving escapade.

In Tomorrowland, there's Space Mountain, with its rocket flight through deep space, the silent Disneyland Monorail system and the conventional internal combustion autos speeding on the Autopia freeway. A completely different mode of transportation is presented on the submarine voyage.

And still another form of travel is offered in an "Adventure Thru Inner Space." Here a continuous line of "automobiles" takes guest through a mighty microscope and into the heart of a snowflake.

For a bird's eye view of the park, the skyway buckets trail over the waters of the submarine lagoon, through the caverns of the mighty Matterhorn and high above Fantasyland.

Accentuating the five-acre Tomorrow land are new forms of travel. Passengers on the People Mover experience stepsaving comfort thanks to a constantly rotating turntable platform as they board four-car trains for a view of Tomorrowland and a trip through the Superspeed Tunnel.



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Software at NCC

Dataware, Inc.

ANAHEIM, Calif. — Dataware, Inc. will show its software translators and technical personnel will be on hand to discuss the firm's conversion packages in Booth 2749.

The packages to be featured include its RPG/RPG II-to-Cobol DOS or OS Translator, which is used in System/3 consolidation and upgrading; the RPG/RPG-II-to-PL/I DOS or OS package, which offers structured code generation; and the 1400 Autocoder-to-ANS Cobol DOS or OS package, which help the user eliminate emulation cycles, according to the firm.

In addition, the firm will have on display its package that allows Cobol-to-Cobol conversion. Being table-driven, the system can address almost any syntax conversion as predefined in the user's "from/to" table, the firm said. Also on display will be the Easycoder/-Easytran-to-ANS Cobol package, which the firm described as an economical answer for transition from Honeywell Information Systems, Inc. 200 series CPUs to "Brand X" computers.

Dataware will also invite attendees to discuss its PL/I-to-ANS Cobol package, which is said to be widely used by those users moving to a single production/standard language-ANS Cobol; its 7070/7074 Autocoder-to-ANS Cobol package, which it calls "the workhorse of second-generation languages and cycle eater of third-generation computers".

Finally, the firm encourages users to stop by and chat about its BAL/ALC-to-ANS Cobol package, which it described as an answer for the Assembler language maintenance programmer who is always in demand.

Dataware, Inc. is at 495 Delaware St., Tonawanda, N.Y. 14150.

Cullinane Corp.

ANAHEIM, Calif. — Cullinane Corp. will be showing the Cullinane Data Management System (CDMS) in Booth 1134.

The CDMS is an information facility that, according to the company, addresses the major requirements of any DP organization, including data base management, teleprocessing data dictionary and on-line query.

In the report generation area, The Culprit Output Processor accesses any file type. Included in this family are Culprit/3, a report writer for the IBM System/3, and EEO-Reporter, a federal minority reporting facility that also provides an Affirmative Action plan.

Cullinane is located at Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.

MRI Systems

ANAHEIM, Calif. — NCC attendees will be able to view on-line demonstrations of MRI System Corp.'s. System 2000, Control 2000 and TP 2000 at Booth 1404 using a *Guinness Book of World Records* data base.

The System 2000 is a generalized data base management system and is operational on IBM, Control Data Corp., Univac and Amdahl Corp. equipment. It features self-contained, English-like query/maintenance language; report writer; rollback; host language interfaces for Cobol, Fortran, PL/I and Assembler; multithread; and sequential files.

The Control 2000 is MRI's data dictionary/directory and the TP 2000 is a teleprocessing monitor.

More information can be obtained from P.O. Box 9968, 12675 Research Blvd., Austin, Texas, 78766.

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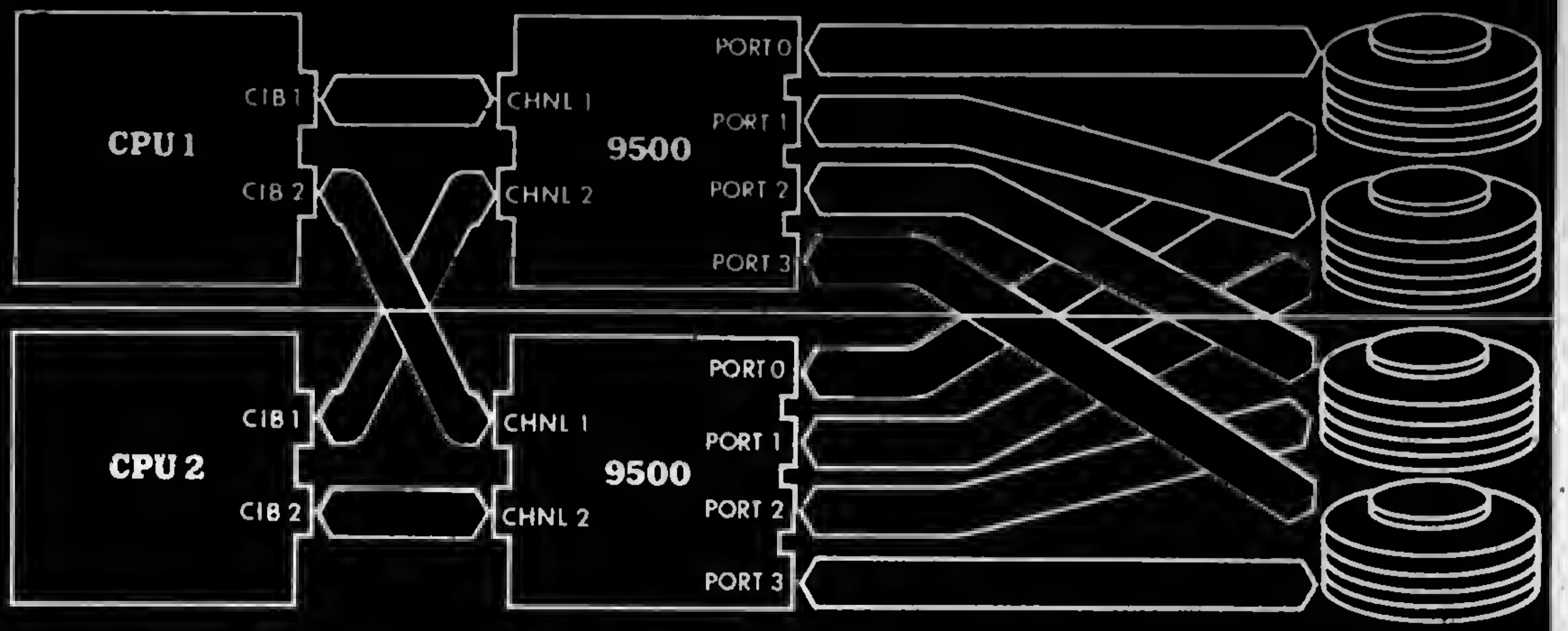

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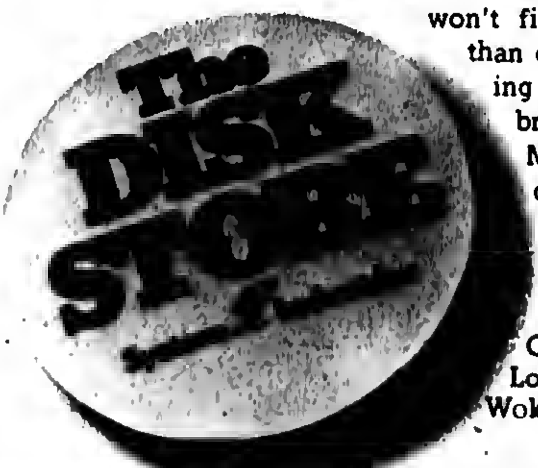

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Communications at NCC

Epicom, Inc.

ANAHEIM, Calif. — Epicom, Inc.'s Model 110 communications line monitor will be on display in Booth 2654.

The instrument offers diagnostic capability for IBM's Synchronous Data Link Control (SDLC) and other synchronous bit-oriented communications protocols, the firm said.

The Model 110 has the capability of viewing and diagnosing synchronous, bit-oriented data. It also allows user selection of up to four character sets compared with the usual two, the firm said. Any three of the four may be multilevel.

First shipments of the unit are expected in July at a single unit price of $4,500. Epicom is at 592 N. Douglas Avenue, Altamonte Springs, Fla. 32701.

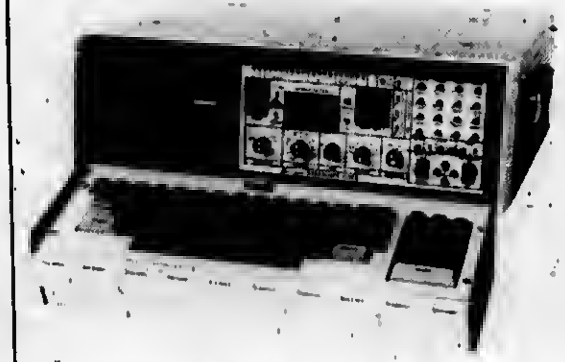
Spectron Corp.

ANAHEIM, Calif. — Three additions to Spectron Corp.'s family of Datascope data communications test instruments, two accessories and a complete network control center will highlight Booth 1858.

Set to be shown is the D-502B, a test instrument that serves as a data monitor, analyzer and interactive data simulator and tester. The company will also display the D-301, a diagnostic instrument for data communications problems.

The D-301 features a solid-state memory in place of tape storage and a user-defined data trap for independently stopping the display on selected transmit or receive data. It operates at speeds up to 72 kbit/sec.

The D-201 data printer/monitor serves as a companion unit for Datascopes equipped with the optional printer output feature. It may also stand alone as an on-line data monitor for asynchronous data at speeds up to 9,600 bit/sec.



Spectron D-502B

Two accessories to enhance the 300/500 series Datascope family will be shown. One is a digital tape unit that may be added to store full-duplex data at speeds up to 9,600 bit/sec. The other is an Ascii/Ebcdic keyboard.

Also featured will be a "typical" network control center featuring Spectron components required to perform monitoring, testing and switching functions.

Spectron Corp. is located at 344 New Albany Road, Moorestown, N.J. 08057.

Timeplex, Inc.

ANAHEIM, Calif.— Timeplex, Inc. will be exhibiting two product series in Booth 4031.

The company will be showing the Dynaplexer Series 1000, a data communications processor which reportedly has the capability of statistical multiplexing, error correction, computer port contention and switching and can handle up to 512 terminals.

Prices start at $5,975 and range up to $35,000 with full options and redundancy.

Timeplex will also be exhibiting the Microplexer series models M4 and M8. These units are statistical multiplexers that permit up to eight asynchronous terminals to share a single low- or high-speed telephone line.

They provide error correction on the line and can be used as computer port expanders and terminal cluster concentrators.

The M4 is priced at $1,750 and the M8 is priced at $2,750.

Timeplex is located at 100 Commerce Way, Hackensack, N.J. 07601.

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The number of intelligent nodes is only one of the key ways in which TYMNET differs qualitatively from other packet network services. There's also the confidence and security that comes from dealing with a packet network carrier with over five years of intensive operating experience. And the flexibility of a programmable interface to your computer. And coverage to over 130 U. S. cities. And international connections.

TYMNET has been specifically designed to meet the unique operating requirements of geographically dispersed low speed (1200 bps and below) terminals. Typical applications include time sharing, database access, and message switching.

If you're a computer network manager, you owe it to yourself to investigate the many operating and economic advantages of TYMNET, the packet network service acknowledged as number one. For more information on TYMNET and how it can assist with your data communications needs, contact your regional TYMNET office or write or call Tymnet, Inc., 10261 Bubb Road, Cupertino, CA 95014, (408)446-7000.

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Communications at NCC

Tymnet, Inc.

ANAHEIM, Calif. — Tymnet, Inc. will demonstrate both its common carrier data communications network service and its public message switching service in Booth 3314.

Tymnet, the network upon which these services are based, provides terminal access to host CPUs in more than 110 U.S. cities and, through interconnections, to other major world cities, according to a spokesman for the firm.

Isis Demonstration

Tymnet will demonstrate a network feature called the Internally Switched Interface System (Isis), which can run up to 16 virtual job slots, each of which is a communications interface, the firm said.

Isis can serve as a gateway between Tymnet and a host CPU, a multiport access for a variety of different terminal types or an X.25 or X.72 interface, the firm said.

Also demonstrated will be Ontyme, an advanced store-and-forward message-switching service.

Tymnet is located at 10261 Bubb Road, Cupertino, Calif. 95014.

Atlantic Research

ANAHEIM, Calif. — Atlantic Research Corp. will show the Interview II stand-alone monitor in Booth 1761.

The monitor, recently added to the firm's line of data communications diagnostic test equipment, is said to be an on-line unit that facilitates problem identification in both hardware and software, displaying the data being sent and received over a communications line.

The Interview II is user-oriented, according to a spokesman, who noted it displays data in text, hexadecimal or octal form. Six different languages are standard features.

System errors and malfunctions are identified on a 9-in. 1,024-char. display, the firm said.

The monitor shows two independent pages of 512 char. in full- or half-screen for later comparison. Send and receive data is said to be automatically highlighted for easy idenfication. Trap and freeze features eliminate the need for bulk storage in most applications.

According to the firm, other key features of Interview II are:

- Direct connection to an RS-232/-V.24 interface.
- Display of full duplex data, with receive data in reverse image for easy identification.
- Display of all data traffic at 62k byte/sec.

The firm is at 5390 Cherokee Ave., Alexandria, Va. 22314.

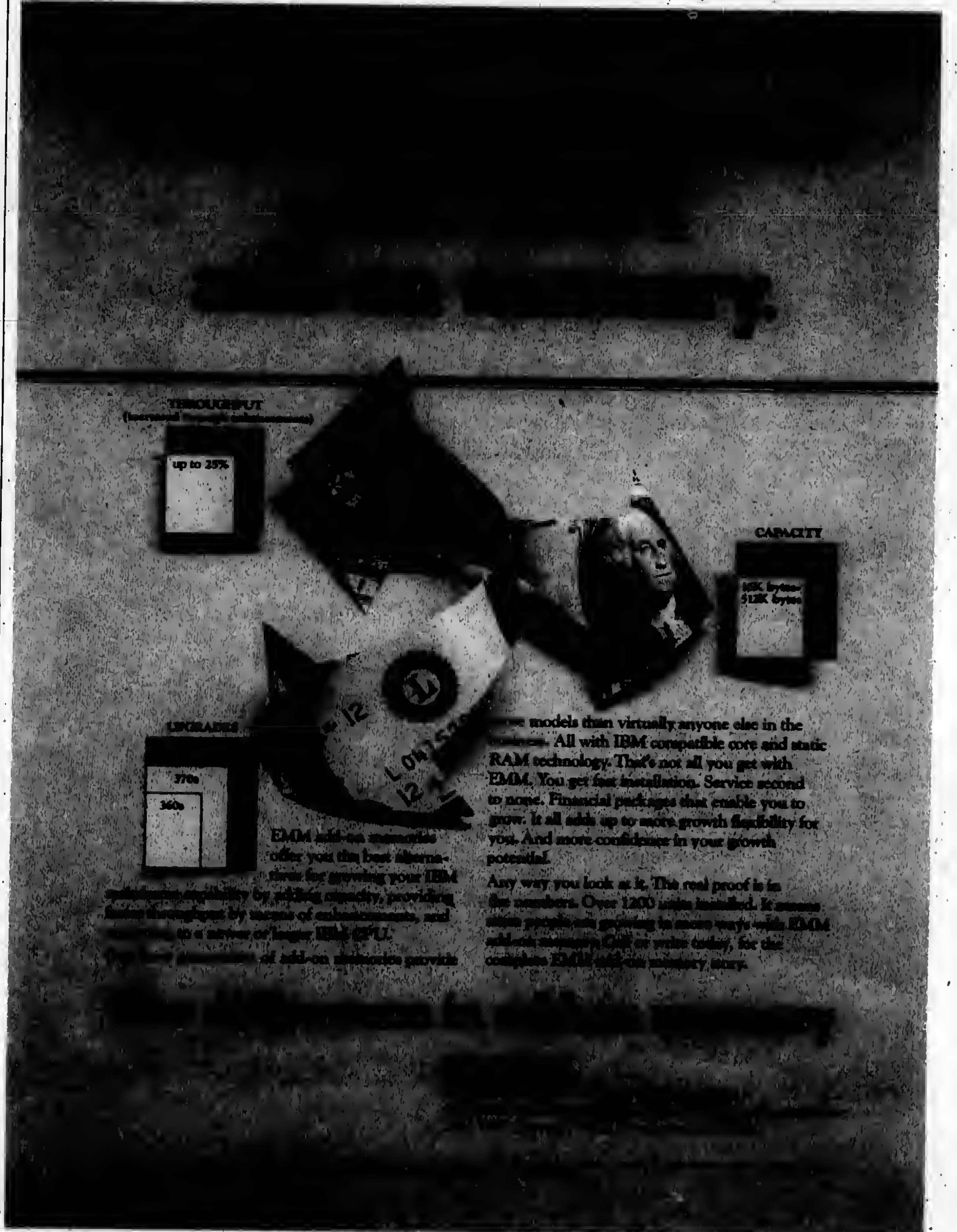
Vadic Corp.

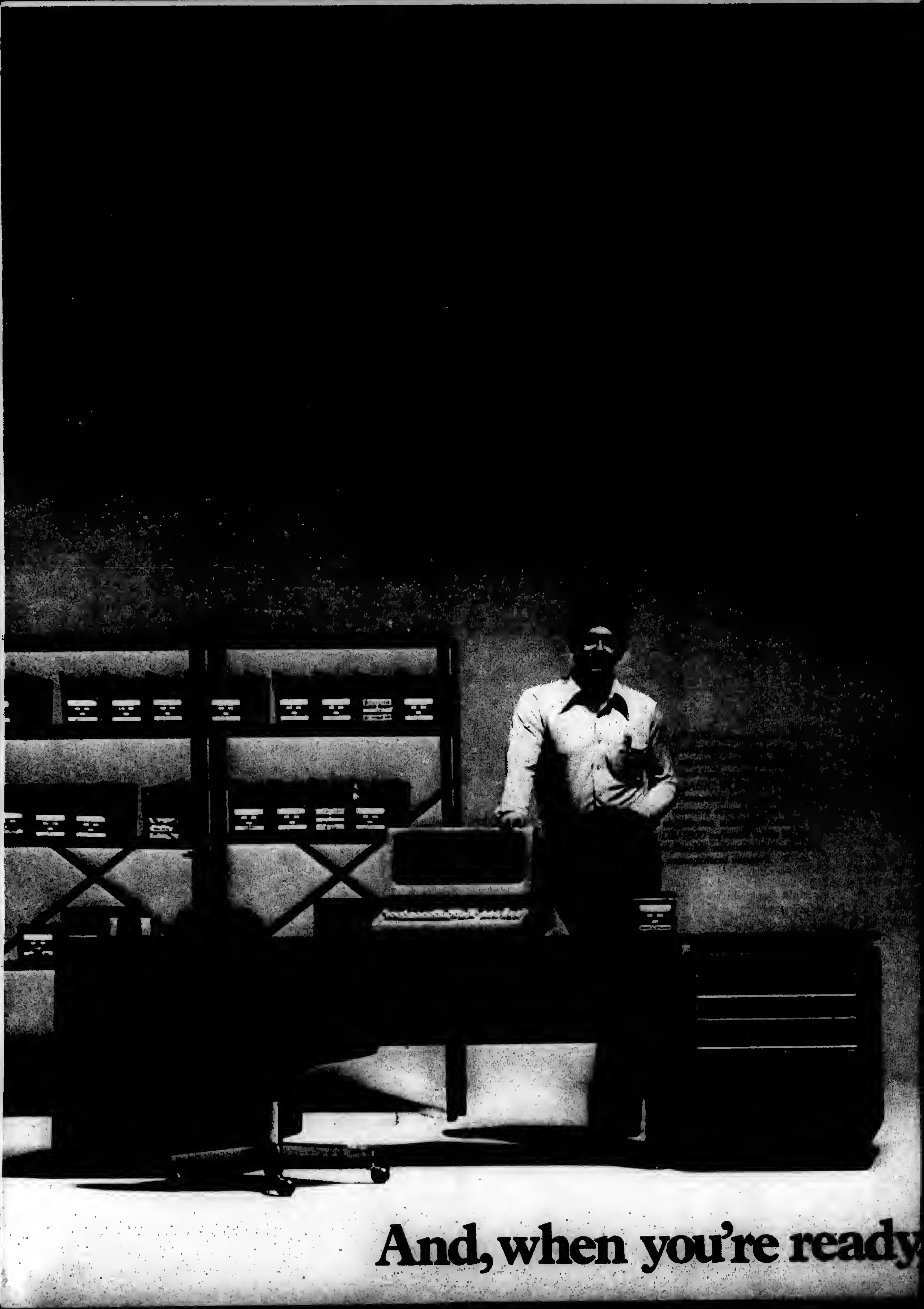
ANAHEIM, Calif. — Booth 2141 will be dedicated to Vadic Corp.'s 0- to 2,400 bit/sec line of modems including the "50 series," the firm said.

Modems to be shown include the full-duplex, 1,200 bit/sec VA3455 for use on dial-up or two-wire leased lines. Also shown will be the VA1250, a Bell 202S-compatible 1,200 bit/sec modem, which is half-duplex on dial-up lines.

The Bell 103A-compatible VA355 300 bit/sec modem — full-duplex unit on dial-up or two-wire leased lines — will also be at NCC.

Price for the VA3455 is $825; for the VA1250, $425; and for the VA355, $375. Vadic is located at 222 Caspian Drive, Sunnyvale, Calif. 94086.




And, when you're ready

CSG803HP43
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Communications at NCC

Western Union Information Systems

ANAHEIM, Calif. — Western Union Information Systems will demonstrate a statistical multiplexer at Booth 1310 that monitors the lines connected to it and, as data is offered, multiplexes it in blocks or subframes on a dynamic allocation basis.

The Model 4100/2 accommodates both synchronous and asynchronous terminal equipment, the firm said. Features include error control, network performance statistics and centralized network control.

The system requires no interface modification and can be operated as a single-ended remote statistical multiplexer into a front-end communications processor, a spokesman noted.

The Model 4100/2 terminates synchronous communications lines with speeds up to 9,600 bit/sec and asynchronous lines with speeds up to 4,800 bit/sec, the firm said. The system is controlled by dual monolithic 8-bit microprocessors capable of addressing up to 64K bytes of read-only, programmable read-only and random-access memory with its 16-bit address lines.

Optional features include an auto-speed firmware function to determine line speed for dialed-in terminals, an intelligent time-division multiplexer, an operator panel with keypad, function buttons, display lights and indicators, an echoplexing feature for signal verification and a data compression option.

A typical system made up of four synchronous and 16 asynchronous lines, operator panel and display costs about $10,000 from the firm at 82 McKee Drive, Mahwah, N.J. 07430.

Network Systems Corp.

ANAHEIM, Calif. — Network Systems Corp. will dedicate Booth 4000 to its Hyperchannel, which it said provides "an economical and effective solution to the multicomputer interconnect problem."

Hyperchannel data transfer is at speeds up to 50 million bit/sec, the firm said.

Up to four independent, single coaxial data network trunks allow multiple, simultaneous data paths.

Hyperchannel also offers a multidrop capability (up to 64 Hyperchannel adapters) on a single data trunk, according to the company.

Switch Capability

A switch capability allows any processor to gain access to any other processor or peripheral device on the network, the firm said. In addition, with Hyperchannel all protocol and data movement management is provided, as well as error detection and retransmission logic.

Sharing of resources between facilities that are located up to one mile apart is possible, the firm said, and further if high-quality coaxial cable is utilized.

Network Systems Corp. is located at 6820 Shingle Creek Parkway, Brooklyn Center, Minn. 55430.

Centigram Corp.

ANAHEIM, Calif.— A microprocessor-based, isolated-word voice recognition system that can "learn" the sounds of up to 16 words will be demonstrated by the Centigram Corp. at Booth 1566.

The system, called Mike, can operate as a remote computer terminal via an RS-232C serial interface or be connected directly to a computer for voice data entry, file inquiry or control applications, Centrigram said.

The user selects the words for the particular application in which the system will operate.

A typical vocabulary might consist of the words "left," "right," "start," "stop," "open," "close," "raise," "lower" and "test," for example.

Speech Pattern Recognition

The unit was designed to recognize speech patterns, a spokesman stated. These patterns are generated from the input audio signal and stored in one of 16 locations designated by the user.

Recognition occurs when the pattern to be recognized meets "closeness-of-fit" criteria with one of the patterns previously learned, the spokesman explained.

The system listens continuously and, when a word is recognized, sends out a code as a control signal or as information to be collected for some other purpose. The code can trigger audible feedback for the word recognized so the operator can confirm recognition, the firm said.

Mike can be instructed to reject any incoming signal that does not closely match one of the words in its learned vocabulary or programmed to recognize words that are reasonably close, even at the risk of an occasional error.

The unit's voice recognition electronics are contained on four printed circuit cards and the total weight of the device is approximately seven pounds.

Mike, with voice response, sells for $5,500; alone, it costs $3,875. Centigram is located at 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

Paradyne Corp.

ANAHEIM, Calif. — Paradyne Corp. will be exhibiting its analysis network restoration system, modems and the PIX II virtual data link in Booth 4006.

The PIX II eliminates the teleprocessing software normally required by IBM 360 and 370 and 30 series users building point-to-point communications networks, the firm said.

LCU Included

The PIX-II includes a minicomputer-based Local Control Unit (LCU), which attaches to the byte multiplexer channel of IBM mainframes, and one or more minicomputer-based Remote Control Units (RCU) to which peripherals such as IBM 3270 interactive terminals, tape drives, printers and card readers/punches can be attached.

The firm will also demonstrate its Analysis network control system. Based upon Paradyne's MP-48, Analysis allows users at a central location to perform a variety of diagnostic tests on remote modems in point-to-point or multipoint configurations.

Modems to be exhibited include the 4,800 bit/sec MP-48; the SRM-192, a short-range modem supporting transmission rates from 1,800 bits/sec to 19.2k bit/sec; LSI-48 and LSI-96 high-speed syncronous modems; and the M-96, a 9,600 bit/sec modem designed for operation on basic Bell 3002 private telephone circuits.

Paradyne is located at 8550 Ulmerton Road, Largo, Fla. 33541.

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Communications at NCC

General Datacomm Industries, Inc.

ANAHEIM, Calif. — Data communications products will be the featured attraction in Booth 3015, where General Datacomm Industries, Inc. will be showing off the Netcon-5, a network diagnostic control system providing central site system control and monitoring for remote stations in a multipoint network.

Designed to scan for system faults in a communications network, the Netcon-5 can identify a problem, restore system operation through alternate facilities and, optionally, provide a record of the malfunction, according to the company.

The capacity of the Netcon-5 system is 64 multipoint circuits with up to 32 stations on each multipoint circuit. The system itself is composed of several parts:

- A network diagnostic controller — a microprocessor-based controller to originate and transmit diagnostic commands to the control units associated with each modem.
- A multipoint diagnostic remote unit that enables a remote modem to receive, decode and execute applicable diagnostic commands transmitted by the diagnostic controller. Called the MDR-53, this unit connects to any Bell 201, 202, 208 modem.
- The MDM-52R, a multipoint diagnostic master unit and the counterpoint to the MDR-53 unit for the master modem.
- A MTU-56, a modem transfer unit module used to restore operation by replacing a failed modem with a spare.
- A dial backup unit, the DBU-57, which is used to provide a four-wire, dial backup function. This component can automatically answer two calls to restore station operation in the event of a primary leased line failure, according to the company.
- A digital bridge, the MAU-1 multiple access unit, which functions as a digital bridge to provide a bridged diagnostic channel to a maximum of four master modems in a network using a time-division multiplexer (TDM).

Among the features of the Netcon-5 are multiple data rates to 9,600 bit/sec, modem transparency to any Bell 201, 202, or 208 modem and automatic testing, which allows central site problem isolation without the use of special test equipment.

Also on display by the company will be its line of modems.

The company is located at One Kennedy Ave., Danbury, Conn. 06810.

Sykes Datatronics, Inc.

ANAHEIM, Calif. — Sykes Datatronics, Inc. will show the Comm-Stor II, a communications floppy disk system and latest addition to the company's Comm-Stor line, in Booth 2606.

Comm-Stor II can be used as intelligence for terminals, as well as for time-sharing enhancements, unattended data transfer, remote batch operation, interactive data entry, data logging, distributed processing and Ascii/IBM 3740 conversion, according to the company.

The system uses IBM 3740 compatible diskettes and interfaces with all RS-232 communications devices. Comm-Stor II is microprocessor-based and allows storage and retrieval by file source.

The system features variable-length files, merging files and buffering and individual file protection, according to the firm.

Comm-Stor II also includes a directory listing of file names, local text editing, off-line/on-line operation, up to 9,600 bit/sec operation, data entry, system parameters, more than 240,000 char./disk and IBM 3740 compatibility.

A single-drive system costs about $3,000 and a dual-drive system about $4,000, the firm said from 375 Orchard St., Rochester, N.Y. 14606.

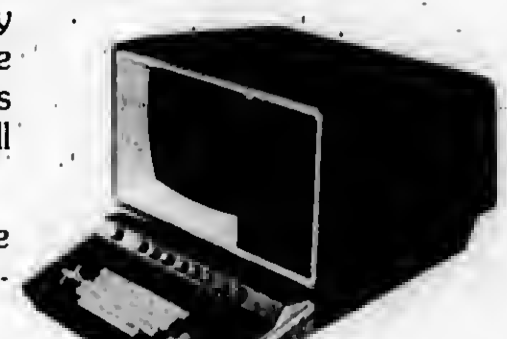
Do You Have A Language Barrier?

SEE US AT NCC BOOTH No. 4301

If communicating in Arabic, Farsi, German, Hebrew, Russian, or any other language presents an obstacle to your data processing, MEGADATA's 700/DL Dual Language Terminal will help to overcome this problem. This intelligent programmable terminal can display two completely different character sets simultaneously or separately, using the same bilingual keyboard, and it provides complete text writing capability for two different languages.

The software for the 700/DL is no problem either, because it is tailored specifically for your application. Furthermore, the entire software package can be adapted easily to your requirements, minimizing any change in the existing program. Hardware obsolescence is eliminated by simply updating the software capability. Interactive Data Entry, Complex Interrupt Capability, Forms Control, Format Storage, Validation — they are all available with the 700/DL.

For further information about the 700/DL or the many other application-oriented MEGADATA terminals, call or write TODAY.



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CORPORATION
35 Orville Drive • Bohemia, New York 11716
Tel. 516-589-6800 • Telex: 14-4659

Central Regional Office: 2200 E. Devon Avenue • Suite 217 • Des Plaines, Illinois 60018 • Tel. 312-296-1900
Western Regional Office: 15910 Ventura Boulevard • Suite 800 • Encino, California 91316 • Tel. 213-990-9777

Terminals at NCC

Interstate Electronics Corp.

ANAHEIM, Calif. — Booth 1444 will be the place where Interstate Electronics Corp. will display its Intelligent Voice Terminal, a unit that enables operators to input to computers in familiar English language terms via microphones or ordinary telephones.

In cases such as verifying telephone-entered data, the computer "talks" back, repeating the words and figures spoken to it or asking for clarification, the firm said.

The system operates with a single operator station vocabulary of up to 900 words or a 250-word vocabulary for each of four channels or stations plugged into the same processor, permitting source data to be entered in the terminology associated with the operator's task, according to the firm.

The terminal frees the operator's hands and eyes so he can concentrate on primary physical tasks, the firm noted. It has a flexible control program in high-level language that permits the user to write his own applications software without modification to the host computer, the company claimed.

The basic voice terminal includes an input/operator feedback station, an intelligent controller (user-programmable processor), an asynchronous output or control interface and executive software. It can be expanded to handle up to four user input stations simultaneously, provided with a voice synthesizer audio response unit and it accommodates a number of optional features for computer interfacing, input/output peripherals and mass storage, according to the firm.

Intelligent Voice Terminal

Single or multiplexed four-channel Ascii interfaces allow interactive operation with most computers or information processing systems, the firm said.

The basic Intelligent Voice Terminal costs $18,750, including software and documentation.

Interstate Electronics will also demonstrate a plasma display terminal designed for airborne and shipboard applications.

The PD 3000 has a standard alphanumeric and graphics capability as well as inherent panel memory that requires no refresh and a single point write/erase feature, the firm stated. The terminal has standard Ascii keyboard comamnds for the user, dual RS-232C-compatible interface ports and an optional parallel I/O facility.

The terminal uses a 16-bit parallel microprocessor with a 330 nsec execution time and is able to write a worst case (longest) vector line in 10 msec, the firm claimed.

The basic cost of the PD 3000 is $12,000. Interstate Electronics is at 707 E. Vermont Ave., P.O. Box 3117, Anaheim, Calif. 92803.

Megatek Corp.

ANAHEIM, Calif. — An intelligent refresh vector graphics display system, the Megraphic 7000, will be exhibited in Booth 1715.

The system, manufactured by Megatek Corp., is said to feature 32-bit graphic word length and a 12-bit, 4K by 4K screen resolution, making this model faster than the company's previous graphics display models.

The refresh memory cards are built into the display case rather than in the host computer.

An interface allows the system to be connected to the Digital Equipment Corp. PDP-11 as well as Data General Corp.'s Nova and Eclipse line; hardware features reportedly allow the addition of rotation, zoom, scale and clip.

A proprietary 32-bit microprocessor is said to make the system faster than its predecessor.

Megatek will also be exhibiting other hardware and software, including a Fortran graphics software package. The company is located at 1055 Shafter St., San Diego, Calif. 92106.

Incoterm Corp.

ANAHEIM, Calif. — Incoterm Corp., now a wholly owned subsidiary of Honeywell Inc., will be demonstrating its Transaction Entry Management System (Items) in Booth 2253.

The system was described as a virtual storage operating system for distributed data processing. The Items software will be operating on the Incoterm SPD-20 Series 40 intelligent terminal system.

Used with the Incoterm terminals, the Items software is said to dramatically reduce the time required to develop and implement distributed applications with extensive local editing, local screen format and data storage, local data entry control, interactive and stand-alone processing options and sign-up procedures.

The firm will also display its SPD 15/Series 25 controller.

Incoterm is at 65 Walnut St., Wellesley Hills, Mass. 02181.

Ann Arbor Terminals, Inc.

ANAHEIM, Calif. — NCC attendees will be able to see Ann Arbor Terminals, Inc.'s line of CRT terminals and display electronics in Booth 4007.

The firm will be featuring its Model 800, with memory size of 60 lines by 80 char., display size of at least 40 lines by 80 char. and block transmission ability, the firm said.

The $2,000 terminal's edit capabilities include the ability to insert or delete a character or line and erase to the end of a line or page. It also features character accent with blink, dim and reverse-video capabilities and includes upper/lower case display.

Ann Arbor Terminals is at 6017 Jackson Road, Ann Arbor, Mich. 48103.

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Terminals at NCC

Intelligent Systems Corp.

ANAHEIM, Calif. — Intelligent Systems Corp. will be demonstrating a number of its color CRTs, graphics terminals and desktop computers in Booth 4407.

The 8070 and 8071, which make up the recently announced Intecolor Series I, feature a 19-in. CRT, background color, insert/delete for characters or lines and a 48-line format.

Additional features include a keyboard with cursor, numeric and color pads, dual 8-in. floppy disk drive, matrix printer and a 24K bytes of read-only and programmable read-only memory (ROM/Prom), with an additional 8K bytes of random-access memory available

The 8070 costs $7,000 in quantities of up to 24 and $6,300 in quantities of 25 to 49. The 8071 is priced at $7,500 in quantities up to 24, and $6,750 in quantities of 25 to 49.

Also on display will be the 8001G color graphics CRT, which the company said will be particularly attractive to the process control industry.

The system, which comes with a 48-line by 80 char./line display, features a 19-in. screen with eight colors, a complete graphics package (160 by 192 points in the grid area) and selectable data rates up 9,600 bit/sec.

Prices for the 8001G start at $2,750 for quantities to 24 or $1,925 on a cash-with-order basis or for 100-unit quantities.

The Intecolor 8031, a desktop computer, will also be on exhibit. The 8031 is a stand-alone color microcomputer system, according to the company, and is based on the 8080A MPU.

Language for the system is Disk Basic 8001. A complete graphics package with graphics plot hardware, expanded graphics software with eight-color background and foreground, a 160 by 192 grid area and a 48-line by 80-char. format are also part of the system.

Prices for the 8031 are $4,495 in the one to 24 range and $3,995 for cash-with-order.

An additional desktop computer which will be demonstrated is the 8051, which also is based on an 8080A microprocessor. The 8051 is similar to the 8031, but comes with 21K bytes of Eprom/ROM and 16K RAM.

Half of the RAM is used for user workspace and half for refresh.

Prices are $4,495 in one to 24 lots and $3,995 for cash-with-order units.

The company will also be demonstrating Arabic and Farsi color graphics microcomputer systems, designated the A8051 and the F8051, respectively, which process all I/O in Arabic.

Intelligent Systems Corp. is located at 5965 Peachtree Corners East, Norcross, Ga. 30071.

Ontel Corp.

ANAHEIM, Calif. — Ontel Corp. will use Booth 1255 to present its OP-1/R user-programmable intelligent terminal system.

The OP-1/R is "downward-compatible" in that it will run standard OP-1 programs, including those written in Ontel's high-level languages, utilities and communications packages, according to the firm. It is configured to be used in clustered or on-line systems.

Features include multiple microprocessors sharing memory, which may be 4K, 8K, 16K or 32K bytes of random-access memory, plus up to 8K of read-only memory or programmable read-only memory, the firm said.

The Op-1/R CRT features upper and lower case, a set of 128 displayable characters and a 7 by 9 dot matrix.

Communications capabilities are asynchronous from 110 bit/sec to 19.2k bit/sec. A parallel Centronics Data Computer Corp. interface is available.

Price of the system in OEM quantities starts at under $1,500. Ontel is located at 250 Crossways Park Drive, Woodbury, N.Y. 11797.

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Terminals at NCC

Magnavox Display Systems

ANAHEIM, Calif. — Magnavox Display Systems will show the latest addition to its Orion-60 series of plasma display-based graphics terminals in Booth 3410.

The unit is a desktop, stand-alone graphics terminal incorporating a disk operating system with full-size floppy disk drives.

The system includes an editor, 8080 assembler, dynamic debugger and a file handler. The disk operating system will support both a Fortran IV compiler and a Basic interpreter containing graphics subroutines and extensions as well as other high-level languages, the vendor said.

Earlier versions of the terminal include the Orion-60/S1 which provides extended user random-access memory that can be programmed in Assembler language, the company claimed.

The Orion-60/S2 and S3 offer resident Basic with graphics extensions and minifloppy disk drives.

Magnavox will also demonstrate an optional random-access 35mm rear projection unit contained within the Orion-60 enclosure.

Additional information is available from Magnavox Display Systems, 2131 S. Coliseum Blvd., Fort Wayne, Ind. 46803.

Evans & Sutherland

ANAHEIM, Calif. — A computer graphics system capable of three-dimensional displays, clipping and viewport mapping will be displayed by Evans & Sutherland Computer Corp. at Booth 1241.

Based on a Digital Equipment Corp. PDP-11, the system is available with several options. These include an 11- by 11-in. data tablet, alphanumeric keyboard, light pen, joystick unit, and a hard-copy unit, the firm noted.

Called the Picture System 2, the system is available with a comprehensive graphics software package that can be accessed from either Fortran or Assembly language programs, according to the company.

Other features of the system include a picture memory, which is a random-access storage space available to the programmer for storing processed or unprocessed data during the display cycle, a picture generator, a picture display and interactive switches.

Evans & Sutherland is located at 580 Arapeen Drive, Salt Lake City, Utah 84108.

Delta Data Systems Corp.

ANAHEIM, Calif. — Three programmable multifunctional CRT terminals will be introduced in Booth 2549 by Delta Data Systems Corp.

The Delta 7000 series CRT terminals incorporate 16-bit microcomputers, 14-in. diagonal screens, a 128-character set expandable to 912 characters and a split-screen option that allows division of the screen into eight independent display areas.

Also available is an option for the simultaneous display of different character fonts, according to the firm.

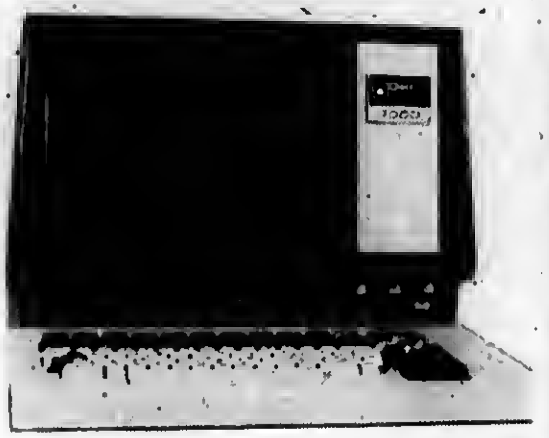
The Delta 7000 has a basic editing program in read-only memory (ROM) and includes a programmable read-only memory (Prom) boot loader program that allows the user to load specific applications programs from a floppy disk system or from the CPU.

The basic editing package includes alphanumeric data entry, insert/delete capabilities, format mode, tabbing, cursor controls and an electrically alterable ROM.

System Possibilities

The Delta 7000 has up to 28K bytes of ROM or random-access memory (RAM). It can operate as a text-processing terminal, a high-speed communications terminal or a small processing computer, the firm said.

The Delta 7500 is a RAM-loadable version of the Delta 7000. It is standard with 8K bytes of RAM, expandable in 4K-byte increments up to 32K bytes.



Delta 7000

The Delta 7300 contains a resident editing and text processing program that supports up to 3K bytes of expanded refresh memory, the firm said. It is standard with 20K bytes of RAM, expandable in 4K-byte increments to 32K bytes.

In addition to the editing capabilities of the 7000, the Delta 7300 offers the following: Define Word; Sentence; Paragraph and Block; and Move, Copy or Delete Text.

Other features of the 7300 include the ability to capitalize and decapitalize strings of data, search, search and replace, search and delete, make temporary hyphenations and count lines and words.

Delta Data Systems Corp. is located at Woodhaven Industrial Park, Cornwells Heights, Pa. 19020.

Hitachi America

ANAHEIM, Calif. — Hitachi America Ltd., occupying Booth 4253 will demonstrate a microprocessor-controlled, seven-color graphics display terminal that incorporates up to 64K bytes of memory.

The H-7000 uses the firm's M-6800 8-bit microprocessor and provides more than 50 command possibilities, the firm noted. The display can be used for process flow control diagrams, tables of process information, trend records, bar charts, limit alarms and changes, as well as common alphanumerics.

Dual Memory Function

The unit has a dual memory function that permits the superimposing of two pictures, a spokesman stated.

Display-generating software, provided with the unit, permits any host computer using Ansi Fortran to input to the terminal, the spokesman said. An operator can generate or modify a display picture using English language instructions through the CRT terminal.

Options include a hard-copy printer, floppy disk drive, slave monitors and keyboards, lightpen and joystick, the firm said.

Hitachi America, Ltd. is at 100 California St., San Francisco, Calif. 94111.

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Terminals at NCC

Univac

ANAHEIM, Calif. — Univac will show a wide range of products at Booth 4223.

Included in its demonstration will be the Universal Terminal System 400 (UTS 400) acting in a stand-alone capacity as intelligent terminals, as well as on-line to Univac 1100 series computers at the company's facilities in Roseville, Minn.

Uniscope 200 CRT terminals will be connected on-line to the firm's Series 90 computers at its headquarters in Blue Bell, Pa., and at facilities in the Los Angeles area.

The Uniscope 200 terminals will be used to demonstrate the Information Management System 90 (IMS 90), the Data Management System 90 (DMS 90), the VS/9 operating sytem and the Unis 90 software program for manufacturing control, the firm said.

The recently announced Universal Distributed System 2000 (UDS 2000), a free-standing, user-programmable, key-to-diskette data entry system, will be shown in operation with four workstations, a spokesman said.

In addition, the firm said, a BC/7 small business computer system will be demonstrated running the basic applications typical to small business concerns.

Univac Minicomputer Operations will show a V77-600 minicomputer together with the Pronto distributed transaction software package.

Disk drives produced for the OEM market by Univac in Cupertino, Calif., will also be on display, the spokesman said.

Univac's headquarters address is P.O. Box 500, Blue Bell, Pa. 19422.

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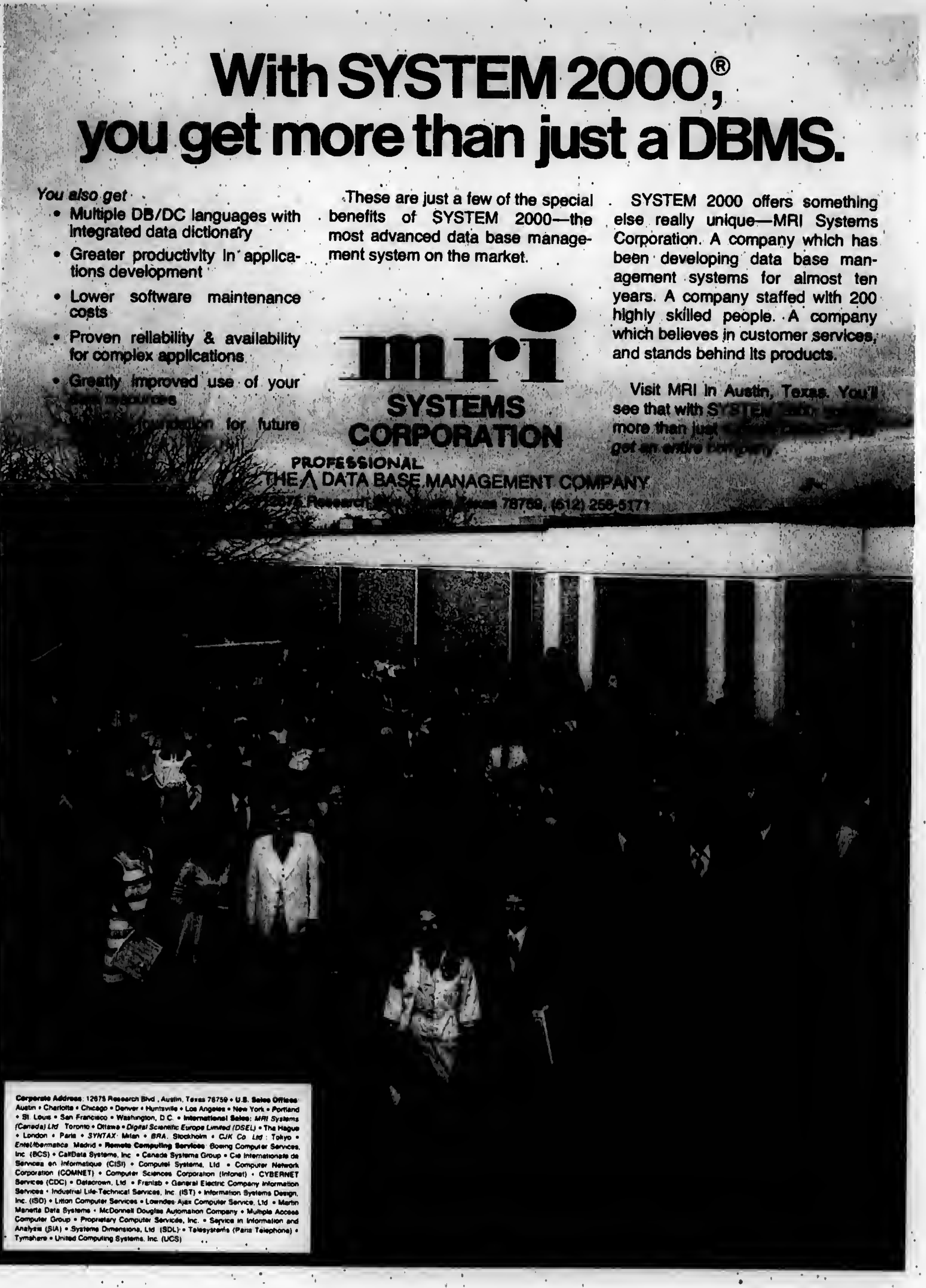

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Terminals at NCC

Digi-Log Systems, Inc.

ANAHEIM, Calif. — Digi-Log Systems, Inc. will exhibit three products in Booth 1465: a desktop workstation, a data communications line monitor and a portable CRT terminal.

Microterm II, the firm's desktop workstation, features a dual-microprocessor direct memory access architecture and a multitasking operating system.

Microterm's software facility includes Isam file controls, data base control, an English command language; sort capabilities, utilities, IBM 2780 remote job entry emulation, teletypewriter emulation and an interactive software development system.

All user applications can be programmed and debugged in either Extended Business Basic or Assembly language from the Microterm II keyboard, a spokesman for the firm noted.

The DLM II/Tapetrap data line monitor system was designed to isolate errors in data communications networks, the firm said. DLM II features large screen display, portability and the ability to trap and store up to one million data characters, according to Digi-Log.

Trap Sequence

A trap sequence of up to 16 characters can be user-programmed from the Tapetrap keypad to start or stop recording on detection. The recorded data can then be searched with the same or different trap sequence or displayed at any rate convenient to the operator.

Digi-Log Microterm II

Telecomputer II is a CRT monitor with keyboard, acoustic coupler and control unit mounted into a briefcase.

Service organizations or programmers can take Telecomputer II home or on the road. It can be used with a number of different CRT terminals.

Digi-Log Systems is at Babylon Road, Horsham, Pa. 19044.

Datamedia Corp.

ANAHEIM, Calif. — The first two members of the Elite 3000 family of microprocessor-based CRT terminals from Datamedia Corp. will be the focus of Booth 1400.

The first, the Elite 3025A, is a communications-oriented unit for transaction processing and inquiry response applications.

The second, the Elite 3052A, is a Digital Equipment Corp. VT-52-compatible alphanumeric CRT.

The 3025A is a buffered Teletype-compatible CRT terminal with a single-page video memory that displays 1,920 alphanumeric characters in a 24-line, 80-character format, the firm noted.

The 3052A offers formatting capability, eight levels of screen enhancements and a detached keyboard.

Datamedia also plans to show the Elite 1521A, an unbuffered Teletype-compatible CRT displaying 1,920 alphanumeric characters in a 24-line by 8-char. format. This unit is available with either the full 128-char. Ascii set or the 64-char. upper case subset with dual intensity display.

System Features

The stand-alone 1521A contains an alphanumeric display, keyboard, storage, control logic and asynchronous communications interface, the firm added.

The 1521A was designed for interactive applications, data entry information retrieval and any related data communications requirement. It accommodates a standard RS-232C or optional 20mA current-loop interface, Datamedia said.

The base unit price for the Elite 1521A is $1,200.

Datamedia is located at 7300 N. Crescent Blvd., Pennsauken, N.J. 08110.

Chromatics, Inc.

ANAHEIM, Calif. — Booth 1726 will be the scene of the introduction of Chromatics, Inc.'s line of color graphics terminals. Each model in the Chromatics eight-color graphics line employs a Z80 microprocessor unit with full memory and I/O structure, according to the firm.

Standard interfaces include 128-key keyboard, variable synchronous and asynchronous transmission rate and serial I/O with TTL and RS-232C compatibility. Optional interfaces include RS-422, IEEE-488 and 20mA current-loop.

An additional serial port and a parallel 8-bit or 16-bit port with a direct memory access controller allowing transfer rates to 416,000 byte/sec are also optional, the firm said.

According to Chromatics, alphanumerics may be placed at any point on the screen and multiplied to any integer size in both height and width. A standard Ascii set is provided along with 96 user-definable graphics symbols.

Chromatics is at 3923 Oakcliff Industrial Court, Atlanta, Ga. 30340.

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Terminals at NCC

Data 100 Corp.

ANAHEIM, Calif. – Data 100 Corp. will exhibit in Booth 2337 "a full range" of multifunction DP systems including the first public viewing of its recently annnounced Model 85-based series of Remote Information Systems (RIS), as well as remote communications printers and disk and printer subsystems.

The RIS series is based on the Model 85 Attached Applications Processor (AAP), which performs high-level language processing using RPG-II and Cobol, in conjunction with the firm's models 76, 78, 82 or Keybatch terminal systems.

The Model 85 AAP consists of a control unit with 96K to 128K of main memory, 10M to 100M characters of fixed and/or removable cartridge disk storage and up to 15 CRT stations (located up to 2,000 feet from the processor) with 1,920-char. screens and typewriter or keypunch-like keyboards.

Peripheral equipment can include up to five printers wth speeds from 62- to 1,250 line/min and 9-track, 800- and 1,600 bit/in. magnetic tape drives. Selected peripheral devices such as printers, magnetic tapes and operator display stations may be switched between the AAP and its associated processor, the firm said.

The RIS communicates in synchronous protocols using point-to-point or multipoint techniques and in Synchronous Data Link Control (SDLC) protocol.

Software includes interactive Ansi 1974 Level 2 Cobol and RPG-II compilers to assist customers in developing fill-in-the-blanks data entry and remote file management capabilities, according to the firm. A multitasking operating system allows up to eight independent tasks to be performed concurrently.

The Model 85 AAP will be shown in conjunction with the Model 78 remote processing system, which also operates under the company's Keybatch software. The Model 78 uses RPG-II for local data manipulation and generation of management reports.

Also displayed will be the Model 82 remote display system with IBM 3270-compatible on-line inquiry capabilities. When combined with the models 78 or 74 Keybatch systems, it provides multifunction features including shared displays, full backup capabilities, concurrent data entry and remote batch functions, the firm said.

The company's OEM Sales Division will show its series of remote communications printers which receive and print data transmitted via industry-standard communications protocols.

Data 100 Corp. is located at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

Inforex, Inc.

ANAHEIM, Calif. – Four major product families will be demonstrated at Booth 1121 by Inforex, Inc. They include the System 7000, a series of distributed processing systems; the System 5000 file managment systems; the System 1330, which combines data entry with remote job entry (RJE) capabilities; and the System 3300 key-to-disk data entry systems.

The System 7000 is a microcomputer-based family of stand-alone and clustered terminal systems, according to Inforex, and supports two different kinds of multitasking capabilities. The first allows access to the same data base by more than one terminal; the second permits several different kinds of tasks to occur concurrently such as data entry, local processing and report generation.

Prices for a minimum configuration, stand-alone System 7000, which includes a processor and keyboard/CRT station, dual diskette drive and binary synchronous communications interface, start at $14,350, or $320/mo on a 42-mo contract.

The System 5000 is also minicomputer-based, and is oriented to multiterminal filing and file updating using two-letter commands to update, retrieve, display or print any record within a specific file, Inforex said.

A typical configuration of the system with one control unit, four terminals, a 30 char./sec pritner and a 25M-byte disk drive sells for approximately $104,000 or leases for $2,000/mo on a 42-mo contract.

The other two products to be demonstrated, the System 3300 and the System 1330, are used in data entry and editing. The System 1330 combines data entry and validation capabilities with RJE features, such as storage of message formats and transmission parameters, according to the company.

A typical 1330 configuration, with control unit, four keystations, 10M bytes of disk storage, tape drive and a 600 line/min printer, leases for approximately $1,950/mo on a 36-mo contract).

The System 3300, a step up from the 1330, features validation and insertion of data through index sequential tables and can respond to inquiries of tables up to 2M characters in less than 1 sec, a spokesman claimed.

A basic System 3300 with control unit, 10 operator stations, 10M-byte disk drive and tape drive leases for $2,020/mo on a 60-mo lease.

The week of NCC coincides with the 10th anniversary of Inforex, according to the company, and that event will be celebrated with special demonstrations and activities at the Inforex booth. The firm is at 21 North Ave., Burlington, Mass. 01803.

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Tektronix

ANAHEIM, Calif. – Tektronix, Inc. will feature several of its CRT terminals in Booth 2309.

The terminals can be used in management information systems, inventory control, purchasing, salary administration, forecasting, mapping, modeling and design applications, according to the company.

Tektronix will feature its 4020 series of CRTs, 4014-1 CRT with Option 40 programmable keyboard capability, 4010 CRT terminal, 4006-1 terminal, 4051 graphics system, 4907 file manager, 4081 interactive graphics terminal, 4662 interactive digital plotter and 4631 hard-copy unit.

Tektronix 4025

Also displayed will be the 4025/24, a unit for the alphanumeric user who wants to use graphics, according to the company. The 4025 is a raster scan terminal that can copy up to 53 lines of alphanumerics and graphics with a Tektronix hard-copy unit.

The Option 40 programmable keyboard capability, when used with the 4014-1 or 4015-1, distributes the graphics workload by allowing the user to save the material locally for display.

Tektronix, Inc.'s Marketing Communications Department can be reached at Mail Station 60-631, Beaverton, Ore. 97077.

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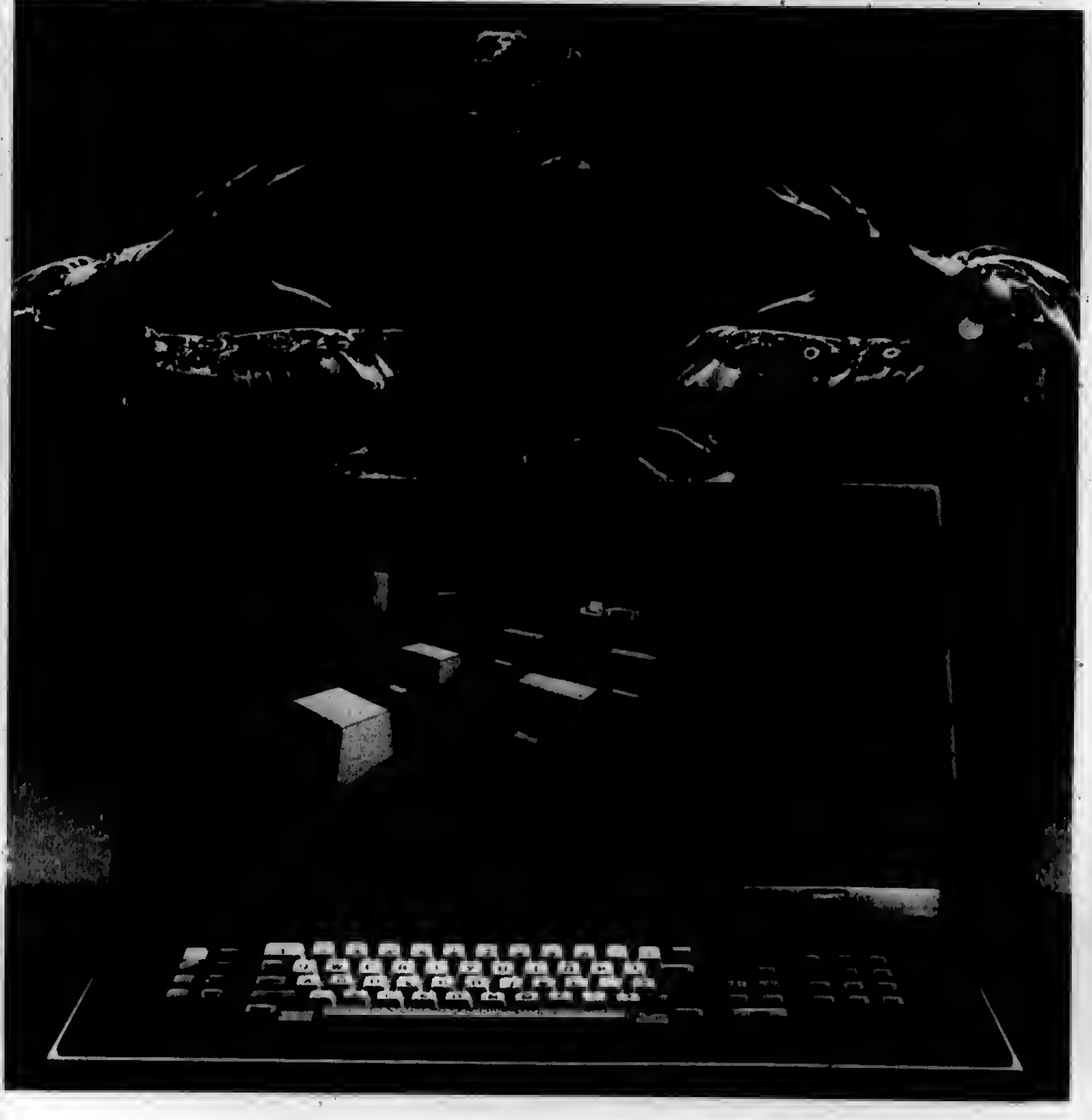

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Peripherals at NCC

Centronics Data Computer Corp.

ANAHEIM, Calif. — Centronics Data Computer Corp. will demonstrate several serial dot matrix printers, a series of line printers and two versions of its 150 line/min micro printer at Booth 1447.

The Series 700 includes the models 700, 701, 702, 703, 779, 780, 781 and 761 dot matrix printers, a spokesman said. Each unit in the line utilizes three to four modules that control each step in the printing process.

The print module uses either a synchronous motor band drive or a stepping motor drive, depending on the printer model. The module can be configured to produce 5 by 7, 7 by 7, 9 by 7 and 9 by 9 dot matrix patterns, the firm stated. Six line/in. vertical spacing is standard on all 700 members and paper movement is up to 15 in./sec (Model 703).

A keyboard module used with the Model 761 contains 61 sculptured keys arranged in standard typewriter fashion. Optionally, a 10-key numeric pad is offered for high-numeric use environments.

Four different paper handling modules — a pinch roll, tractor feed, pin feed platen and front feed — are available that can accommodate paper widths from 9.8 in. to 11.7 in., depending on the printer model, the spokesman continued.

Finally, printer control is maintained by an electronics module that contains an input power transformer, DC power supply and logic card.

Printers in the 6000 series, which include the 6075, 6150, 6300 and the 6600, operate at 75- to 600 line/min. The units, also microprocessor-controlled, have a 64-char. set, can accommodate one- to six-part forms, paper widths of from 4 in. to 19 in. and use cassette-encased ribbons, the firm said. A paper restack tray, out-of-paper sensor and parallel interface are also included as standard equipment.

The models 306TP and 306SC printers, also on display, are serial dot matrix printers that can print alphanumeric characters, symbols and contiguous horizontal/vertical bars.

The 306SC can print lines of characters from the standard .1 in. high to newspaper front-page banner headline size on an 8-in. line, the firm pointed out. The unit has the capacity to store 320-char. for segmented, geometric or bar code printing and up to 128 standard char.

Applications for both units include material handling and warehouse systems as well as shelf tag label printing in supermarkets, the spokesman said.

Centronic's Microprinter models Pl and Sl are RS-232 bus-compatible and operate at speeds up to 150 line/min, the firm noted. The units feature 96 char. (upper and lower case), underlining functions, an audio alarm and either a 7-bit serial interface with parity selection or a parallel interface with transistor-transistor logic compatible I/O signals.

Centronics Microprinters

The printers use a conductive aluminized coated paper, vaporized by a low voltage discharge from the print head, the firm stated.

The Microprinter is priced at $695 and the 306TP and 306SC cost $2,280 and $3,950, respectively, in end-user prices.

Centronics is located in Hudson, N.H. 03051.

Summagraphics

ANAHEIM, Calif. — The Summagraphics Corp. will show a digitizer called the Bit Pad in Booth 1760.

Bit Pad is a high-performance digitizer designed for small system users that permits entry of positional information, according to the vendor.

The Bit Pad is designed for collection of X and Y values and is claimed to be interfaceable to any microcomputer currently on the market. The firm said Bit Pad can be used in applications involving medical treatment, opinion sampling, design, games, research, computer animation and other areas.

Bit Pad coss $555, Summagraphics Corp. said from 35 Brentwood Ave., Fairfield, Conn. 06430.

Clary Corp.

ANAHEIM, Calif. — Clary Corp.'s Precise Instruments Division will be showing printers ranging from strip devices to serial entry decimal printers to line printers in Booth 4009.

The Model 2000, Model 4000 and Model 7000 line printers will be featured.

The 70-pound Model 2000 uses a hypocyclodial printing mechanism to provide reliability and incorporates a ruggedized design, the firm said. The 4000 uses Model 2000 design and printing mechanisms, but is recommended for commercial applications, and the 10 line/sec Model 7000, also designed for commercial applications, offers a maximum of 20 data columns and weighs 32 pounds.

The Model LP 321 digital printer prints up to 21 columns on pressure-sensitive paper at rates of up to 63 char./sec.

Expandable to 21 columns, it allows 16 character positions per column and prints at a rate of three line/sec.

To round out the display, two strip printers will be shown.

The Model SP20 commercial strip printer is aimed at military applications and weighs 8 lb. It prints 200 word/min and requires little maintenance, according to the firm. Th Model AN 16, weighing only 4 lb. produces an alphanumeric strip using the simplest method of data reproduction — impacting pressure-sensitiv paper between a hammer and a character wheel "on the fly."

It prints 25 char./sec.

Clary is at 320 W. Clary Ave., San Gabriel, Calif. 91776.

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The Leader

"We enter each market with this commitment:

The best solution in the industry. The best long-term value.

That's why Tektronix is far and away the world leader in computer graphics."

"Service to the markets, more than any single innovation, has maintained our graphics leadership."

At Tektronix, we're famous for quality assurance. And we're also famous for value assurance: that means a commitment to adapting graphics to the needs of the customers we address. And to anticipate their future needs.

You see part of that commitment demonstrated here. In low cost graphics. High information density. Simple alphanumeric and forms ruling. Local intelligence. Color. Software. Peripheral support and service.

From business and scientific graphing to complete graphic computer systems, our product development is a mutual process: As our customers demonstrate new needs, we continue to develop solutions. On the following pages you'll see where the graphics market, and thus the graphics leader, are heading.

"We found customers asking for even more information capacity. Now we're offering them 25-inch graphics."

Ten years ago Tektronix storage tube (DVST) technology plummeted the price of graphics to a fraction of its former cost.

Today, about four out of five CRT graphics terminals are of Tektronix origin. Most are from our high-resolution DVST family. Our customer base is as broad as business and industry, government and education.

We're sensitive both to the graphics needs of new customers, and to the need of experienced graphics users to expand capabilities at minimal cost.

Our 19-inch, high resolution display, introduced in 1974, was a response to the requests of sophisticated computer users for a bigger and more detailed graphics workspace. About the same time we satisfied the requests of newcomers—in education and business environments, for example—for basic graphics capabilities priced under $3000.

Other DVST terminals are also offering enhanced capabilities—from plug-in intelligence to combined refresh and storage.

The advantages of greater information capacity on the Tektronix storage tube are especially clear in environments like cartography, urban planning, and network modeling.

The state-of-the-art is based on stated needs.

Now we are introducing our 25-inch 4016-1 terminal. Several years in development, it has been built with specific markets in mind: Customers from network modeling, mapping, and IC design and layout let us know the value of increased graphics capacity. Plus 86 lines of 179 alphanumeric characters per line.

Size alone called for breaking through several technological barriers. At the same time, the design team integrated various features and options based on direct customer input: like detachable keyboard. Larger display copy. Local digitizing.

Final criteria was based on conformity with existing customer systems.

Users of our smaller screens will be able to expand their capabilities, as necessary, to 25-inch graphics with little or no modification to existing applications software and communications support.

At Tektronix, innovation is a partner with practical application. That means knowing the market—existing customers and new—and knowing how to provide for their individual needs.

"Many of our customers are ready for color. Now for the first time, color is ready for them."

Tektronix has long been a leader in refresh capability. Our first, highly-rated alphanumeric terminal was a pioneer in forms-ruling.

Now we have increased this capability to meet new needs. Our recent additions have brought new levels of both graphics simplicity and sophistication into the marketplace.

The 4020 Series offers general business environments an easy evolution to graphics.

Expandable from simple alphanumerics to graphics, this new series makes graphing capability as easy as alphanumeric output has been for years. Yet it's versatile. Rather than fix a few graphing formats in firmware, we designed a complementary English-language, PLOT 10 Easy Graphing software package. Now many non-graphic information systems can easily add graphics capability.

Even more significant may be the introduction of our new color terminal, the 4027.

It literally sets the standard for color graphics — from the one company with the expertise, the service and reputation to give real value to color capability.

This represents the first effort to bring universal order to color graphics.

When we brought out our first storage tube terminal and supporting software years ago, we developed standards and coding systems that are still in use today. The same will be true for color.

We've also made sure that our current customers can make an easy transition from present graphics to color: with compatible software. Multi-color plotter support. Gray-scale hard copy. . . and continued innovation as our customers' color requirements advance.

Tektronix color is designed to facilitate graphical interpretation of statistics in business graphing, and to answer the needs of computer-assisted instruction, laboratory analysis, mapping and network modeling.

Until now, these applications could only imagine the possibility of color graphics. We're making it practical.

Tektronix color will add a new dimension, clarity and convenience to many applications. Sometimes a simple change of color can communicate even more quickly than a graph.

tektronix

"Easy-to-use stand alone systems can free our customers to do what they do best."

Personal computing is already improving decision-making information—not only in engineering and scientific environments, but on the desktops of corporate management.

We plan our intelligent products to expand upon many of the same time, cost, and labor saving benefits of graphics: by reducing routine processes, intelligence can keep each customer working at the decision-making level.

Our goal is to make each product as simple and personally manageable as possible. By understanding our customers and answering their applications one by one, we make our intelligent graphics products an extension of the mind.

The smartest thing about our personal computer is how well it works with its operator.

The desktop computer user expects an immediate comfort level. He looks for simplicity. An easy-to-use language. A familiar keyboard. And fast answers. So when we built our 4051 graphics system, we made it powerful enough to command a system of peripherals and to operate as an intelligent terminal. But we also designed it to be inherently simple to operate and easy to understand.

It is so consistent that once you've mastered it you don't have to live with a set of manuals.

While designing a nonrestrictive hardware package responsive to the expectations of most personal computer users, we've individualized software to specific users groups. Including utilities for sophisticated programmers. Easy application packages like Modeling & Reporting. A PLOT 50 library that includes statistics, mathematics and electrical engineering. Plus a business planning package that produces bar charts, pie charts and line graphs with little more input than the numbers themselves.

Customer needs are leading graphics intelligence into new territories.

Recognizing some major bottlenecks in the nearly universal engineering technique of finite element analysis, we designed the FEM181, a complete stand-alone applications package that can cut the long, arduous task of finite element modeling by up to two-thirds the time and cost.

You can be sure, too, that with Tektronix' customer orientation these future developments will be done not only with intelligence but with good common sense based on your future needs.

"We saw the need to distribute information. Which is why we now lead the art of putting graphics on paper."

Tektronix digital plotters provide intelligence, precision and multi-color graphics to many applications needing permanent or camera-ready plots.

To the computer builder, graphics is just one more peripheral to his central system. But at Tektronix, we regard all our products as peripheral to the central idea of quality graphics solving customer needs.

...That's why peripherals like our plotters and hard copy are graphics leaders in their own right.

Take plotters. In 1976 we introduced the first smart B-size (11"x17") unit, and led the trend away from analog to digital devices, with the 4662. Its customer base ranges from advanced research environments to office timesharing systems.

The C-size plotter: Not just bigger. More versatile.

Now we are introducing a C-size (17"x22") plotter, the 4663. The thinking behind it, and inside it, is as advanced as it looks.

Although C-size plotters are now rare in printed circuit design, numeric control, civil engineering and drafting environments, much of their work can be done on a C-size work station...cutting time and costs significantly.

Many of our customers have already begun redefining their needs to fit the benefits of the C-size plotter alternative.

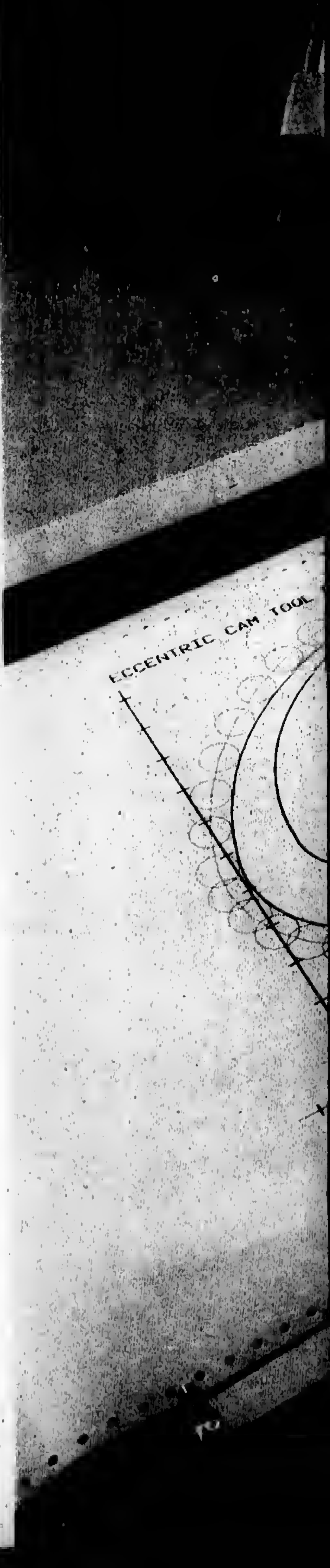
Its local intelligence distributes the graphic workload, and configures easily with existing Tektronix products.

It offers increased character generation capability. Circular interpolation. Automatic paper advance. All in a flexible, easy-to-use package.

In display hard copy, too, we've achieved a quality and simplicity any user would appreciate.

Hard copy from the push of a button: It's a simple operation that hides the advanced technology behind high quality copy. It provides sharp, dry copies directly from the screen in a matter of seconds, with reliability that lives up to Tektronix standards.

Our customers take for granted the fact that hard copy is now personal, quick, and economical. The more people can take us for granted, the better we're doing our job.



Getting Hard Copy

"We sell the same thing to every system builder: a reliable and responsive partnership."

System builders for the publishing market are looking to Tektronix graphics for new capabilities in graphic editing. New dimension in page layout.

A few years ago, Tektronix committed itself to a separate organization specifically to serve the OEM needs of the system builder.

It was really the only way. Compared to other markets, many OEM needs are as different as night and day.

Or as different as today and tomorrow. Because what the system builder looks for, more than product reliability, are far-sighted technologies and long-term, close working relationships with their manufacturers.

Our responsibility to the system builder begins with an introduction to our graphics' concept and potential. It involves helping define needs and prove systems feasibility—often years in advance of actual OEM product purchase.

The GMA display series: our first graphics designed specifically for the systems builder.

Planning often includes our GMA modules: combining refresh and storage capability within the same tube, they bring our customers the high detail and economy of storage display, plus the dynamics of refresh. They are designed around a modular chassis that enables easy threading of system cables and addition of a wide range of optional components.

This modular approach helps many system builders cut costs by ordering custom configurations virtually "off the shelf." At the same time, our engineers and manufacturing people are on-call to further tailor the product to meet individual needs.

Inherent to our OEM concept is upward-expandability. System builders who switch to our new 25-inch display, for example, will be able to do so with no modification to software, timing, or interfaces.

In the OEM market, corporate strength is also a product feature.

Vendor "staying power" is especially important to the OEM. We appeal to people who seek not simply a product, but an extension of their own manufacturing lines.

You'll find too, that we value our OEM customers for many of the same reasons they value us. The benefits are truly reciprocal: it is through other innovators exercising our product concepts that we learn the full potential of our own technologies...and, in the long run, learn to make graphics better and better for the end user. That's what good partnerships are all about.

"We designed PLOT 10 IGL to anticipate the needs and new equipment that come with growing markets."

The new PLOT 10 Interactive Graphics Library is built for expanding customer capabilities. It supports color, peripherals, and advanced graphic capabilities in a highly modular, device-independent package.

One of the biggest pitfalls in computation has been around since William Burroughs invented the adding machine 80 years ago. Burroughs had 50 of his first model built before realizing that no customer was ever likely to get the hang of its operation. Hardware builders have been falling into the same pit ever since.

At Tektronix, we make our products' operation as easy as possible, and provide the tools for future expansion. That includes operational software and documentation that is the most thorough in the industry.

PLOT 10 Software has set a standard for the industry to follow.

Our PLOT 10 Terminal Control System was the industry's first major effort at packaging the building blocks of graphics programming. Today, virtually all other graphics suppliers have made their equipment PLOT 10-compatible.

That's a leadership role we plan to maintain, by continuing to support our customers' specific software needs. Towards this end, our latest software package may be the most versatile ever.

Known as the PLOT 10 Interactive Graphics Library, this latest package is completely I/O and device-independent. It allows a customer to run programs today, for example, on a color graphics terminal, then on a storage terminal tomorrow. He can also update his graphics to new applications by selecting advanced capabilities, like 3-D and line smoothing, one at a time.

Our PLOT 50 library, designed for our personal computer, includes the most comprehensive series of statistics volumes yet developed, plus other powerful applications software. Plot 80, developed for the 4081 Interactive Graphics Terminal, includes wide-ranging operational and graphics software, host-resident support subroutines, utilities and diagnostics.

The power and convenience of these software packages don't accrue only to the sophisticated programmer, but to users of all experience levels as well. Although the sophisticated innovator is usually our first customer, we're concerned with looking ahead to those users who will be starting with graphics tomorrow.

For more from the graphics leader, come see us at NCC.

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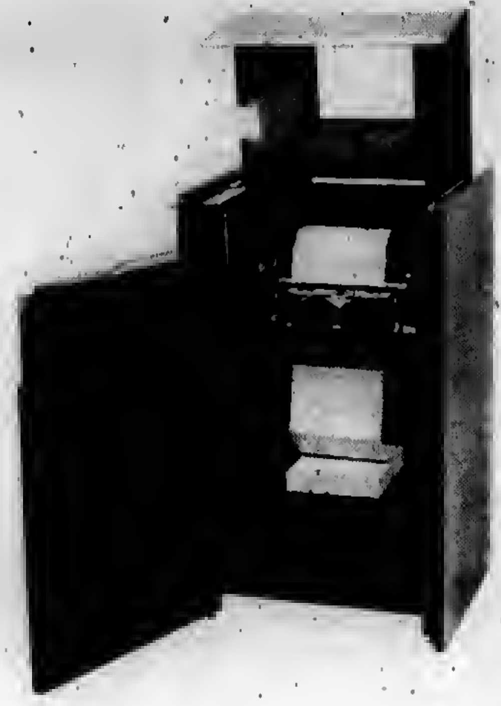
Peripherals at NCC

Innovative Electronics, Inc.

ANAHEIM, Calif. — A line of 300 line/min printers will be exhibited by Innovative Electronics, Inc. in Booth 1723.

The Innovator family includes three models offering both parallel and serial interfaces at prices formerly obtainable only by dot matrix printers, Innovative claimed.



Innovator Printer

The family features the Teletype Corp. 300 line/min tractor-feed Model 40, housed in a sound-reducing floor-mounted acoustic cabinet, the firm said.

Offerings include the Model 154 80-column; Model 202 132-column; and Model 250 72-column forms access printers. These printers provide for immediate access to a printed form, utilizing a tear bar to avoid waste of paper, according to Innovative.

Each character printed is fully formed, imprinted into the paper by a hammer for each column within a rotating carrier belt. Up to six clear copies are possible with this design.

A variety of type carriers are available, the firm said, and interfaces are implemented by the Innovator controller board that is mounted within the cabinet.

Custom nonstandard sets may be generated for special applications, and print speeds up to 500 line/min may be achieved using the optional IBM 1403 equivalent 48-char. set.

Noise-reducing properties of the Innovator cabinet are said to permit its use in office environements previously suited only to thermal printers.

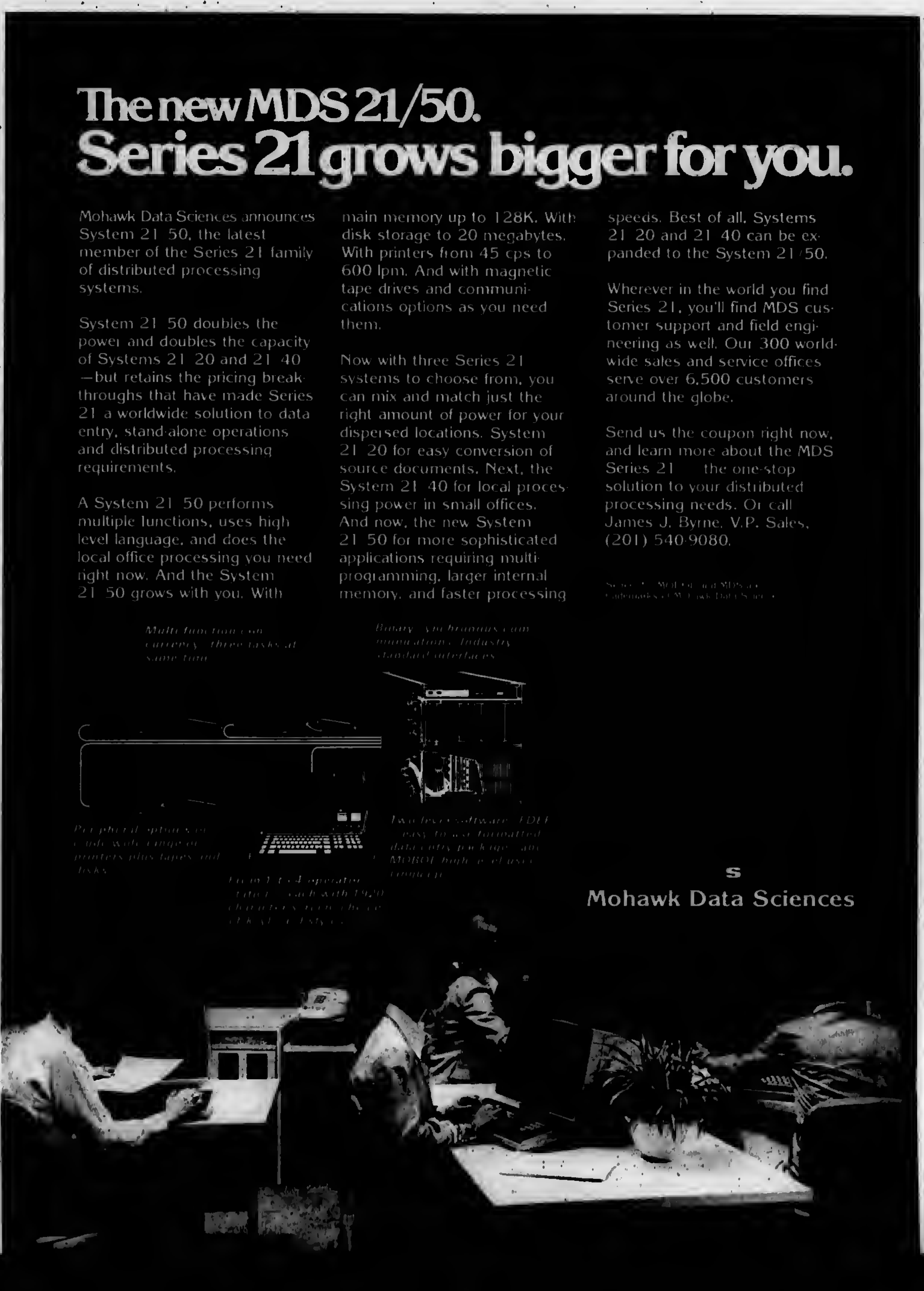
The Model 154 costs $3,600; the 202, $4,300; and the 250, $3,950, the firm said from 15200 N.W. 60th Ave. Miami Lakes, Fla. 33014.

Addressograph-Multigraph Corp.

ANAHEIM, Calif. — Addessograph-Multigraph Corp.'s Bruning Model 1830 Micropublisher, a plain paper microfiche enlarger-printer, will be on display at Booth 1621.

The unit is said to be capable of producing copies at a rate of 900/hour, accepts standard 105 mm by 148 mm silver, diazo or vesicular microfiche and gives the user a choice of any three of seven standard formats, using reductions of 20X, 24X, 42X or 48X. The resulting "blow back" ranges from an 18:1 ratio for the 20X reductions to 44:1 for the 48X mode.

The 1830 meets copy legibility requirements of PCS MFT-2411 using sans serif microfont type and has a 16-key control panel, the company said from 20600 Chagrin Blvd., Cleveland, Ohio 44122.



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A System 21/50 performs multiple functions, uses high level language, and does the local office processing you need right now. And the System 21/50 grows with you. With main memory up to 128K. With disk storage to 20 megabytes. With printers from 45 cps to 600 lpm. And with magnetic tape drives and communications options as you need them.

Now with three Series 21 systems to choose from, you can mix and match just the right amount of power for your dispersed locations. System 21/20 for easy conversion of source documents. Next, the System 21/40 for local processing power in small offices. And now, the new System 21/50 for more sophisticated applications requiring multiprogramming, larger internal memory, and faster processing speeds. Best of all, Systems 21/20 and 21/40 can be expanded to the System 21/50.

Wherever in the world you find Series 21, you'll find MDS customer support and field engineering as well. Our 300 worldwide sales and service offices serve over 6,500 customers around the globe.

Send us the coupon right now, and learn more about the MDS Series 21 — the one-stop solution to your distributed processing needs. Or call James J. Byrne, V.P. Sales, (201) 540-9080.

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Two level software: EDIT — easy to use formatted data entry package — and MOBOL high level user language.

Peripherals at NCC

Tally Corp.

ANAHEIM, Calif. — The Tally Corp., in Booth 1115 will display several models of serial dot matrix and line printers designed for the office environment.

The T-1000 series features microprocessor-controlled bidirectional printing at speeds from 40- to 200 line/min, the firm stated. The print head, controlled by ruby-jewel front bearings, is designed to accelerate to three times the printing speed while moving over a space and it is protected by an integral dust cover to guard against outside contaminants, Tally said.

Two rails hold the print head carriage in alignment to lock-in registration, and print quality is maintained by half-space matrix fonts, a spokesman stated. The unit also features a magnetic "pick-off" carriage return wheel that provides positive servo feedback, eliminating light sources and sensors.

The T-1612, a 1,200 bit/sec printer terminal, incorporates 42 programmable keyboard functions. The unit has a 20-char. answerback capability and a multikey rollover feature if two keys are struck simultaneously.

The terminal offers a full 128-char. Ascii set, end-of-line warning and automatic paper-out detection functions.

An operator control panel with switches for power, data rate selection, local or off-line operation, half- or full-duplex mode, automatic line feed and automatic new line is also included.

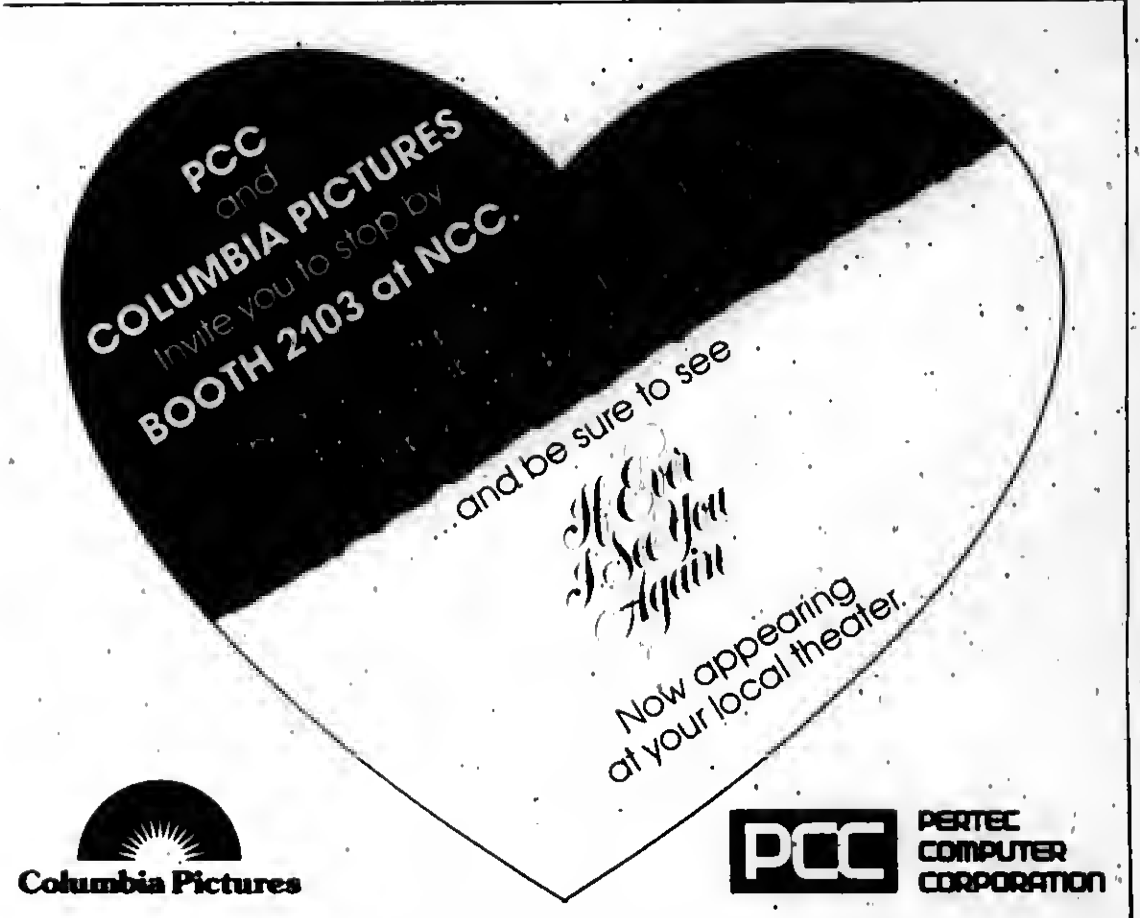
The Model T-2000 line printer produces full 132-char. columns at 125- or 200 line/min. The printer employs a matrix scanning technique whereby the rotary stepping motor motion is transformed into a linear horizontal scan motion. The dot matrix characters are generated one at a time by an oscillating print comb of 132 hammers, each with a steel ball impact face. Each hammer is pulled back by its own electromagnet and then released to fly forward, creating a dot.

The paper advances vertically and the process is repeated until the complete line matrix has been scanned, the company said.

The T-5000 is a 500 line/min dot matrix printer that features swing gate paper loading, dual tractor engagement above and below the print line and a "helix" printing principle, the spokesman said. Printing is produced by the controlled interaction of a constant-speed rotating helix and 22 voice coil activated hammers. By keeping an electronic count of hammer and helix location, and by incremental stepper motor paper advance during the print cycle, a dot matrix character is formed, the spokesman explained.

The 132-column printer handles multipart forms from 4 in. to 16.75 in. wide, the firm noted. The unit uses industry-standard scroll ribbons.

The Tally Corp. is located at 8301 S. 180th St., Kent, Wash. 98031.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Documation, Inc.

ANAHEIM, Calif.— Documation, Inc. will use Booth 2363 to show a series of microprocessor-controlled impact printers intended for use as replacements for IBM printers, as well as for use by OEMs.

The two printers, called the DOC 1000 and the DOC 1200, each incorporate two 8080 microprocessors for reliability, according to a company spokesman. The microprocessors together maintain and execute printer functions from data transfer to forms movement.

DOC 1000

The printers, rated at 1,000 line/min and 1,200 line/min respectively, are each available in three models: for compatibility with IBM 3211/3811 printers, IBM 1403/2821 printers and standard OEM interfaces. Both use a 48-character set and feature a fully buffered print line of 132 characters, Documation said.

Spacing and forms skipping for the Model I (3211/3811 compatible) is achieved by computer control through the forms control buffer, while the other two models use a punched carriage tape. Both printers are capable of operating at 6- or 8 line/in. with a slew rate of 50 in./sec, on all three models.

Forms capacity of the printers is 3 in. to 34 in. in length, and depth of 4 in. to 18-3/4 in. in width, with a maximum of six-part forms, a spokesman said. Other standard features include an acoustically insulated cover, interchangeable character arrays and a universal character set (UCS) buffer that allows all character sets, including OCR fonts, according to the firm at P.O. Box 1240, Melbourne, Fla. 32901.

Mag-Tek, Inc.

ANAHEIM, Calif.— Mag-Tek, Inc. will feature its magnetic stripe card readers and encoders as well as the MT-50 magnetic stripe card encoder in Booth 2612.

The MT-50 is available in two versions for encoding at either 75- or 210 bit/in. It is priced at $1,450.

Mag-Tek will also show its MT-210 magnetic stripe card reader, which is available in five versions. With the MT-210, the user can choose which track or tracks of information he wishes to read, according to the company.

The MT-150 magnetic stripe card writer/reader, which is also being shown, is available in three versions for recording information on any of the standard data tracks.

Mag-Tek MT-50

The MT-210 reader starts at $140 with OEM prices of $38 per unit. Cost of the MT-150 writer/reader starts at $350, with OEM prices at $150 per unit.

The readers and encoders can be used in factory data collection, automatic gas dispensing and access control systems, according to the company at 20725 S. Annalee Ave., Carson, Calif. 90746.

Peripherals at NCC

Applicon, Inc.

ANAHEIM, Calif. — A color plotter from Applicon, Inc. will be demonstrated at Booth 3219.

The plotter, which can generate graphics up to 22 in. by 34 in. in size is capable of resolution of up to 125 point/in., according to the company.

Additional features include the ability to produce more than 15,000 shades of color under software control and the availability of a range of software, a spokesman noted.

The color plotter sells for $45,000 from the company at 154 Middlesex Tnpk., Burlington, Mass. 01803.

Techtran

ANAHEIM, Calif. — Six products will be displayed in Booth 2751 by Techtran Industries, Inc.

Microprocessor-based, minidiskette systems featuring over 200K usable character storage, the Models 950 and 951 microdisks, will be demonstrated. The drives meet EIA RS-232 and 20mA standards and are plug-compatible, the company said, with prices starting at $1,395.

Also to be presented will be three microprocessor-based data cassettes with standard RS-232 interfaces. The models 816, 817 and 818 have an optional Ansi/Ecma recording format which is said to provide total compatibility with a variety of systems. The recorders list for $950.

A hand-held data recorder, the Porta 200, will also be shown. The unit can store up to 85,000 characters for a variety of applications.

The Porta 200 is priced at $825, including batteries and charger, the spokesman said from 200 Commerce Drive, Rochester, N.Y. 14623.

Gould, Inc.

ANAHEIM, Calif. — Two electrostatic plotters will be exhibited in Booth 1107 by Gould, Inc. Instruments Division.

The first, the Gould 5400 electrostatic plotter, has a resolution of .010 in. (100 dot/-in.) horizontally or vertically and can be used in generating "E" and larger size drawings.

The Gould Vector Plotter is multi-microprocessor based, according to the company, and therefore removes the vector-to-raster conversion task from the host system to the plotter.

Using the vector plotter, the mainframe need only generate and sectorize vectors, which means less CPU time, less main memory space, less mass storage space and fewer I/O operations. This approach also requires less tape for off-line plotting and uses less transmission time to remote systems, the firm said from 3631 Perkins Ave., Cleveland, Ohio 44114.

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For more information, write Perkin-Elmer Data Systems Sales and Service Division, 106 Apple Street, Tinton Falls, New Jersey 07724 or telephone toll-free 1-800-631-2154.

*Quantity 75

PERKIN ELMER

Peripherals at NCC

Siemens Corp.

ANAHEIM, Calif. — Siemens Corp. will exhibit a high-speed version of its silent ink-jet PT 80 printer terminal in Booth 2343.

The PT-80i can operate at 270 char./-sec and is bidirectional and microprocessor-controlled.

The printing head moves in relation to the text to be printed on the following line. The head, which includes the 12 ink-jet elements, can print in a 12 by 9 dot matrix from either one of two character generators and is free to choose character elements for printing logos, symbols or other graphics, according to the company.

The system uses an 8085 microprocessor and the control provides standard parallel interface of the original PT 80 as well as an extended system information bus interface, Siemens said. The bus allows for the external connection of network selectors, data sets and additional storage devices such as floppy disks, it added.

The modular PT-80i uses paper from 8-1/2 in. through 14-7/8 in. in width.

For further information, contact Siemens Corp., 186 Wood Ave. South Iselin, N.J. 08830.

Xerox Corp.

ANAHEIM, Calif. — Xerox Corp. will show five products in Booth 1331. Two printing systems and three communications terminals will be displayed.

The Xerox 9700 electronic printing system is said to produce computer-generated text while creating business forms and other images at a rate of 2 page/sec. The 9700 prints on 8-1/2-in. by 11-in. cut sheet paper in on-line or off-line mode with a variety of standard vendor tape formats.

Forms, including logos, signatures and charts, are stored within the 9700 and imaged electronically with variable data. This eliminates the need for forms overlays and most preprinted forms, according to Xerox. Multiple forms, stored in digital format, are changeable on a page-to-page or copy-to-copy basis, the firm added.

Printing System

The firm will also show its 1200 series printing system. The 1200 is said to print forms and text at speeds up to 4,000 line/min. All models of the 1200 come with the firm's 416 processor.

The Xerox 1700 terminal is addressed to time-sharing users, offering Ascii-compatible APL and text processing. The 1720 terminal is designed for the scientific or administrative user requiring Ascii and/or 2741 code compatibility, the firm said, adding that both the 1700 and 1720 are 30 char./-sec terminals using the Hytype II printing mechanism and featuring interchangeable printwheels in a variety of type fonts.

The Xerox 1760 terminal is a 200 char./sec, Ascii-compatible dot matrix impact printer offering automatic bidirectional printing. The 1760 is held suitable where high speed throughput from the terminal is essential.

The 1700, 1720 and 1760 offer conventional, absolute horizontal and vertical tabbing; certain forms handling features; upper and lower case printing; and a multiple copy capability, Xerox said, adding that these terminals can function as typewriters in off-line mode.

Xerox Corp. is located at 701 S. Aviation Blvd., El Segundo, Calif. 90245.

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A directory of names and addresses of more than 900 department chairmen and 1400 Computer Center Directors at colleges and universities in the United States and Canada, including degree programs offered and on-site computer equipment. The officers and key staff members of computer-related associations are also listed. 180 pages.

ACM Members and persons listed in the directory: $7.00
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PROCEEDINGS OF THE 1977 ACM ANNUAL CONFERENCE, SEATTLE, WASHINGTON, OCTOBER 17-19

The latest in ACM Annual Conference proceedings features 84 papers from sessions organized by the Special Interest Groups. The ACM Annual Conference is traditionally the reporting ground for the leading edge in applied computer research, covering a wide range of topics. This proceeding is noteworthy for its report on a proposed industry standard: the CODASYL Committee report on "A Data-base Language for FORTRAN." 516 pages.

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Companion Volume. ACM SIGCSE Special Issue on Computer Science Curricula, June, 1977. Includes (1) an update of "Curriculum 68,", which is a working paper on undergraduate computer science curricula, and (2) a working paper on a Community and Junior college curriculum in computer programming. 36 pages.

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Peripherals at NCC

Okidata Corp.

ANAHEIM, Calif. — Okidata Corp. will exhibit its microprocessor-controlled 300-, 160- and 125 line/min printers in Booth 1319.

All of the printers include graphics capability, program-controlled font selection and a choice of plug-compatible interfaces, according to the firm.

Okidata will also demonstrate other minicomputer peripherals such as disk drives and a passbook printer.

The 132-column 300- and 160 line/-min models print 7 by 7 characters and the 250- and 125 line/min units print 5 by 7 or 9 by 7 characters, according to the company.

Users may change fonts on command and can select form 12 different styles including true lower case, double height and double width. Microprocessor-based RS-232 and plug-compatible interfaces are available for many CRTs, minis and micros, Okidata claimed.

Graphics capabilities are offered and all systems include built-in diagnostics.

Okidata will also display its Model CP210 document/passbook printer, a table-top unit that adjusts automatically to accommodate documents and multipart forms of different sizes and thicknesses.

The unit, which has a fractional line feed, will print on both the document or passbook and an optional locked journal tape.

The CP210 will print 5 by 7 characters bidirectionally at 110 char./sec. Users may change fonts on command and select upper case, lower case or double width. An RS-232 interface and built-in diagnostic capabilities are included, the firm said.

Two RS-232 interfaces have been added to the Model CP110 printer, the company noted. The CP110 prints a 5 by 7 character bidirectionally at 110 char./sec across an 80-column page. Fonts can be selected in upper and lower case and in double width and are changeable on command. The printer also offers a choice of microprocessor-controlled interfaces in addition to the RS-232 option, the company said.

The Series 3300 disk drive has been expanded to 80M bytes and the moving head units use Okidata's rotary head positioner.

More information can be obtained from the firm at 111 Gaither Drive, Mount Laurel, N.J. 08054.

Tri-Data Corp.

ANAHEIM, Calif. — The Flexifile 21, a microprocessor-controlled minidisk system will be exhibited by the Tri-Data Corp. in Booth 4440.

The Flexifile 21 features a dual RS-232 interface and 8K memory expandable to 16K, according to the company.

A text edit software package is supplied with the unit, which adapts to time-sharing systems and includes insert, delete and search features.

The system is used in on-line data collection, off-line editing, program loading and secondary data storage. The Flexifile 21 also reduces line costs, remote computer storage and CPU access time, according to the company.

The random-access mini floppy features front panel flexibility, microprocessor control, user programmability, miniflexible disk media, interface capability and dual drive capability.

Available as a desktop unit or in rack-mounted configuration, it contains an 8080 microprocessor and Shugart minidrive and is priced at $1,995.

For more information, contact Tri-Data Corp., 800 Maude Ave., Mountain View, Calif. 94043.

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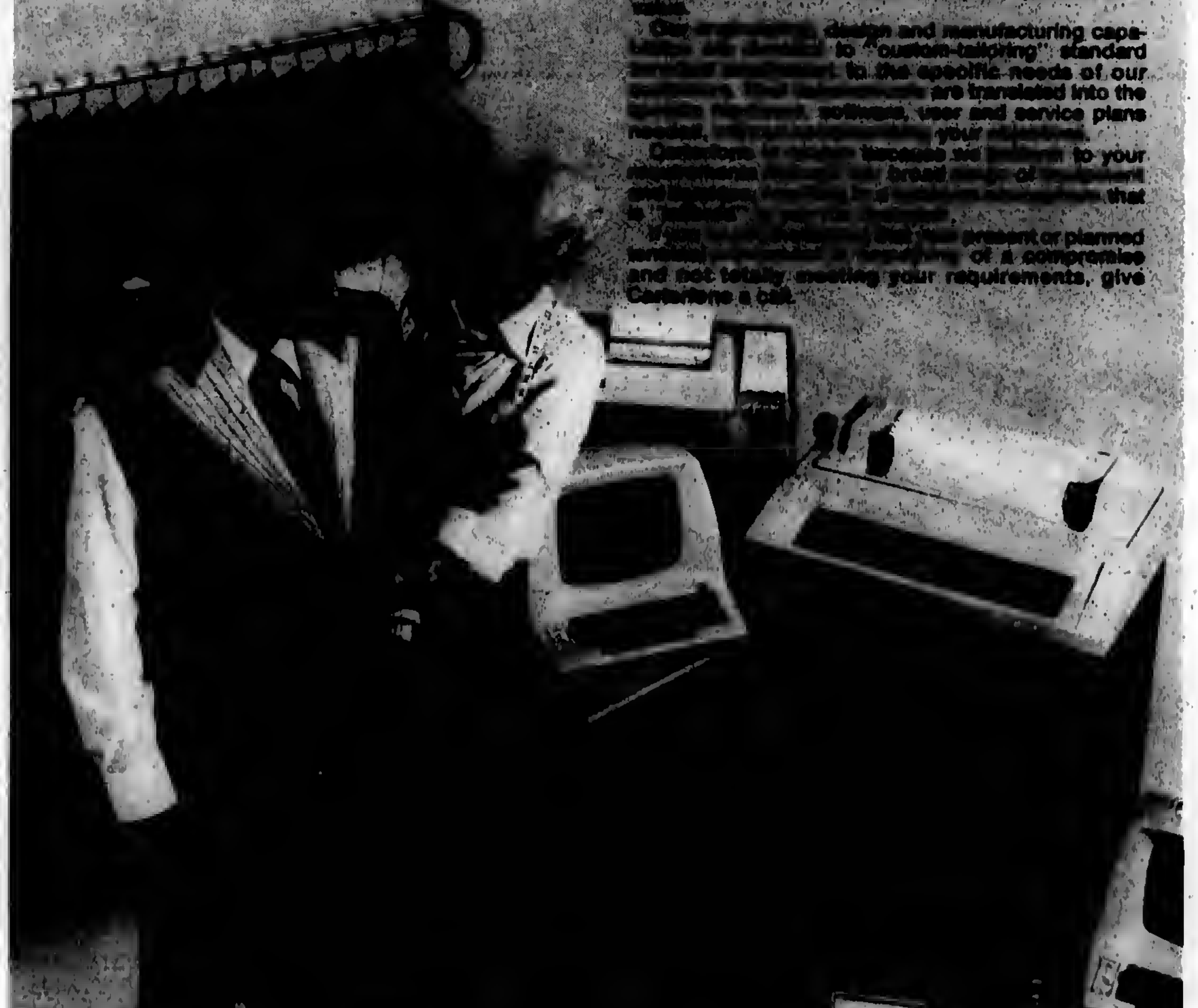

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Peripherals at NCC

Kybe Corp.

ANAHEIM, Calif. — In Booth 2151, Kybe Corp. will show a computer tape cleaner for auto load banded reels that opens the band and threads the tape, then cleans, tests and stacks the tape back onto the reel in approximately 3.75 min, a spokesman for the firm said.

The SLT-80 removes dirt, dust and oxide particles that adhere to tape surfaces, causing signal dropouts and read/-write errors, the firm stated. The system also reports the condition of the tape in question, computer-correlated at subcritical, nominal or hypercritical levels, it added.

The unit features a three-way cleaning system that incorporates a sapphire cleaning blade, auto-advancing tissues and a high-pressure vacuum. An ionized air barrier neutralizes the static charge to eliminate attraction of debris, the firm noted. The system has a programmed read-only memory for control and an inkless chart recorder that monitors track dropouts, edge damage and tape footage.

Vacuum Cleaner

A tapered vacuum chamber works in conjunction with air bearings to isolate the tape from surface contact to minimize surface damage and wear, the company spokesman added.

Also to be demonstrated is the TMS-70, a tape management system; the TMS-77, a magnetic tape tester; the TMS-200, a tape certifier; the DP-10, -20 and -30 line of IBM-compatible disk pack cleaners; the Kybe/Weircliffe series of bulk tape erasers and the TC-225 cleaner, retensioner and rewinder.

Kybe also will show its "K" series of Accutrack cassettes. The cassettes feature a fiberglass-reinforced, interlocking case, computer-grade tape, low-friction slipsheets and tape rollers and custom-designed spring and foam pressure pads, according to the spokesman for the firm.

The cassettes also have a dual "write lockout" system consisting of removable plugs and permanently attached slides to guard against accidental tape erasure, the firm claimed.

The SLT-80 cleaner/tester is priced at $13,100 with a delivery time averaging from 90- to 120 days, the firm said. The K series tapes range in price from $4.30 to $6.95 in quantities of 10 from the company at 132 Calvary St., Waltham, Mass: 02154.

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Shugart Associates

ANAHEIM, Calif. — Shugart Associates will be demonstrating its SA4000 fixed disk drive in Booth 2445. The first rigid disk drive product to be offered by the company, it is available in 14.5M-byte and 29M-byte (unformatted) capacities, with an optional 144K bytes of additional head-per-track storage.

Features of the drive include a transfer rate of 7.1M bit/sec, a band actuator and capstan used to position the Winchester-type read/write heads and compatibility with the interface and controller for the company's line of floppy drives.

Prices for the 14.5M byte drive start at $2,550 (in single quantities) and go down to $1,325, in quantities of 250. The 29M byte version sells for $3,500 and $1,800 in the same quantities, from the company at 415 Oakmead Pkwy., Sunnyvale, Calif. 94086.

MFE Corp.

ANAHEIM, Calif. — Available for inspection at Booth 2159 will be MFE Corp.'s Model 2500 buffered data cassette terminal and its Model 450B digital cassette transport.

The microprocessor-based Model 2500 incorporates MFE's Model 450B tape drive, which allows recording on both sides of the tape, for a character capacity of 350,000, the firm said.

Ansi-compatible, the MFE 2500 is available with Texas Instruments, Inc. or NCR Corp. compatibility, selectable rates up to 2,400 bit/sec and binary mode. Also standard are teletypewriter and RS-232C interfaces, the firm said.

The Model 450B incorporates the "Tachlock" speed control system, providing 1% long-term speed accuracy at the heads in a reel-to-reel transport without the use of a prerecorded digital clock track, according to the firm. The 450B is Ansi/Ecma compatible. Two data tracks are available.

MFE Model 2500

The Model 2500 costs $1,190. Price of the Model 450B is $560, with delivery in four to six weeks. MFE Corp. is located at Keewaydin Drive, Salem, N.H. 03079.

Printronix, Inc.

ANAHEIM, Calif. — Attendees will be able to examine the Printronix 600 featured by Printronix, Inc. in Booth 3215.

The 600 line/min matrix impact line printer is similar to the 150- and 300 line/min printers offered by Printronix, according to the company.

The unit features raster matrix impact printing capabilities, multicopy print quality and a printing mechanism with up to 50% fewer parts than drum, chain, belt or band printers, the company claimed.

The 600 printer also features full 96-char. set expandable to 160 characters without speed degradation and an inherent computer graphics/plotting capability.

Deliveries will begin late in the year, the company said. For more information, contact Printronix, Inc., 17421 Derian Ave., Irvine, Calif. 92714.

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Peripherals at NCC

Information Terminals Corp.

ANAHEIM, Calif. — Five products will be announced and exhibited by Information Terminals Corp. at Booth 1364.

The first of the products, a quad-density, 1/4-in. data cartridge providing four times the data storage capacity of a standard 1/4-in. data cartridge, is designated the Verbatim TC 400.

The cartridge can store approximately 10M bytes of data in formatted mode or 11.5M bytes unformatted, according to a company spokesman, making it suitable as a backup storage unit for post-Winchester generation fixed disk drives. Environments without professional computer operators should find the quad density cartridge usable since it is easier to use and less expensive than standard 1/2-in. magnetic tape, he added.

The quad density cartridges are tested for 6,400 bit/in. operation, according to the company, and are compatible with standard Ansi-Ecma 1/4-in. cartridge drives.

The second product is a data cartridge with 50% more storage capacity than a standard package, in the same physical space, the firm said. The cartridge can hold 4.3M bytes of data in Ansi/Ecma format, according to the company, on 450 feet of tape. The company plans to price the product approximately 33% higher than standard-length cartridges.

A double-sided, double-density diskette with storage capacity of .6M- to 1M-byte capacity (depending on formatting) will also be announced. Called the D² Minidisk, the product is said to be compatible with Shugart and other dual-head minidisk drives and is available in softsector, 10-sector and 16-sector versions.

The 5.25-in. diameter disk is also said to have an oxide formulated specifically for dual-drive applications.

The Verbatim D² diskette, a double-sided, double-density diskette suitable for use with IBM's 5110, System 34 and Series/1 and Shugart 850/851 will also be shown.

An additional product, the Verbatim MI-80 mini cassette, will also be displayed. The product is capable of storing 100K bytes formatted or 190K bytes unformatted on an 80 foot tape, according to the company.

Information Terminals Corp. is located at 323 Soquel Way, Sunnyvale, Calif. 94086.

Qantex

ANAHEIM, Calif. — A ruggedized commercial tape transport for use with 3M Co.'s DC300A data cartridge will be exhibited by Qantex Division of North Atlantic Industries, Inc. in Booth 1213.

Using the Model 650 tape transport a memory module can store up to 23M bytes of unformatted data on the 4-track DC300A cartridge tape, the firm said.

The transport is said to provide a tape speed of 30 in./sec and a recording density of 1600 Ansi-compatible bit/in., yielding a data transfer rate of 48,000 bit/sec.

Qantex said this throughput rate is such that a typical CRT terminal can be "filled up" in about half a second, contrasting with a conventional CRT "fill-up" time of several seconds.

The Model 650 drives the tape at 90 in./sec for rewind or fast search.

The Qantex Model 650 with operating electronics costs $920; but the unit can be purchased as a simple electromechanical transport — omitting servo/data card and control/-housekeeping boards — for $475, the firm said from 200 Terminal Drive, Plainview, N.Y. 11803.

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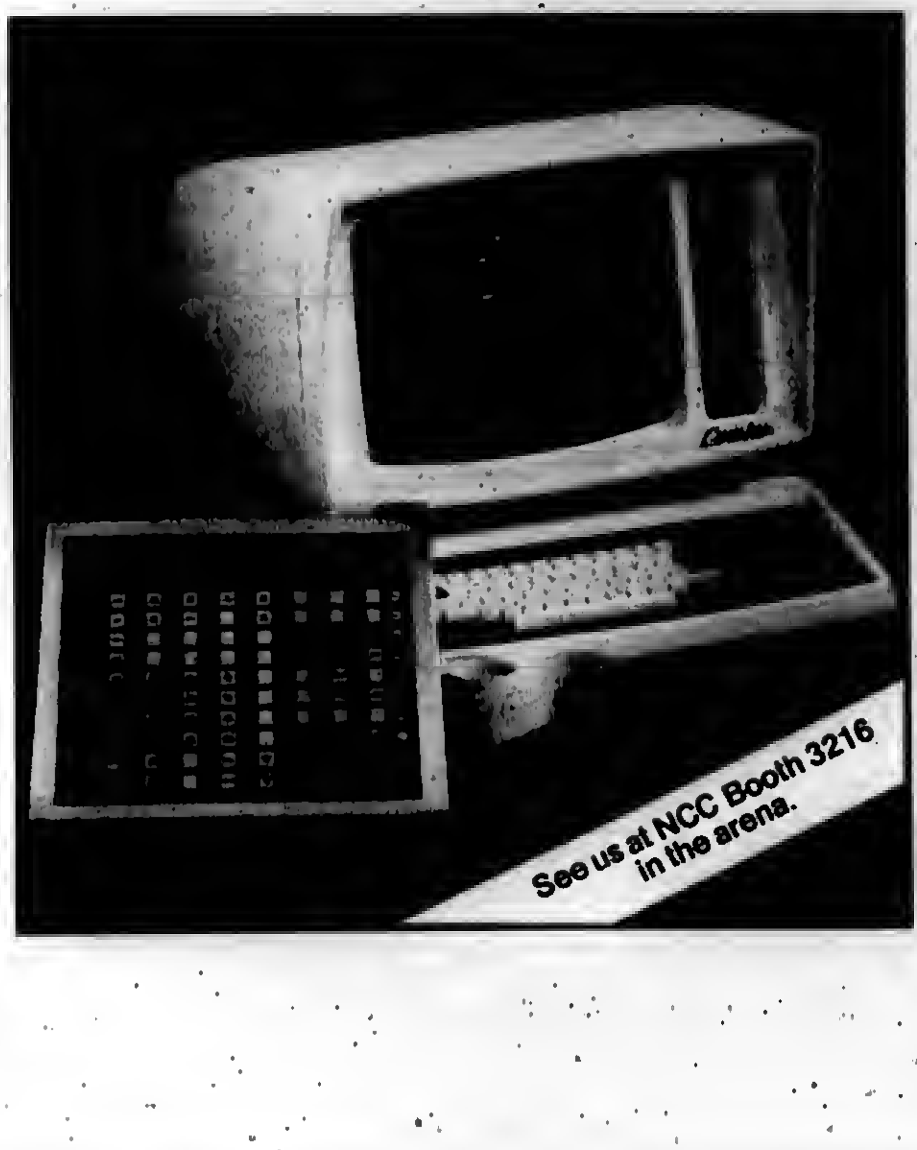
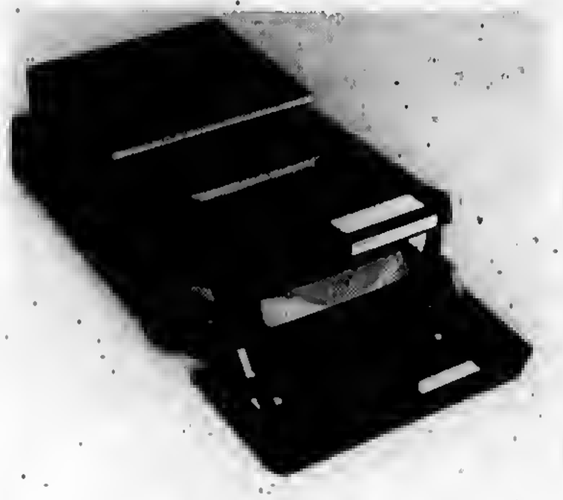


Peripherals at NCC

Bull Corp. Of America

ANAHEIM, Calif. — Three disk-related products will be demonstrated in Booth 1758 by Bull Corp. of America, the wholly owned subsidiary in the U.S. of CII-Honeywell Bull in Paris.

The D120 Mididisk drive is a 10M-byte (preformatted), two-head drive with 50 sector/track. The drive uses standard grade, IBM 3336-type recording media to record on two surfaces at a density of 4,750 bit/in. and is priced at $3,000 (less power supply).



Model D120

The D140 Mididisk drive reportedly has the same specifications as the D120, with twice as much capacity — 10M bytes of fixed storage and 10M bytes for the removable disk. Like the 120, it has a transfer rate of 920k byte/sec. Prices start at $3,900, less power supply.

Also to be demonstrated is a controller for both drives, the firm noted from 200 Smith St., Waltham, Mass. 02154.

Zeta Research

ANAHEIM, Calif.— A microcomputer-based controller that when combined with a plotter can be preprogrammed for random plotting sequences or multiple copies will be demonstrated by Zeta Research in Booth 4118.

The Model 6300 controller, compatible with the firm's line of plotting stations, incorporates four microcomputers as system components, the firm noted. The controller consists of a tape transport and control electronics along with an operator console and CRT terminal control.

RS-232 Interface

A communications interface provides the ability to write tapes on the system via RS-232 lines and then, without removing the tape, plot off-line. The graphic machine language (GML) software is provided by the firm.

Error correction is provided so that the plot data may be recorded, corrected and then plotted off-line under operator control.

The 6300 is priced at $13,500 from Zeta Research, located at 2300 Stanwell Drive, Concord, Calif. 94520.

Tandberg Data, Inc.

ANAHEIM, Calif. — Tandberg Data, Inc. plans to exhibit its TDC 3000 digital cartridge recorder, its TDI 1050 synchronous tape transport and modifications of these two products to make them suitable for use as call detail recording systems (CDR 3000 and CDR 1050) in Booth 1149.

The TDC 3000 digital cartridge recorder is a storage device for serial data. The medium is 3M Co.'s DC300A data cartridge with 1/4-in. tape and a capacity of up to 2.5M characters. The product complies with Ansi/Ecma/ISO standards.

The TDI 1050 tape transport is designed for reels of up to 10.5 in. One design encompasses 7-track, 9-track, NRZI and phase-encoded (PE) formats, the firm said.

It utilizes a data density of 1,600 char./in. PE or 800-, 556- or 200 char./in. NRZI at speeds of 12.5- to 45 in./sec, with an average rewind speed of 200 in./sec, the firm said.

The basic TDC 3000 is priced at $1,900 and the basic TDI 1050 costs $3,400. The CDR 3000 is priced at $4,500 for a single unit and $6,000 for a dual-drive unit. The CDR 1050 costs $11,000. Tandberg Data, Inc. is located at 3593 Fifth Ave., San Diego, Calif. 92103.

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See us at NCC Booth #1732

Peripherals at NCC

Key Tronic Corp.

ANAHEIM, Calif. – An optical character recognition (OCR) device manufactured by Key Tronic Corp. will be exhibited in Booth 1155.

Called Datareader, the device is aimed at banking applications such as scanning credit cards and personal checks..

The firm noted that 24 to 36 digits must be manually key-entered to complete the data entry portion of credit card processing: account numbers consisting of up to 16 digits plus the date (six digits maximum); the six-digit Authorization Code; and the total dollar amount (six digits maximum, usually four). The Datareader is an economical alternative to manual key entry that increases the data capture rate, a spokesman for the firm claimed.

With the read and key method, time is saved by automatic handling of sales drafts, Key Tronic said, explaining that this procedure frees the operator from unnecessary document handling. Sales drafts are transported through the Datareader while the account number is scanned by the OCR read head, reducing the number of required key strokes by approximately 50%, according to the spokesman.

Automatic Transport

After the account number has been optically read, the document is automatically transported to a viewing area where the operator can key in the remaining data. In most cases, the operator is required to key in only the dollar amount and authorization code. The Datareader allows documents to be processed in one pass using Read and Key, Key Tronic asserted.

Check digit routines are said to be performed internally to ensure transmission of good data. If an error occurs, the document can be corrected on-line through an operator-prompting routine or sorted to a reject tray.

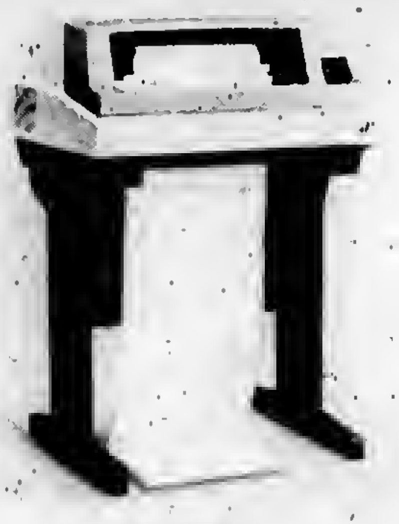
Throughput Doubled

The Datareader reportedly doubles the throughput of an individual operator in this application and offers dollar savings while the equipment is paid for. The product is backed by a Key Tronic guarantee that if operator throughput is not doubled without conversion costs, the user may return the system within 90 days after delivery at no cost, the firm said. Key Tronic can be reached through P.O. Box 14687, Spokane, Wash. 99214.

Dataproducts Corp.

ANAHEIM, Calif. – Dataproducts Corp. will introduce the latest member of its B series of line printers, the Model B-600 band printer, in Booth 1562.

The printer uses a steel band font carrier, the patented Mark V hammer system, custom integrated circuit hammer drivers and microprogrammed control to produce 600 line/-min throughput, the company said.


Model B-600

The printer will complement the Model B-300, a 300 line/-min printer, and will be useful in applications such as small and medium-sized business systems and batch terminals, according to a spokesman.

Options include either direct access or tape-controlled 12-channel vertical format units, a forms-length select switch, parity check, an elapsed time meter, automatic line feed, long-line drivers and receivers and ground isolation.

Line Printers Series

Dataproducts will also be showing its 2200 series of line printers, including the models 2230, 2260 and 2290. These printers are interchangeable and interface-compatible, allowing print rates of 300-, 600- and 900 line/min, respectively, using a 64-char. set in a 136-column format, the company said.

Also on display at the firm's booth will be the M-200 matrix printer with a bidirectional print speed of 340 char./sec and throughput of 125 line/min at 132 char./line, 200 line/min at 80 char./line and 300 line/min at 40 char./-line. The printer has an 8 bit-parallel standard interface.

The company's T-80 thermal printer will also be shown. The printer has a print speed of 80 char./sec, a standard serial RS-232 interface, an optional parallel interface, a 5 by 7 matrix font, and a 64-char. Ascii set.

Dataproducts is located at 6219 De Soto Ave., Woodland Hills, Calif. 91365.

General Electric Co.

ANAHEIM, Calif.— The General Electric Co. in Booth 4309 will demonstrate its series of interactive and microprocessor-controlled line printers.

The Terminet 200 line of matrix printers feature servo control for both carriage and paper advance, a 20 in./sec slew rate, a 1K buffer, multipart forms printing, 136 column print positions with variable character spacing, vernier tractor adjustment for fine tuning paper and the ability to handle paper widths from 2 in. to 16.5 in., a spokesman said. The line printer version also features a bidirectional printing capability.

The units also have a ballistic firing function and a laminated core for reduced heat. The printhead is operator-replaceable and has a 7 by 9 matrix printing format, the firm noted.

A nonvolatile semiconductor memory module can be added to the interactive model that includes a multichannel 128-position vertical format unit, both keyboard and remote source programmable; horizontal tabbing; and an 85-char. answerback, the firm explained.

A self-test feature is available on the line printer, which generates a preset test pattern, and the ribbon mechanism on the printer is motor-driven to prevent excessive ribbon wear, the spokesman stated.

Peripherals Offered

Peripherals include paper tape, a stand-alone magnetic tape terminal and a diskette storage terminal. An RS-232C data set control, line control, numeric cluster and memory module are also offered as options.

The interactive printer with keyboard is priced at $3,325 and the line printer costs $3,325. A forms control option is also available separately from the company's Data Communications Products Department, Waynesboro, Va. 22980.

Who said it couldn't be done?
It takes a high-technology company to do it!
Hazeltine

Minis at NCC

Diva, Inc.

ANAHEIM, Calif. — Shown in Booth 4323 will be Digi-Data Corp.'s Model 75 IPS tension arm magnetic tape transport and the microprocessor-based imbedded NRZI/PE formatter. Also shown will be the firm's 7-, 8.5- and 10.5-in. tape transports. current NRZI and PE formatters, dual buffered tape system and the firm's Nova, PDP-11 and HP 2100 interfaces.

According to the firm, the unique feature of the imbedded formatter is the use of a programmable microprocessor with a 400-step NRZI or 800-step NRZI/PE instruction set to perform the functions that "previously required dozens of integrated circuit chips." The microprocessor can control timing and data paths; generate and check file marks, check characters, pre- and postambles; confirm validity of data transfers; and monitor and act in response to the legality of commands, according to the firm.

The Digi-Data Dual Formatter is inteded to mount in the firm's line of 7-, 8.5- and 10.5-in. tape drives. It can generate IBM- and Ansi-compatible NRZI and PE tapes and can control four tape drives with any combination of two tape speeds, 9- or 7-track recording, 1,600- or 800 bit/in. in 9-track, and two selected densities in 7-track (800-, 556- or 200 bit/in.), the firm said.

Digi-Data Corp. is at 8580 Dorsey Run Road, Jessup, Md. 20794.

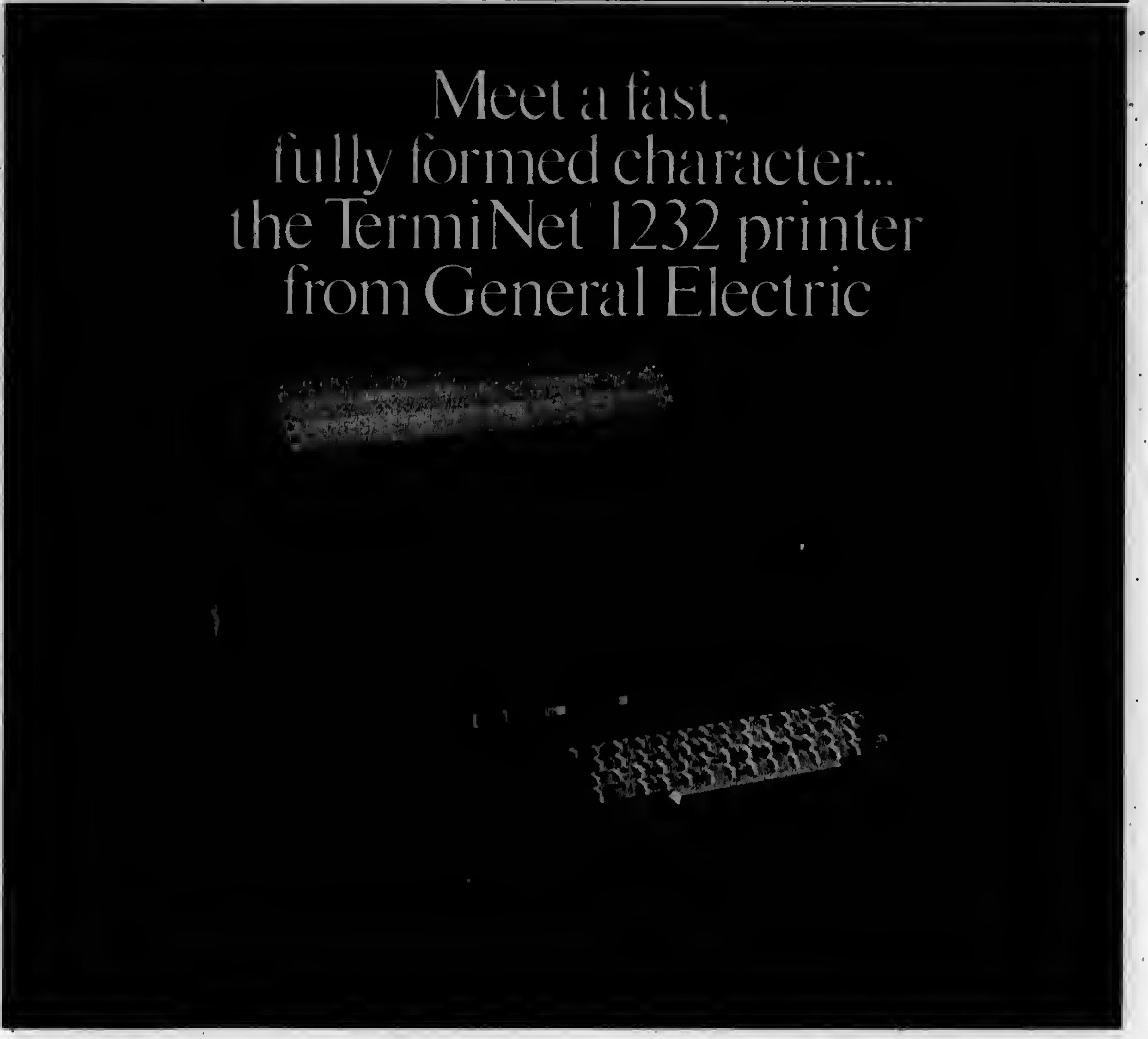
Digi-Data Corp.

ANAHEIM, Calif. — A disk storage system for Digital Equipment Corp. PDP-11 processors, capable of providing 80 million to 300 million bytes of disk storage, will be demonstrated by Diva, Inc. in Booth 4123.

Called the DD-70 series, the system consists of a microprocessor-based disk controller, a four-board PDP-11/-70 interface replacing the DEC RH70 Massbus, and a choice of disk drives in the range of 80M to 300M bytes per spindle. It is designed to be a functional replacement for the DEC RP04 or RP06 drives, according to a company spokesman, who added that systems providing a 50% faster disk transfer rate than presently available are also being sold by the company.

Features of the system include error correction for both header and data fields, transfer rates to 1,209K byte/sec and a series of self-test diagnostics.

Single-drive systems start at $22,000 and additional add-on drives at $10,000 from the company at 607 Industrial Way West, Eatontown, N.J. 07724.



Fast thruput, rugged performance and fully formed characters make the difference in General Electric's new TermiNet 1232 belt printer.

The speed—all 1200 baud of it—comes from a 1000-character input buffer, a 510-character-per-second hammer bank and fully formed individual characters.

The ruggedness—which enables the TermiNet 1232 printer to handle the most demanding data communications workloads with ease—comes from 10 years of developing and producing performance-proven belt printers. It's the kind of experience few companies can match.

Features? The TermiNet 1232 is available with an integrated punched paper tape or magnetic tape option (single or dual). Its Hall-effect keyboard, with n-key rollover, means there are no contacts to wear out. The 94 fully formed upper and lower case ASCII characters result in clear, high print quality—even on 6-part forms. A snap-in ribbon cartridge provides clean, multi-million character printing and also contributes to the printer's ease of operation.

In addition, paper can be loaded from either the front or the back. Sturdy, adjustable 6-pin form-feed tractors can handle any paper width from 3" to 14-7/8".

Service? It's at your fingertips with over 100 locations nationwide, where fully trained GE technicians stand ready to respond to any service need.

We'd like to tell you more about the remarkable TermiNet 1232 printer. For the whole story, write: General Electric Company, TermiNet 794-28C, Waynesboro, VA 22980.

For your special kind of needs— a special kind of printer

GENERAL ELECTRIC

Minis at NCC

Randal Data Systems

ANAHEIM, Calif. — Randal Data Systems, Inc. will show five minicomputer-based systems in Booth 2464.

The Link 140 features a 1.2M-char. floppy disk drive and a 30 char./sec teleprinter input station. The 140 sells for as low as $13,350 and costs $13,900 including a CRT display terminal and 110 char./sec printer.

Accommodating up to five users simultaneously, the Link 240 is claimed to be among the least expensive hard disk systems offered in the U.S., priced at $22,900 with CRT terminal and 110 char./sec printer.

Randal Link 240

The Link 250 can handle 10 users simultaneously, has an internal storage capacity of from 64K to 128K bytes and is supported by the partitioned Randal Time-Sharing Operating System II (Rtos II), Randal said. The 250 base price is $27,500.

The Link 540 offers a 50M-char. disk drive, can handle five simultaneous users, uses the nonpartitioned Rtos I and costs $37,900 with a 110 char./sec printer, according to a spokesman for the firm.

The Link 550 comes with three terminals and a 110 char./sec printer, can handle 10 simultaneous users, can drive several printers simultaneously and costs $44,900 using Rtos II, Randal said.

Randal Data Systems, Inc. is located at 365 Maple Ave., Torrance, Calif. 90503.

Digital Equipment Corp.

ANAHEIM, Calif. — Two of the featured items to be demonstrated by Digital Equipment Corp. in Booth 4123 will be the Decsystem 2020 and the company's VAX-11/780. In addition, three new disk storage peripherals and the company's Decnet computer networking software will also be demonstrated, the firm said.

The three disks to be exhibited, the RL01, RK07 and RM02, range in capacity from 5M- through 67M bytes. All three are designed to work with DEC's PDP-11 family. In addition to PDP-11 compatibility, the RL01 also works with the PDP-8 family and the RK07 with the VAX-11/780, which is a 32-bit system.

DEC can be reached in Maynard, Mass. 01754.

Logical Machine

ANAHEIM, Calif. — A voice recognition and response unit called Mike will be shown by Logical Machine Corp. in Booth 1227. Mike is designed to be used in conjunction with Adam, a small business system instructable in English, the firm said.

The business owner can speak to Adam via a microphone and receive either a printed report, screen display or voice response, according to the firm. Mike may be used to access Adam's data, such as management financial figures, inventory status, order records, credit checks or year-to-date sales. Mike may be used to enter data into Adam's files and can confirm inputs verbally to ensure accurate data entry, the firm said.

Mike is designed to learn and recognize a user-specified vocabulary consisting of up to 16 words or phrases. Adam can store multiple vocabulary sets of 16 words that can be recalled upon voice or keyboard command, a spokesman added.

Logical Machine Corp. is located at 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

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Minis at NCC

Basic/Four Corp.

ANAHEIM, Calif. — Basic/Four Corp. will be demonstrating two of its business systems in Booth 4201.

The first, the Model 600 is a transaction processing system designed for users requiring a large storage capacity, according to the company. The 610 features 35M bytes of disk storage, expandable to 105M bytes in three disk drives, a 40K semiconductor memory, a 165 char./sec printer and a CRT terminal. Software includes an inquiry/reporting system called Easy, which the company said is designed to produce special reports on a one-time basis and a Tri-state Language Processor said to retain the on-line programming advantages of an interpreter, while offering the execution time associated with a compiler.

The 610 is microprocessor-based, as are all the company's products, a spokesman said, and is designed to execute programs written in business Basic.

Prices for the unit begin at $51,400.

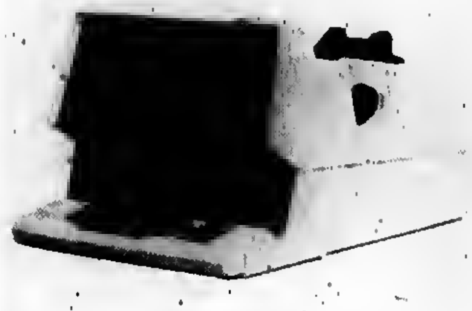
Also on display will be the System 200, which consists of a Basic/Four-manufactured CPU, 32K memory, 10M-byte fixed-media Winchester-type drive, a CRT terminal, a cartridge tape drive and a 120 char./sec bidirectional printer.

Basic/Four can be reached through P.O. Box C-11921, Santa Ana, Calif. 92711.

General Robotics Corp.

ANAHEIM, Calif. — The MVT/X3 desktop system will be the highlight of General Robotics Corp.'s display at Booth 2602.

The MVT/X3 includes a Digital Equipment Corp. LSI-11, 62K bytes of random-access memory (RAM), a line printer, keyboard, three mini floppy disks, an operating system and a 12-line by 40-character display, the firm said.



MVT/X3 System

The LSI-11 CPU is packaged in an 8 quad slot backplane and floating-point arithmetic hardware is a standard feature. According to the firm, the normal configuration has nine additional dual-height Qbus slots for user expansion. The MOS RAM has an access time of 450 nsec.

The MVT/X3 is priced at $12,000. General Robotics Corp. is located at 57 N. Main St., Hartford, Wis. 53027.

Minis at NCC

Qantel Corp.

ANAHEIM, Calif. — Qantel Corp. will exhibit its System 210, 900, 950 and 1400 business computer systems in Booth 4231.

The 210 is called an entry-level business system specifically designed to bring all the advantages of automation to first-time computer users. The basic configuration includes a business-oriented CPU, 16K bytes of user-dedicated memory, a 27-line by 64-char. video display, a keyboard, a random-access dual disk drive able to store 1.3M alphanumeric or 2.6M numeric characters and built-in expansion space.

The 900 features a business-oriented CPU, 6K bytes of user-dedicated memory, a video display, a random-access disk drive able to store 6M char., a 45 chat./sec serial output printer and built-in expansion space, the firm said.

The 950 offers multiuser capabilities and is said to feature all attributes of the 900 except that it incorporates an extended memory capacity of 8K bytes, according to Qantel.

Stand-Alone or in Net

The 1400 is said to handle all of the computing requirements of small to medium-sized businesses and to function as a stand-alone host or satellite processor in a distributed DP network. The 1400 features a business-oriented CPU, 16K bytes of user-dedicated main memory, two video displays, a random-access disk drive with a storage capacity of 25M characters, a 300 line/min printer; a 45 in./sec magnetic tape unit and built-in expansion space.

The Business Executive System for Time-Sharing (Best) support the 210, 900, 950 and 1400.

When a file is created, Best assigns a small disk area for its data. As records are added, the file expands automatically; and when records are deleted, unused disk area is returned to a pool for reuse, the firm maintained.

Dynamic storage allocation relieves programmers of tedious mapping and remapping disk storage areas to accommodate changing user requirements, the firm continued.

Qicbasic Language

Also available with these models is Qicbasic, a business programming language described as similar to the well-known Basic developed at Dartmouth College. Qantel said Qicbasic has more sophisticated file handling and printing capabilities than conventional Basic and was designed for business applications.

A series of Qantel-developed and supported applications program modules is available for installation with these models on an as-is basis. The series includes the following modules; order entry, purchase orders, payroll, inventory management, sales statistics, accounts receivable, invoicing, accounts payable and general ledger, the firm said.

Also available is Report Generator, a conversational inquiry language. Qantel said this language can be used by businessmen with little or no programming experience through simple question-and-answer dialogue. The Report Generator user can specify data file for use, information to be printed, the criteria by which to select items for printing, the order in which to print the items, items that contribute to report totals and the report title.

Qantel's Program Generator also addresses the 210, 900, 950 and 1400. The feature is said to lead the systems designer through a simple series of steps to create an overview of the system and then automatically generate complete Qicbasic programs to perform tasks as each element of the system design is defined in more detail.

Qantel is at 3525 Breakwater Ave., Hayward, Calif. 94545.

Perkin-Elmer Corp.

ANAHEIM, Calif. — Perkin-Elmer Corp. will show a variety of products in Booth 2430.

The firm will exhibit its Interdata business systems, the Pack system, the Owl 1200 editing terminal, the Pussycat 650 CRT page printer with graphics, a Wangco 14 tape drive, a Model 82 microfloppy, a Model 76 standard floppy and other products.

Interdata 700

The Interdata Business System was designed around the 32-bit minicomputers of Perkin-Elmer's Interdata division. The Interdata Transaction Controller (ITC) lets users develop, implement and maintain on-line transaction processing systems, the firm claimed, noting that ITC is Cobol-compatible with interactive screen formatting and on-line screen form testing capabilities.

The Interdata Pack system is available in 16- or 32-bit configurations. This is a packaged system for use immediately upon installation, providing the user with the ability to expand or tailor the system to his particular environment, the firm said.

Perkin-Elmer's Owl and Pussycat CPUs and the firm's Model 1100 interactive CRT terminal handle up to six major European language sets, such as French and Cyrillic, including accent marks, symbols and character configurations, the firm continued.

The Pussycat CRT page printer reportedly outputs an 80-column by 24-line page at the rate of 100 char./sec with its sideway printing fixed heads. Available with double buffering, the Pussycat can accept output from the unbuffered printer ports.

Perkin-Elmer's Smart Connection, consisting of a CRT and Pussycat printer, is aimed at potential users of Decwriter-type equipment.

The Model 14 125 in./sec magnetic tape drive from Perkin-Elmer's Wangco division features low power consumption and gentle tape handling and is designed for easy use and maintenance, the firm claimed. The Model 14 includes automatic loading and threading with IBM Easyload cartridges.

The Model 82 microfloppy disk drive offers a single drive configuration, optional extra track, double-density and double-sided recording. Positive loading interlocks are said to provide extra protection against diskette damage.

Perkin-Elmer's Data Systems Group is located at 106 Apple St., Tinton Falls, N.J. 07724.

Hazeltine's done it!

Seeing is believing.
Booth 2237, NCC.

Hazeltine

Minis at NCC

Decision Data Computer Corp.

ANAHEIM, Calif. — The Decision Data Computer Corp. System/4, introduced last fall, will be shown in Booth 1635. This appearance will be the first public demonstration of the computer on the West Coast.

The System/4 is a microprocessor-based business system that offers concurrent batch and interactive operations, RPG-II and tutorial processing. The I/O devices available include disk, IBM-compatible diskette, serial and line printers, data recorders, CRT workstations and communications equipment, the company said.

Other products Decision Data will display for the first time on the West Coast are the Model 3240 printer terminal and 6540 serial printer, which were introduced at the same time as the System/4. The 3240 terminal is being marketed as a time-sharing terminal, system console or console/output printer for minicomputers or small business systems.

The CS 780 data communications terminal will also be shown. According to the company, the unit was designed to emulate the IBM 2780 and combines basic batch terminal capabilities with card data entry to produce a "workstation" effect that includes keypunching, verifying, card reading, punching and interpreting and line printing at rates up to 900 line/min.

Decision Data's display will also include demonstrations of its line printers, which provide IBM System/3 and 360 and 370 users with printing at rates up to 1,500 line/min.

Purchase prices on the System/4 range from $19,305 to $80,000 with monthly lease rates fraom $680 to $2,770. The purchase prices on the 3240/6540 range from $2,395 to $2,850 with monthly lease rates from $78 to $125.

The CS 780 starts at $14,320 to $36,790 with monthly lease rates from $482 to $1,471. The 6600 series printers range in price from $9,000 to $41,175 with monthly lease rates from $290 to $1,675.

Monthly rates include maintenance service, the company said from 100 Witmer Road, Horsham, Pa. 19044.

Mostek Corp.

ANAHEIM, Calif. — Mostek Corp. will introduce three add-on memory systems for Digital Equipment Corp. and Data General Corp. minis in Booth 1531.

These will include a 128-word 16/21 bit add-on memory system for DG's Eclipse, which will cost $4,800 for a 32K by 16 single card system with OEM discounts available. Capacity options are 8K, 16K, 32K, 64K and 128K words by 16 bits, Mostek said.

Also introduced will be an upgraded DEC PDP-11 add-on memory system designated the MK 8011. The series will feature a write access time of 150 nsec, plus optional on-board parity generation and checking, the firm said.

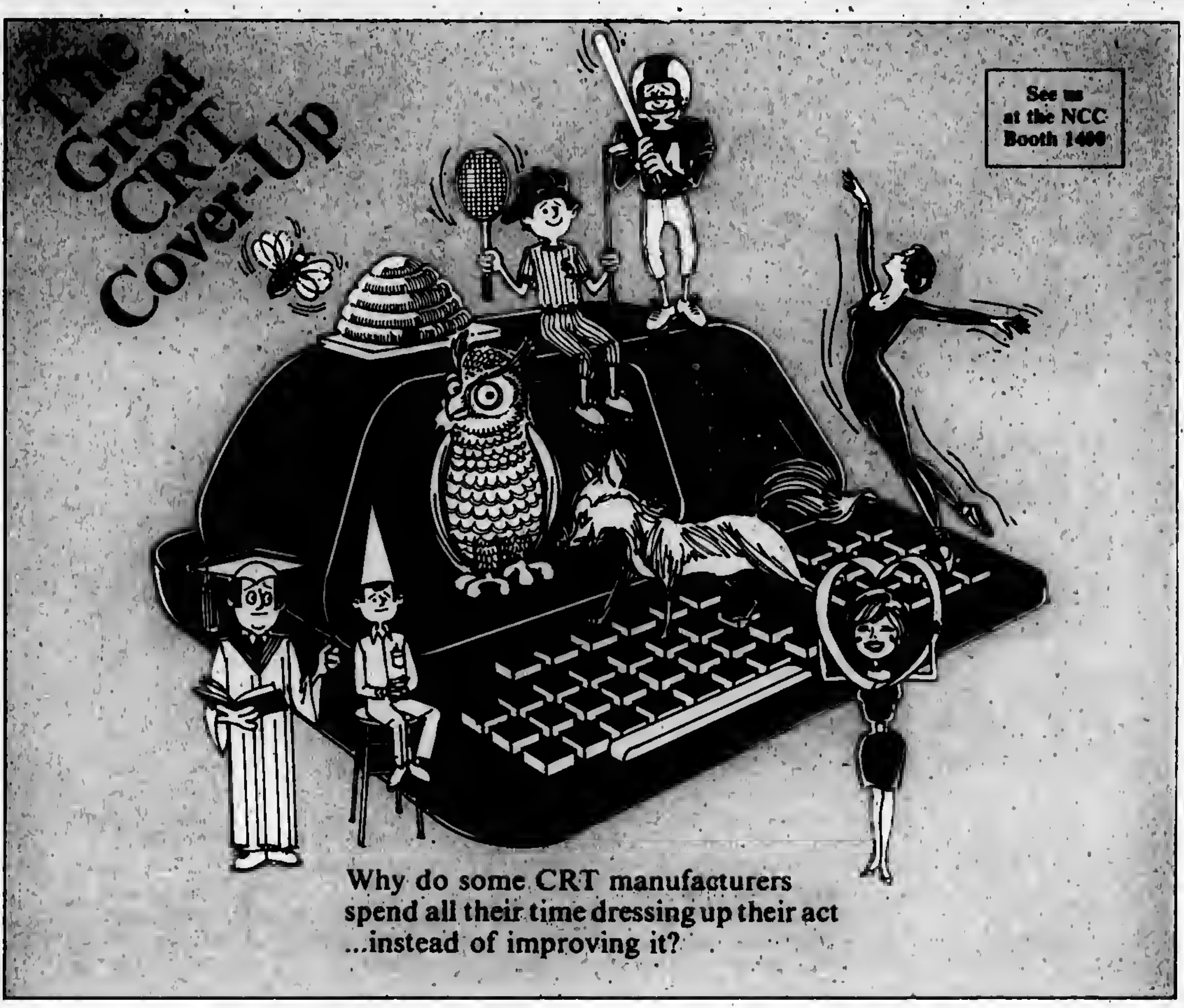
The read access time is 350 nsec and cycle time is 650 nsec. The MK 8011 offers capacities of 16K, 32K or 64K by 18 bits. It will be priced at $4,300 for a 64K by 18 single-card system.

Mostek will also announce its LSI-11/2 add-on memory system, the MK 8005.

The MK 8005 offers capacities of 8K, 16K, 24K or 32K by 16 bits on a single memory card measuring 9 in. by 5.2 in. It also features internal distributed refresh, a battery backup provision and address DIP switch for assigning starting addresses.

Price for a 32K by 16 single card system will be $1,690 with OEM discounts available.

Mostek is located at 1215 W. Crosby Road, Carrolton, Texas 75006.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Minis at NCC

Prime Computer, Inc.

ANAHEIM, Calif. — Prime Computer, Inc. will be demonstrating what it claims to be the "largest minicomputer system ever shown at the National Computer Conference" — a Prime 500 with 8M bytes of main memory — in Booth 1548.

The system will be configured with 8M bytes of error-correcting MOS main memory, 600M bytes of disk storage and will support one 600 line/-min printer, one 75 in./sec tape drive and up to 16 concurrent users. The system is valued at $1.5 million.

Demonstrating applications will be Marshall & Swift, Inc. of Los Angeles; Day & Zimmerman of Philadelphia; Marc Analysis, Inc. of Palo Alto, Calif.; Management Decision Systems, Inc. of Weston, Mass., and Imlac Corp. of Needham, Mass.

Marshall & Swift will demonstrate an interactive real estate appraisal program. By analyzing geographical location, building structure and other variables, the program will estimate the replacement value of a building in today's market.

Day & Zimmerman, consulting engineers, will run a railroad route blocking program that gives the best use of track mileage for various freight transport between two points.

Marc Analysis, an engineering consulting firm, will demonstrate its Marc system, an engineering structural analysis program, as well as Mentat, an interactive graphic software program for engineers.

Prime 500

Management Decision Systems will show its Express system, an interactive information analysis system used in sales and marketing analyses and modeling and for financial planning and reporting applications.

Imlac Corp. will show an interactive graphic software program developed at Rensselaer Polytechnical Institute for educational engineering applications.

Prime is located at 40 Walnut St., Wellesley Hills, Mass. 02181.

Computer Automation, Inc.

ANAHEIM, Calif. — Computer Automation, Inc. will exhibit an automated inspection station and a hardware/software office desk system in Booth 2436.

The Mica 5000 tester system features ease of use, according to the firm. It incorporates a Naked Mini 16-bit processor, 32K words of memory, integrated alphanumeric CRT display, programming keyboard, operator's console, repair message printer, 256K-byte floppy disk and system software, the company said.

The basic Mica 5000 is priced at $29,500. Expandable to a capacity of 1,408 pins in 64-pin increments, a 128-pin system sells for $37,900, and a 640-pin system sells for $63,500.

CA's other offering, the Basic Desk, is configurable from a minimum single-terminal, dual-floppy disk system to a four-terminal version supporting multiple floppy and 10M-byte disks, line printer and other peripherals, the firm said.

The standard version of Basic Desk is $11,700 in quantities of 25 and $9,750 in quantities of 100 with 90-day delivery. CA is located at 18651 Von Karman, Irvine, Calif. 92713.

Does 35 day delivery make Centronics' line printer family the best? **NO.** Centronics 6000 series band printers have much more to offer than just fast delivery; 85% parts commonality and technical features like an operator-changeable print band with a choice of several character sets and microprocessor control, for example. Four models—providing superior print quality and a range of print speeds—75, 150, 300 and 600 lpm, plus design simplicity that provides exceptional reliability and makes the 6000 series a true family of low priced, fully formed character line printers.

And, as with Centronics' matrix printers and teleprinters, the 6000 series is backed by the largest worldwide service organization of any printer company, and Centronics' reputation for reliability.

Write or call for complete 6000 series information. Centronics Data Computer Corp., Hudson, NH 03051, Tel. (603) 883-0111.

CENTRONICS® PRINTERS
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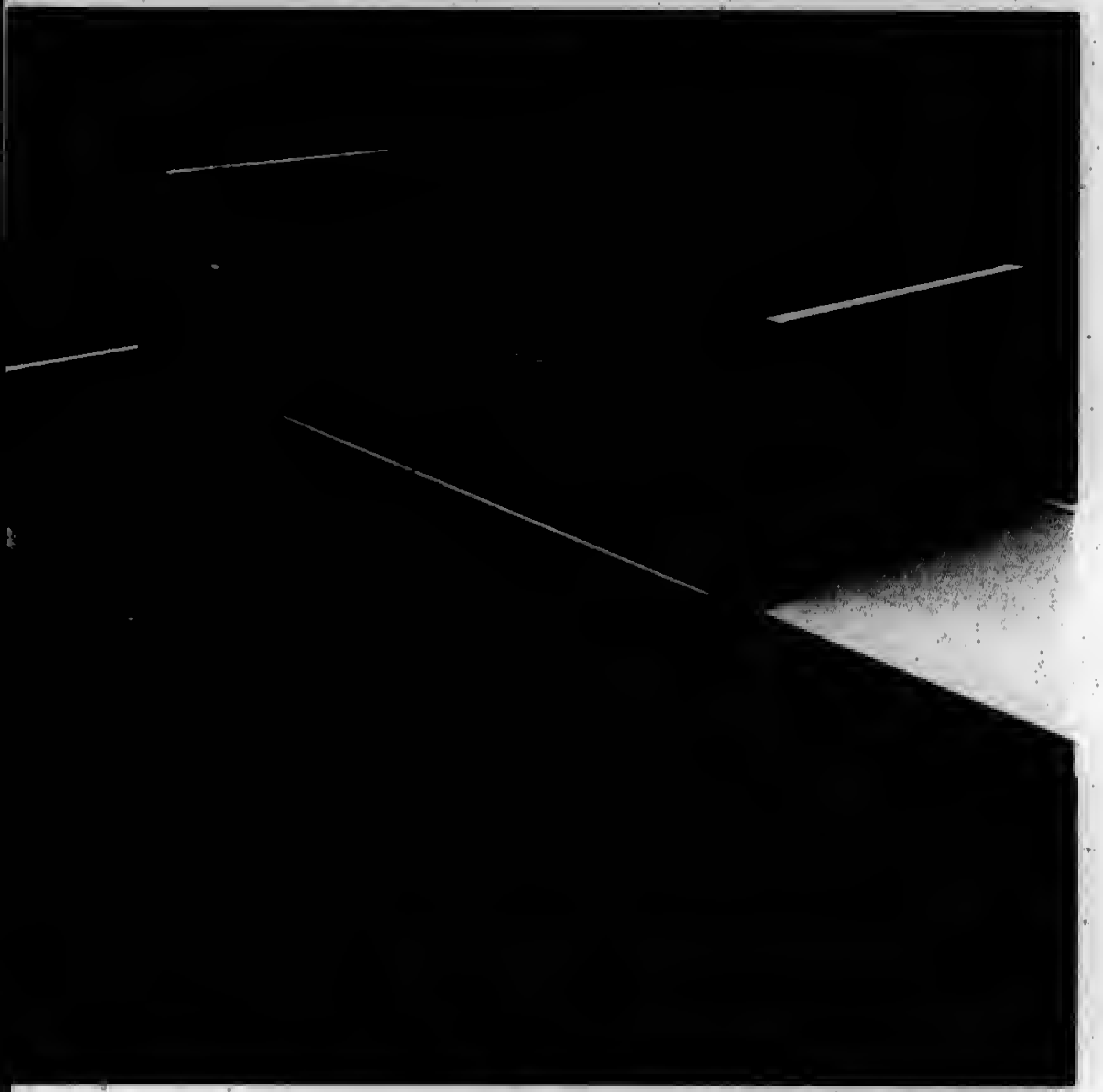
See us at NCC Booth 1447

Watch this Kodak laser printer print a 150-page report.



The Kodak laser printer prints at the rate of more than 2½ computer pages per second.

So it can zap out a 150-page report in a shade under one minute. Or a 1000-page report in about 6 minutes.

Because it prints on microfilm—not paper—the Kodak printer condenses up to 270 bulky computer pages on a single 105 x 148-mm fiche. And it does it in under 2 minutes.

That means a Kodak printer can print a 1000-page report at a reduction ratio of 48:1 on just 4 microfiche. And each fiche is produced, titled, and indexed, ready for fast retrieval.

How does paper stack up against fiche? Using current prices,* 1000 pages of computer paper would cost $3.50, while 4 fiche would cost just 54¢. So compared with paper, not only is printing on film demonstrably faster, it's also thousands of dollars a month cheaper.

Want to see that again?

Why not call your Kodak representative today for a demonstration of the Kodak Komstar 100, 200, or 300 microimage processor. But hurry. Every day you wait costs you money.

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Kodak

Kodak Komstar microimage processors.
The printers that print without paper.

*Prices vary with geographic location and grade of paper purchased.

Minis at NCC

Datum, Inc.

ANAHEIM, Calif. — A family of IBM Series/1 subsystems heads the list of products to be shown by Datum, Inc. in Booth 1647.

Users of Series/1 models 3 or 5 will be offered a storage module disk system, a high-speed line printer system and a magnetic tape system, all to be demonstrated in their basic configurations, according to a spokesman for the firm.

Datum 7- or 9-track Series/1 magnetic tape systems feature recording densities of 200 bit/in. through 1,600 bit/in. PE. Speeds of 12.5 through 125 in./sec are available, and up to four magnetic tape units can be attached to each system, the firm said.

The storage module disk system provides 40M bytes to 300M bytes of removable storage. The system can reportedly accommodate from one to four disk drives in a single- or dual-processor environment.

Software Drivers

Software drivers provided for both tape and disk systems are software-compatible with IBM Series/1 operating systems.

Datum provides 300-, 600- and 900 line/min printer systems, which operate without software modifications, the firm said. The line printer controller has a self-test feature.

Datum will show its 45020 disk system with single-board design, which occupies one slot.

The 45020 is software- and media-transparent to Digital Equipment Corp.'s RK11-RK05 system, according to the firm.

The 45020 can mix or match drive capacities at speeds of 1,500 or 2,400 rev/min, the firm said.

It controls up to four 2.5M-byte, 5M-byte or 10M-byte disk drives.

Also to be shown is the TM 11 tape controller, which provides an interface between the DEC PDP-11 and any industry-standard magnetic tape drive, the firm said. All PE and NRZ densities are software-selectable. As many as four industry-standard tape drives may be connected, Datum said.

Datum, Inc. is located at 1363 S. State College Blvd., Anaheim, Calif. 92806.

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Real productivity is a function of time and performance controls. The Panasonic Data Entry Terminal helps by providing simplified, immediate, error-free transmission of data by any worker, at any station, directly to the computer.

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And the Panasonic Data Entry Terminal makes source data acquisition a practicality almost anywhere. Designed for reliability, it combines a unique optical punched badge reader with advanced CMOS IC's to eliminate the need for any moving parts. The compact, lightweight enclosure is molded of high-impact material which stands up to tough industrial environments. Priced within reach, the basic unit is available with a variety of options, so you buy only the data collection capability you need.

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For added economy, any number of Panasonic Data Entry Terminals can be used on a single line without the need for an expensive multiplexer or other line controlling device.

For more information on the system that gives you tight time and cost control to improve productivity, write or call Panasonic Industrial Sales Division, 2960 Hart Drive, Franklin Park, Illinois 60131. (312) 451-1340.

Put a Panasonic Data Entry Terminal into your payroll recording system and watch your productivity improve.

See us at NCC Booth 2616 & 2618

Minis at NCC

Tab Products Co.

ANAHEIM, Calif. — Tab Products Co. will be demonstrating two systems and several enhancements recently added to its product line, in addition to two new products currently being offered by its media storage and handling lines in Booth 1411.

Tab's Machine Products Division will be demonstrating two new systems and enhancements designed to expand the System 700 and System 501 electronic card processor. First, the Tab/-Terminus Financial Control and Accounting System offers financial operations in general ledger, payroll accounts, accounts payable and accounts receivable.

The system is marketed with complete software and is implemented on a Tab Series 700 system, according to the company.

Tab will also be showing its inventory control system.

System 700

Tab's System 700 with printer option offers diskette data entry with a printout capability in one package for monitoring inventories. This system combines the electronic filing capacity of diskettes with the ability to print forms and generate reports, according to the company.

The System 700 tape converter will also be demonstrated. This enhancement combines data entry with a tape converter in one package and is designed to permit conversion of data on flexible diskettes to reels of magnetic tape in less than three minutes, the company said. This system attaches to Tab's 701 or 702 unit and employs the data entry station's diskette drives, electronics, screen display and keyboard-to-control converter operations.

The System 700 offers an automatic pooler option that sequentially feeds up to 20 diskettes to the drive for automatic conversion to tape or transmission over a communications interface. This device loads diskettes without operator intervention until the series is complete. The load and eject pooling process takes less than 20 seconds, the company claimed.

Charge-Out System

Tab's Machine Products Division will also demonstrate its electronic charge-out system, which offers access to any record location. The system consists of a central charge-out station and any number of remote stations, which can be placed in separate departments, the company said.

Tab's Computer Accessory Division will be showing the Model 2464 mini burster, which will handle bursting requirements in small to medium-size businesses.

The 2464 features a slide safety cover with interlock switch, variable speeds to 200 feet/min and a jam detector that automatically stops bursting activity if forms do not stack properly, according to the company.

Tab's recently redesigned multipurpose and data media cabinets will also be shown with the following enhancements: slotted side panels in each compartment to simplify installation of accessories that clip in to the cabinet, rollouts featuring an interlock device to ensure a single rollout, and a redesigned ganglock to ensure that the locking mechanism cannot be overridden, a spokesman for the company added.

Tab is at 2690 Hanover St., Palo Alto, Calif. 94304.

Watch the fiche fly at NCC this year.

If you want to see the latest in high-speed, high resolution COM systems, fly by booth 2408.

That's where you'll find the new CalComp Model 1680 Graphics COM System. Perched, poised and ready to go.

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CALCOMP
California Computer Products, Inc.

NCC it all at booth 2408.

Minis at NCC

Rianda Electronics, Inc.

ANAHEIM, Calif. — Rianda Electronics, Ltd. will feature its Model 25XX storage module device disk controller at Booth 4445.

The 25XX is compatible with Data General Corp. 4231 software or Media III software, staggered or sequential sectoring, the company said.

Standard features of the $4,500 controller include automatic address verification before any read or write operation and full sector buffering, according to the company. Drive interfaces are available for Control Data Corp., California Computer Products, Inc., Ampex, Microdata and Okidata devices.

Rianda will also be displaying its Model 28XX which offers 64K-byte memory, four asynchronous communication channels, a parallel line printer interface, a real-time clock and a Teletype port in one 15- by 15-in. printed circuit board, according to the company.

When fully configured, the Model 28XX occupies one slot in a Data General Nova 3 chassis. The unit is supplied with cable set for the communication channels, teletypewriter and line printer, the company said.

Software Compatibility

Communications channels are software-compatible with the DG 4060 asynchronous multiplexer; the line printer is software-compatible with the DG 4034/4193 printer controller; the real-time clock and teletypewriter are software-compatible with the DG 4008 and 4010, respectively, the company said.

The asynchronous multiplexer permits transmission rate selection, word length selection, parity determination and RS-232-C or 20mA I/O on a per-channel basis, the company said.

The line printer controller will interface with Dataproducts, Centronics, Printronix, Tally or equivalent line printers, according to the firm.

The price for the fully configured unit, including cable set and documentation, is $4,500. Rianda Electronics is at 2535 Via Palma, Anaheim, Calif. 92801.

Dynus, Inc.

ANAHEIM, Calif. — Dynus, Inc., in Booth 3211, will display both a magnetic tape controller compatible with Digital Equipment Corp.'s LSI-11 and a moving-head disk controller for users of DEC's PDP-11 system.

The DI-CO4 tape controller plugs directly into the LSI-11 standard quad or dual wide backplane assemblies, the firm said.

The unit emulates the DEC TM-11/TU10 reel-to-reel magnetic tape system providing for software and diagnostic compatibility with existing systems, it added.

The device uses DEC's circuit drivers and receivers and has a 128K-word address range for upward compatibility with future LSI-11s, a spokesman noted.

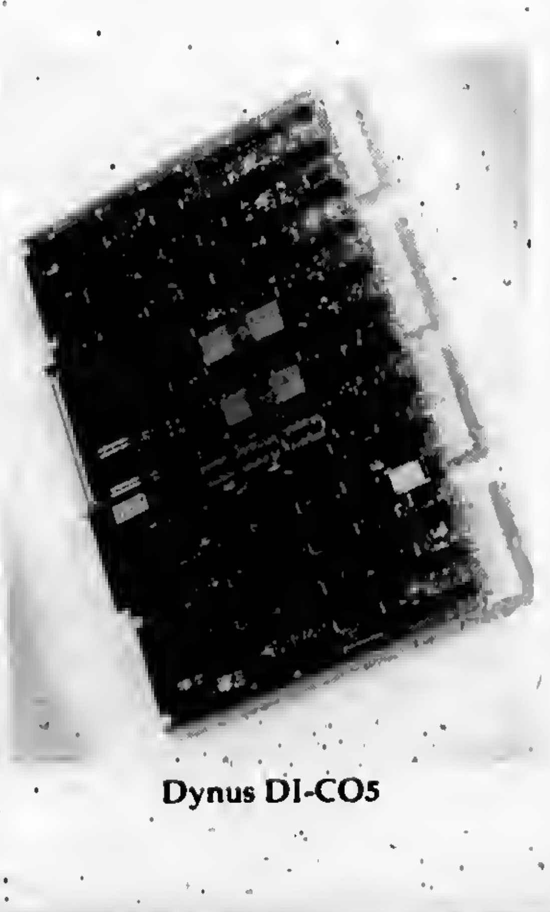
The DI-CO4 uses a bipolar microprocessor, has 2-byte on-board storage for direct memory access (DMA) latency and includes a 7- or 9-track NRZI industry standard interface. It can support up to four drives and has a data transfer rate of 33 microsec/word.

Optional equipment includes an operator control panel, integral power supply, power sequencing, line clock, card cage assembly and guides and eight quad slots wired for the Q-bus, the firm pointed out.

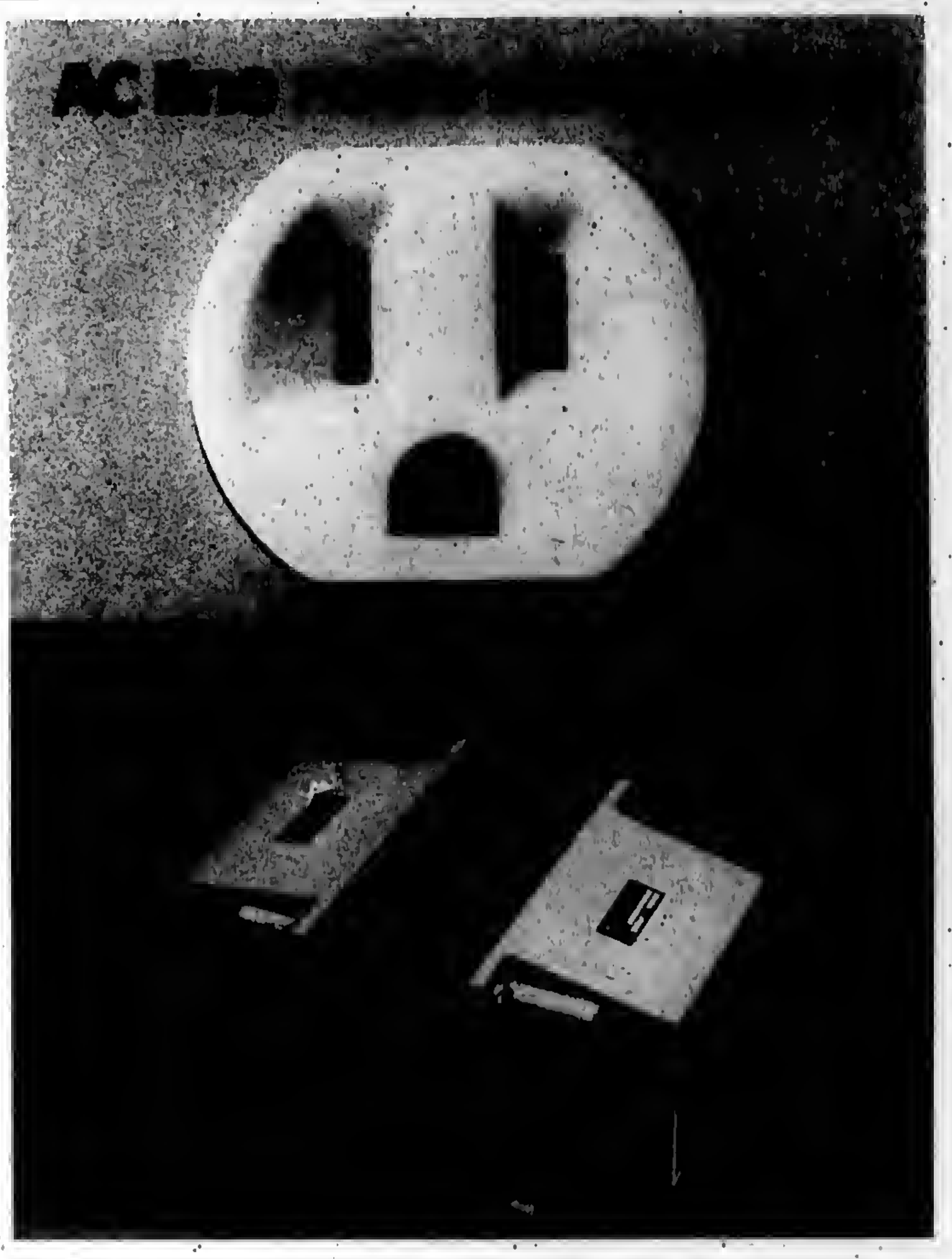
The DI-CO5 disk controller for the PDP-11 emulates the RK-11 disk system, providing for diagnostics and software compatibility with existing systems, the spokesman continued. Operating characteristics include an on-line storage capacity of up to 20M bytes with disk drives functioning at 1,500- to 2,400 rev/min with 100- to 200 track/in.

The units have a DMA transfer rate of 6.4 microsec/word, an overlap seek capability and record at a double frequency mode, the spokesman for the firm added.

Information on both controllers is available from Dynus, Inc. at 3198 G Airport Loop Drive, Costa Mesa, Calif. 92626.



Dynus DI-CO5



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See us at NCC, Booths 1209/1211.

Micros at NCC

Mupro Co. Systems Division

ANAHEIM, Calif. — Two product lines from the Mupro Co. Systems Division will be showcased at Booth 4038.

The complete line of Intel Corp. Multibus-compatible memory boards will be on display. The boards are available in sizes of 4K, 8K, 12K, 16K, 32K, 48K and 64K bytes.

Boards under 16K are available with 4K dynamic random-access memory (RAM), while boards with more than 16K are available with 16K RAMs.

The 16K boards are available with both sizes of RAMs, and all boards are available in three configurations — with no error detection, with single-bit parity error detection and with double-bit error detection.

Error-correcting configurations are equipped with diagnostic indicators to pinpoint the memory chip in which any correctable error occurs, according to the company.

Features of the boards include on-board refresh on the dynamic RAM memory, provision for external refresh synchronization and battery backup capability.

Prices for the boards range from $455 for a 4K board without error correction to $2,750 for a 64K board with error detection and correction.

Also to be shown is an on-line program debugger for the multiuser Mupro-80DOS microprocessor development system.

Called Debug, the debugger operates in conjunction with Mupro's Multiuser/Multi-task (Mute) Executive to increase efficiency in writing and debugging programs, the company said. Debug provides interuser protection in multiuser configurations by allowing each user to prohibit access by his program to areas outside its memory boundaries, a spokesman for the company said.

Two breakpoint capabilities are offered by the system: fast breakpoints, which allow a maximum of 10 breakpoints at full program speed, and software emulation breakpoints.

The display/modification features of Debug allow the user to access any CPU register or memory location and display the contents in hexadecimal, decimal, octal, binary or disassembled source code. The user is relieved of address calculation by relocation registers that allow automatic offsets for programs and data, according to the spokesman.

The package is said to operate on any Mupro disk system with Mute Release 2.1 for a cost of $75 to current customers. The company is located at 424 Oakmead Parkway, Sunnyvale, Calif. 94086.

Processor Technology

ANAHEIM, Calif. — Visitors at Booth 2231 will be able to view Processor Technology Corp.'s Sol System IV, which includes the company's Sol-20 mainframe with 49K 8-bit words of random-access memory (RAM), a Helios II Model 4 disk memory system, PTDOS disk operating system, Extended Disk Basic, a CRT monitor and documentation.

Total mass storage capability on four formatted disks is 1.5M bytes, the vendor said.

The PTDOS disk operating system offers functions including editors, assembler, device-independent files and random indexed files, a spokesman added.

The CRT display can be addressed randomly to any position on the screen so users can write forms control procedures.

In addition to Extended Basic, Processor Technology is offering the Disk Fortran and Disk Pilot languages as options.

The cost of a Sol System IV, fully assembled and factory tested, is $7,995. Processor Technology is located at 7100 Johnson Industrlal Drive, Pleasanton, Calif. 94566.

Get a short course on self-control at NCC this year.

If you want to know where plotter controllers are headed, head for booth 2408.

We guarantee it'll be an education.

For starters, you'll see CalComp's brand-new Model 909 Controller. It's a stand-out when it comes to on-line or remote applications and goes our old Model 906 one better.

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NCC it all at booth 2408.

OEMs at NCC

Qantex Division

ANAHEIM, Calif. — Booth 2257 will be used to show a tape transport for 3M Co.'s DC100A miniature data cartridge.

The Qantex Division of North Atlantic Industries, Inc. will exhibit its Model 200 Minidrive transport designed for OEM data storage systems. Minidrive can store up to 772,000 bytes of unformatted data on the 3M cartridge, while measuring 3- by 4- by 4-1/8-in. with the cartridge in place, the firm said.

Minidrive is available in different configurations. The simplest version provides single-track recording at 800 bit/in. data density to yield an unformatted capacity of 168,000 bytes and a 24 bit/sec data transfer rate.

A dual-track version is also available, providing 772,000 bytes on two tracks at 1,600 bit/in. density and a transfer rate of 48 bit/sec. Further, the transport can be ordered with dual gap heads, permitting read-after-write capability for data validation during recording, the firm added.

Minidrive is applicable to such "smart" analytical instruments as mass spectrometers, spectrum analyzers and blood analyzers. The module can also be built directly into process control and data acquisition systems, the firm said.

Textile Field

In the textile field, knitting machines can choreograph needle movement via data read from the Minidrive cartridge, while looms weave patterns set by similarly taped routines, the firm said.

Minidrive was designed as the key module in a vertical array of components for OEM tape memory applications. The transport is offered as a "bare bones" unit incorporating only "intimate" electronics for firms preferring to design and manufacture their own controller, formatter, power supply and interface.

Qantex can supply the transport plus an electronics package to manufacturers who want to build a memroy into their final equipment, the firm said, adding it will help the do-it-yourself OEM customer by making available certain circuit designs and production drawings.

The firm can supply Minidrive with a direct interface to the Intel Corp. 8080 and Motorola 6800 microprocessors. The Minidrive is also said to be upwardly compatible with the Qantex Model 650 "big cartridge" transports and electronics.

Minidrive also interfaces to the Digital Equipment Corp. PDP-11; Data General, Rolm, Interdata and Altair computers, according to the firm at 200 Terminal Drive, Plainview, N.Y. 11803.

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CW-T-5

Epson America, Inc.

ANAHEIM, Calif. — Epson America, Inc. will introduce the 80-column Model 3110 dot matrix printer mechanism featuring a 100 million-character dot head at Booth 2249.

Model 3110

The mechanism offers three times the present head life of similar mechanisms, according to the company and sells for less than $250 in quantities of 500.

The life of the head comes from the mechanism's alignment and pin movement, which uses techniques developed by Shinshu Seiko Co., Ltd., a spokesman for the firm added.

The Model 3110 prints 80 columns at 150 char./sec, with a 5 by 7 dot matrix character and 1/10 column spacing for small business and home computer use.

The unit requires a 24V/30-42V/5V dc power supply provided by the OEM plus case, control board and interface electronics.

The 3110 is 95mm high, 335mm wide and 185mm deep; its weight is 6.6 lbs, the firm said.

A 40-column version, the Model 512, is currently available for $155 in quantitites of 500.

Epson America is at 23844 Hawthorne Blvd., Torrance, Calif. 90505.

BASF Systems

ANAHEIM, Calif. — BASF Systems will be at Booth 1249 with several OEM disk media products, among which will be 8-in. oxide coated disk for use in small, high-density disk drives.

A "superdisk" version for use in 3350 applications, an electrostatically plated disk with a high bit density, a two-sided version of the firm's minidisk drive and other product enhancements will also be shown by the firm.

A minifloppy disk for 5.25-in. drives and double-sided and double-density versions of the firm's 8-in. floppy disks will be included in the display.

Information and specifications concerning BASF's disk media products can be obtained from the firm at Crosby Drive, Bedford, Mass. 01730.

Precision Handling Devices

ANAHEIM, Calif. — In Booth 4016, Precision Handling Devices, Inc. will introduce a 90° tractor designed for low-profile printers.

The Model 1040-90 feeds forms along a 90° path, providing the same paper path inherent to pinwheel systems, the firm said. This feature overcomes the misregistration of multipart forms problem encountered with sprocket-fed pinwheel paper feeding devices, according to the company.

Guide Bar Optional

For continuous guiding of stiff, multipart cardstock (at slew speeds up to 30 in./sec), an optional guide bar is available.

Price of the product is $1.25 each in addition to standard tractor prices. The firm is located at 63 S. Main St., Assonet, Mass. 02702.

OEMs at NCC

EMM Memory Products Division

ANAHEIM, Calif. — A 1M-byte random-access memory (RAM) module and a 128K by 22 bit semiconductor memory system will be two of the products shown by Electronic Memory & Magnetics Corp.'s (EMM) Memory Products Division in Booth 1327.

The memory module is configured with an additional 64K-byte capacity that allows for implementation of various error-checking methods while reportedly maintaining a 1M-byte capacity for data.

The module is packaged on a single pluggable printed circuit card and the unit's chassis can accommodate up to four 1M-byte modules, two I/O cards and a power supply, the firm noted.

The module operates at 2 msec in the read/restore and clear/write modes with an access time of 1.2 msec. The +5V output of the power supply also has an excess capacity to power interface I/O logic, the firm added.

The Microram 3500 semiconductor memory system has such on-card options as single-bit error correction and multiple-bit error detection and word or byte parity generation and checking, the spokesman stated. The card also utilizes page and byte moding, error stop and a fault-location LED display which operates in conjunction with the error correction/detection feature.

The system, when operated in a page mode, will detect page boundaries; with a match condition, it can attain a cycle time of 270 nsec, the firm claimed. A no-match condition would yield a 450 nsec cycle time and non-page mode cycles are completed within 450 nsec.

The system was designed to be plugged into the firm's Micromemory 3000 chassis or used independently, requiring only a power supply. The unit operates on 5- and 12 Vdc, but can function with 5- and 15 Vdc as an alternative, the firm explained.

EMM will also have other memory systems on display at its booth. Among them will be the Model 3800 8K by 16-bit core memory system; the Megabyte memory card; the Micromemory 3003QD 32K RAM system; the 7711 semiconductor add-on memory; and the 32K 7501 memory.

The memory module and Micromemory 3500 are priced at .1 cent/bit and $4,995, respectively, in OEM quantities from the company at 12621 Chadron Ave., Hawthorne, Calif. 91250.

Peripheral Dynamics, Inc.

ANAHEIM, Calif. — Three badge and card readers, designed for a variety of uses, will be exhibited in Booth 4149 by Peripheral Dynamics, Inc.

The CB3 series readers, designed for stand-alone use or mounting in a data collection terminal, accept both standard and mark sense tab cards, according to the company. Type 3 plastic badges are also accepted, and media can be intermixed, it added.

The B50 series badge readers, designed for manual operation and self-contained, will also be shown. Devices in this series can also be used stand-alone or mounted in a data collection terminal.

The series was designed to handle Type 5 badges with or without a plastic loop attached and features a latch mechanism to engage with the reference hole only when the badge is correctly oriented.

Finally, the company will demonstrate its PDI 2022 series of card readers, rated nominally at 200 card/-min. Designed to fill the gap between manually fed readers and medium-speed automatic readers, the devices can read punched hole cards in 80-column format or mark sense cards in 40- or 80-column format, with or without clock track.

Peripheral Dynamics is at 1850 Gravers Road, Norristown, Pa. 19401.

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CALCOMP
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NCC it all at booth 2408.

OEMs at NCC

Persci, Inc.

ANAHEIM, Calif. — A Z-80 based, double-density diskette drive controller featuring S-100 bus compatibility will be demonstrated by Persci, Inc. in Booth 1239.

Also to be demonstrated will be the company's "four-headed" flexible disk drive.

The micro-based controller, called the Model 1170, is capable of managing either single- or double-density recording on a maximum of 32 diskette sides. It has a data capacity of 16M bytes, can communicate by file name and can assume housekeeping functions usually performed by the CPU, according to the company.

File management functions possible on the system include initialization, allocation and deallocation of diskette space, error detection and retry and creation, deletion, renaming and copying of files.

The system is also capable of diagnostic testing, a spokesman added. It was designed as an extension of the company's Model 1070 single-density controller, which means no software changes are required, he said.

The 1170 will support up to eight of the Model 299 double-density, dual-headed, dual-diskette drives at one time, according to a spokesman, or various combinations of the company's models 299 and 277 drives. Prices start at $800, in OEM quatities.

The Persci Model 299 disk drives will also be on exhibit. The Model 299 has a capacity of up to 3.2M bytes of data in the space required by a standard-size floppy drive and can interface with 8080, 6800, and Z-80 systems, as well as minicomputers.

Data on the diskettes can be encoded in single or double density for compatibility with IBM soft-sectored formats or expanded hard- and soft-sectored formats on IBM diskette I, II, IID or equivalent media.

To provide the critical tolerances required by this type of drive, the company uses its own miniaturization of the type of positioner used on large disks, according to the spokesman. This results in an average seek time of 33 msecs.

Error rate is claimed to be 1 in 10^9 for soft errors and 1 in 10^{12} for hard errors, which is an industry standard.

Prices for the four-headed drive start at $1,595 in single-unit quantities. Persci is at 12210 Nebraska Ave., W. Los Angeles, Calif. 90025.

Data Specialties

NORTHBROOK, Ill. — A rack panel-mounted punch system capable of serial or parallel interfacing, concentric spooling and quiet operation, the RP-75, will be on display at Booth 1663.

The punch, manufactured by Data Specialties, Inc., can receive at speeds up to 75 char./sec (asynchronous) or serial configuration speeds of 300-, 600- or 750 bit/sec, according to a spokesman.

The punch mechanism, which the company guarantees to punch a minimum of 1 million feet of paper tape, can also operate on Mylar, Mylar laminates and oiled or unoiled tape with no modification or readjustment.

In addition, the company said the front-mounted supply and take-up spooling eliminate the need for drawer slides. Data Specialties is at 3455 Commercial, Northbrook, Ill. 60062.

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OEMs at NCC

Pertec Computer Corp.

ANAHEIM, Calif. — Pertec Computer Corp.'s Pertec Division will be showing the FD250 and the FD650 floppy disk drives in Booth 2103.

The FD650 is an 8-in, double-headed flexible disk drive capable of recording and reading data on both sides of an IBM or equivalent Diskette 2 or 2D, Pertec said.

The drive also features double-density recording to offer an addressable unformatted storage capacity of 1.6M bytes.

The two-sided diskette drive is capable of double-density operation using MFM encoding. Each drive is equipped with a door lock, and the drive has die-cast construction.

All electronics are on a single printed circuit board. Track-to-track access time is 3 msec, with head load time of 35 msec and track settling time of 15 msec. The user can daisy-chain up to eight drives.

The FD650 is priced at $755 in single quantities.

The FD 250 microfloppy disk drive will also be shown. The drive stores up to 437,500 bytes without operator intervention. Double-density, hard or soft sectoring and write protect are all standard features.

The unit can write and read data on both sides of a diskette, according to the company.

Measuring 3.25 in. in height, 5.75 in. in width and 8 in. in depth, the FD250 weighs 3.2 lbs. Its seek time is 25 msec track-to-track, with head settling time of 10 msec and head loading time of 35 msec.

Recommended recording mode is FM on single-density and MFM on double-density.

The disk drives will be manufactured and marketed on an OEM basis by Pertec Division and will be incorporated into Mits/Altair and Icom products manufactured and marketed by Pertec Computer Corp.'s Microsystems Division, Price for OEM quantities of 100 is $325 per unit.

Pertec is located at 9600 Irondale, Chatsworth, Calif. 91311.

Vertel, Inc.

ANAHEIM, Calif. — A demonstration of Vertel, Inc.'s LC-31 Gameloader Magnetic Card Reader/Encoder will take place in Booth 1856. Both the reader, which is a consumer version of the company's industrial series KB-31 reader/encoder, and the company's Kilobyte magnetic card will be demonstrated.

Gameloader, Kilobyte Card

The Kilobyte card is a 1K byte, 8-bit, four-stripe magnetic card designed for use in the company's readers. It will be demonstrated in conjunction with the company's latest entry in the magnetic card reader/encoder field, the LC-31.

The device is said to provide jitter-free recording and reading, with character load time of 5K byte/min.

Although functionally equivalent to the company's industrial-grade reader/encoder, according to the company, the reader was designed to meet the cost/-volume requirements of the consumer market.

Features of the unit include RS-232, 20mA and byte parallel interfaces, a two-channel read and write type head, and a read/write cycle time of 5 sec/-stripe.

The device will be priced under $40 in quantities over 100,000, the company said from 125 Ellsworth St., Clifton, N.J. 07012.

CalComp beats its own drums at NCC this year.

CalComp has always lead the drum plotter parade at NCC.

But this year, as a visit to booth 2408 will prove, the parade is going in two directions.

First, CalComp proudly introduces the new Model 1012 Drum Plotter.

It's a low-cost, high-speed desk-top drum plotter. It's microprocessor-based.

Second, leading our traditional state-of-the-art march will be the new CalComp Model 1055 Drum Plotter. Demonstrating its unmatched versatility in on-line, remote/time-sharing and off-line applications. And establishing an entirely new set of standards for high-performance drum plotters with a speed of 30 ips, an acceleration ramp of 4Gs and a 10MS pen-down time.

Drum-up superior graphics in record time by marching into booth 2408. Or write for all the graphics details to: CalComp, Dept. MS-3, 2411 W. La Palma Ave., Anaheim, California 92801.

CALCOMP
California Computer Products, Inc.

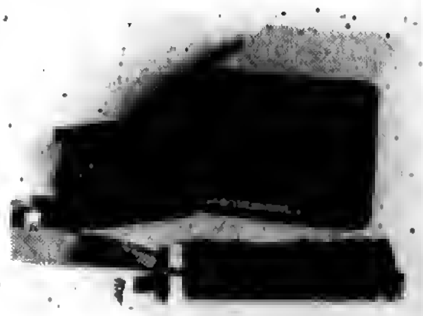
NCC it all at booth 2408.

OEMs at NCC

Micropolis Corp.

ANAHEIM, Calif. — Micropolis Corp. has extended the capacity of 5.25-in. floppy disk susbsystems via double-sided models with formatted file storage of up to nearly 2 million bytes and will display the series in Booth 4443.

The Megafloppy series also features an intelligent controller that facilitates interconnection of four subsystems to a common host interface for a total on-line storage capacity of more than 15M bytes, the firm said.



Models 1015 and 1055

Double-sided versions of the product line will be implemented first on two OEM series — Model 1015 and Model 1055, according to a spokesman for the firm.

The Model 1015 is an unpackaged drive designed for the manufacturer who integrates floppy disk storage into his own system enclosure. A range of storage capacities from 143,000 bytes to 630,000 bytes per drive is available, he added.

Model 1015 customers have the option of using the Micropolis intelligent controller and Group Code Recording (GCR) method to further expand file space up to 946,000 bytes, the firm said.

Offering GCR and a microprocessor-based controller as standard features, the Model 1055 5.25-in. floppy has four soft-sectored formats for each of its 77 tracks, yielding a maximum capacity of 1,892,000 bytes of file space on its double-sided version, the spokesman for the company said.

Add-On Available

An add-on module available for the 1055 is comprised of two read/write heads and two drives, sharing a common controller. The subsystem capacity (formatted) with the module is 3,784,000 bytes, the firm said.

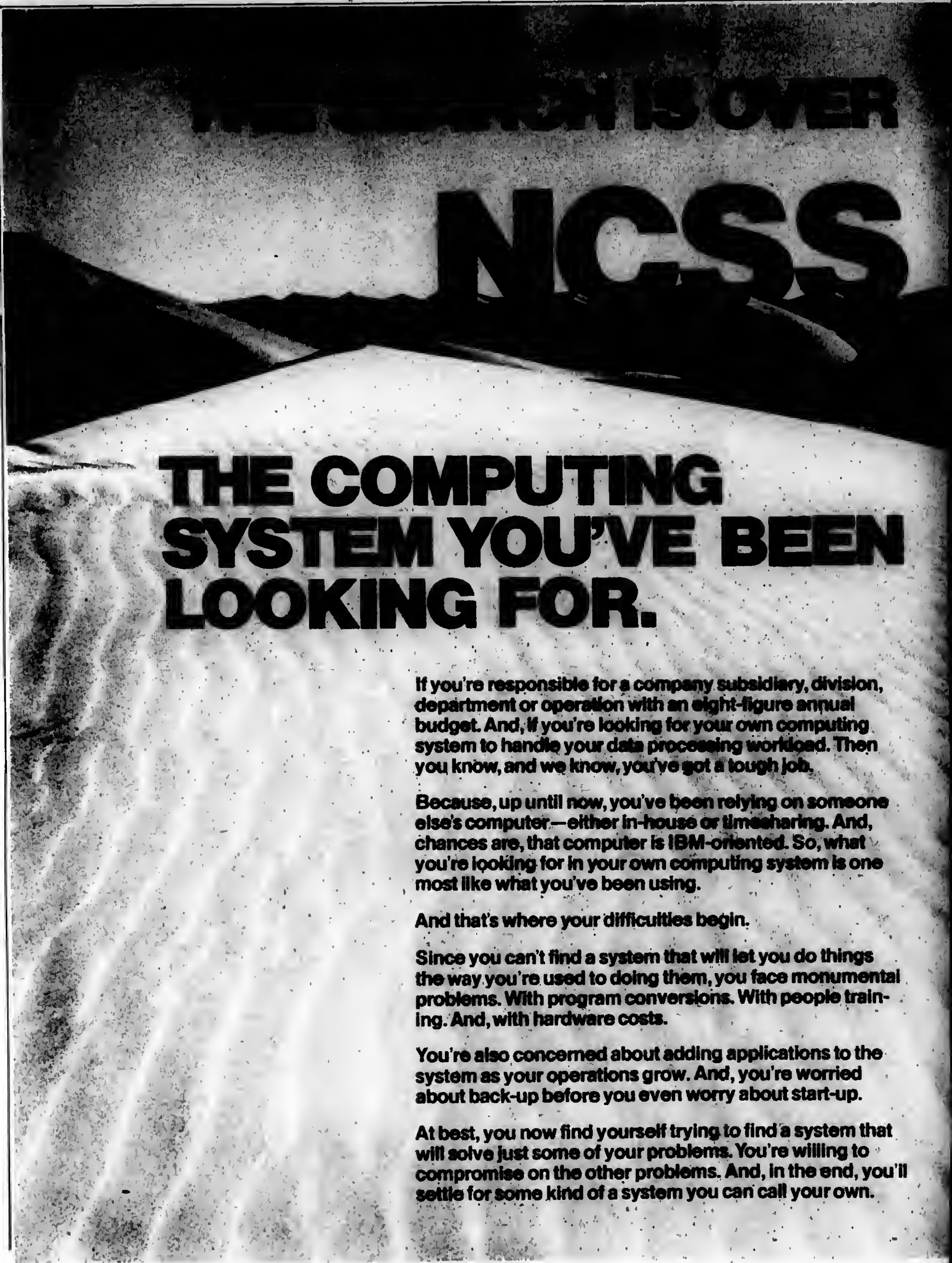
Up to four 1055s, each with an add-on module, can be daisy-chained to a common host for a maximum on-line storage capacity of more than 15M bytes, according to the firm.

Micropolis Corp. is at 7959 Deering Ave., Canoga Park, Calif. 91304.

Accuride

ANAHEIM, Calif. — Accuride, a division of Standard Precision, Inc., is bringing to NCC several ball-bearing slide mechanisms that suspend disk drive units from cabinet enclosures and eliminate screw mountings.

This type of suspension method provides a uniform and consistent movement via linear motion mechanisms, the firm stated from 12311 S. Shoemaker Ave., Santa Fe Springs, Calif. 90670.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Since you can't find a system that will let you do things the way you're used to doing them, you face monumental problems. With program conversions. With people training. And, with hardware costs.

You're also concerned about adding applications to the system as your operations grow. And, you're worried about back-up before you even worry about start-up.

At best, you now find yourself trying to find a system that will solve just some of your problems. You're willing to compromise on the other problems. And, in the end, you'll settle for some kind of a system you can call your own.

OEMs at NCC

Magnusonic Devices, Inc.

ANAHEIM, Calif. — Magnusonic Devices, Inc. will roll out IBM-compatible magnetic tape and disk heads as well as several floppy disk and cartridge and cassette heads in Booth 2603.

The models 3330 and 3330-11 read/write heads are available in both single- and double-density versions, a spokesman said. Both have a bit density of 4,040 bit/in.

The units were designed to operate at a disk speed of 3,600 rev/min and at a temperature of 60°F to 135°F.

The Model 2314, available in quadruple density as well as single and double, has a bit density of 2,200 bit/in. The 2314 was designed for configuration with disk pack, cartridge or fixed-head drives and has a head load force of 250 grams at 1,500 rev/min and 350 grams at 2,400 rev/min, the firm noted.

The Model 237-9 dual-density head assembly for read/write Ansi-compatible tapes features a ferrite erase head and a "no flux gate" design, the firm explained. The unit operates at tape speeds from 75- to 125 in./sec and has a useful life of up to 10,000 hours, the firm claimed.

The 237-9 has a bifilar winding format and an inductance uniformity of less than 15% of all the tracks within a particular block.

The 219-9 dual-density read/write head is similar to the 237-9 except that is is designed for use with 800 bit/in. tapes. It was designed for small computer systems, data terminals and key-to-tape stations and also features a ferrite erase head. Tape motion with the unit is bidirectional.

A floppy disk read/write head, also unveiled by the firm, is compatible with IBM 3741 systems and has a bit density of 3,270 bit/in. Head force load is 15 grams and the unit was designed to operate at a disk speed of 360 rev/min.

Magnusonic Devices is located at 290 Duffy Ave., Hicksville, N.Y. 11801.

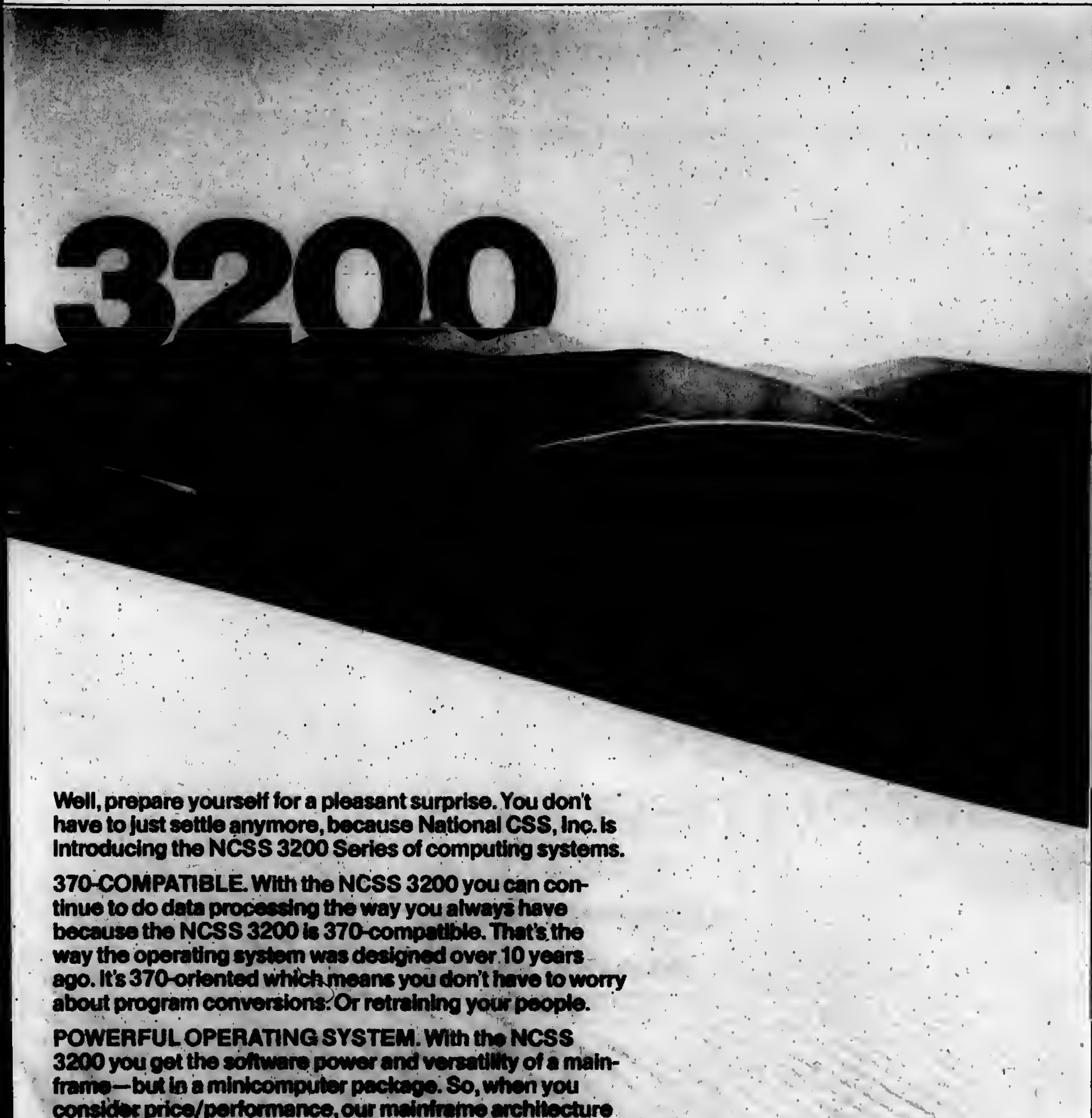
Industrial Engraving

ANAHEIM, Calif. — Industrial Engraving Co., Inc. will introduce its chemically engraved print bands for high-speed applications in Booth 3411.

Features of the bands include optimum character reproduction with no distortion and uniform band thickness in etched areas, according to the firm. The latter feature is realized through one-bite chemical etching, the firm said.

The print bands are supplied with or without surface finishing, depending on the customer's requirements.

The company is located at 2100 Liberty St., P.O. Box 311, Easton, Pa. 18042.



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OEMs at NCC

Sheldon-Sodeco Printer Corp.

ANAHEIM, Calif. — Sheldon-Sodeco Printer Corp. will use Booth 2661 to display its family of print mechanisms, associated controls and power supplies for "inexpensive column printing."

Systems elements to be shown include impact printing mechanisms for 15 and 21 columns; an interface/-controller based on the Mostek 3870 microprocessor; an interface/controller based on the Fairchild F8 microprocessor; a system power supply; and separate programmed 3870 chips, the firm said.

The Series PR15 and PR21 printing mechanisms can print numeric-only or alphanumeric data at speeds up to 3 line/sec for numeric models and 1.5 line/sec for alphanumeric. The PR series printers use two-color snap-in ribbon cartridges with the second color for highlighting.

Both interfaces to be shown — Model 4-621-9205 and Model 4-621-9210 — accept Ascii, RS-232C or BCD parallel data formats, the firm said. Both interfaces include the hammer solenoid drivers, read-only memory character generator, full line buffer, timing control, and logic necessary for interfacing and control.

In quantities of 100 or more, the PR15 costs $105 and the PR21 costs $130. The Model 4-621-9210 interface costs $120; the Model 4-621-9205 is $210. The 3870 chip is $40.

The firm is located at 305 W. Grand Ave., Montvale, N.J. 07645.

Photo by Rasmussen, University of Wyoming

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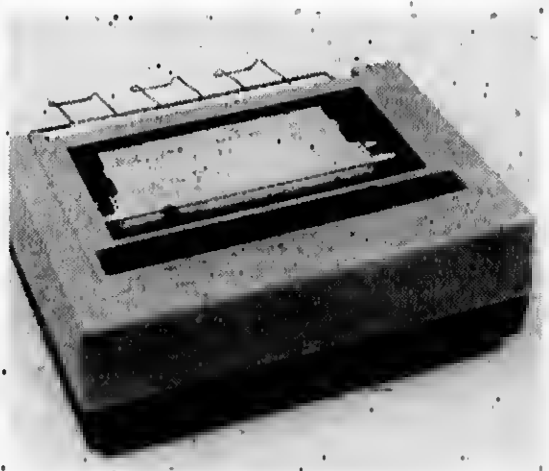
Facit-Addo, Inc.

ANAHEIM, Calif. — Facit-Addo, Inc. will feature the 4540 serial page printer in Booth 2145.

The 4540 uses a print head that has hammers instead of needles or wires, according to the firm. It is based on a principle in which the print hammers are mounted on flexible arms held back by electromagnets.



Facit-Addo 4540

For each impact, the holding current is cut off and the hammer snaps forward. According to the firm, this principle has resulted in a very tight, small head guaranteed to produce 500 million characters.

Since the print force is mechanical, the effective power consumption is a fraction of that used by conventional matrix printheads, the firm claimed. As a result, it said, the head has no duty cycle limit, and there are no lubrication or adjustment problems.

Facit-Addo is located at 66 Field Point Road, Greenwich, Conn. 06830.

OEMs at NCC

Practical Automation, Inc.

ANAHEIM, Calif. — Practical Automation, Inc. will display a stepper motor paper advance option for the DMTP-6 series printers, as well as a teletypewriter emulator interface/controller in Booth 1345.

The stepper option is intended for use by OEMs whose printing requirements demand the ability to select either 6 line/in. vertical spacing for normal text printing or 9 line/in. vertical spacing for high-density applications such as graphics, plotting or forms printing, the firm said.

Printer With UP-9

Line-by-line alternation of modes is also possible, a spokesman added.

One feature of the stepper motor is the capability for forward or reverse operation at the user's discretion. This feature can be used for extra darkening or when formatting is simplified by the ability to go back to a previously printed area, the firm said.

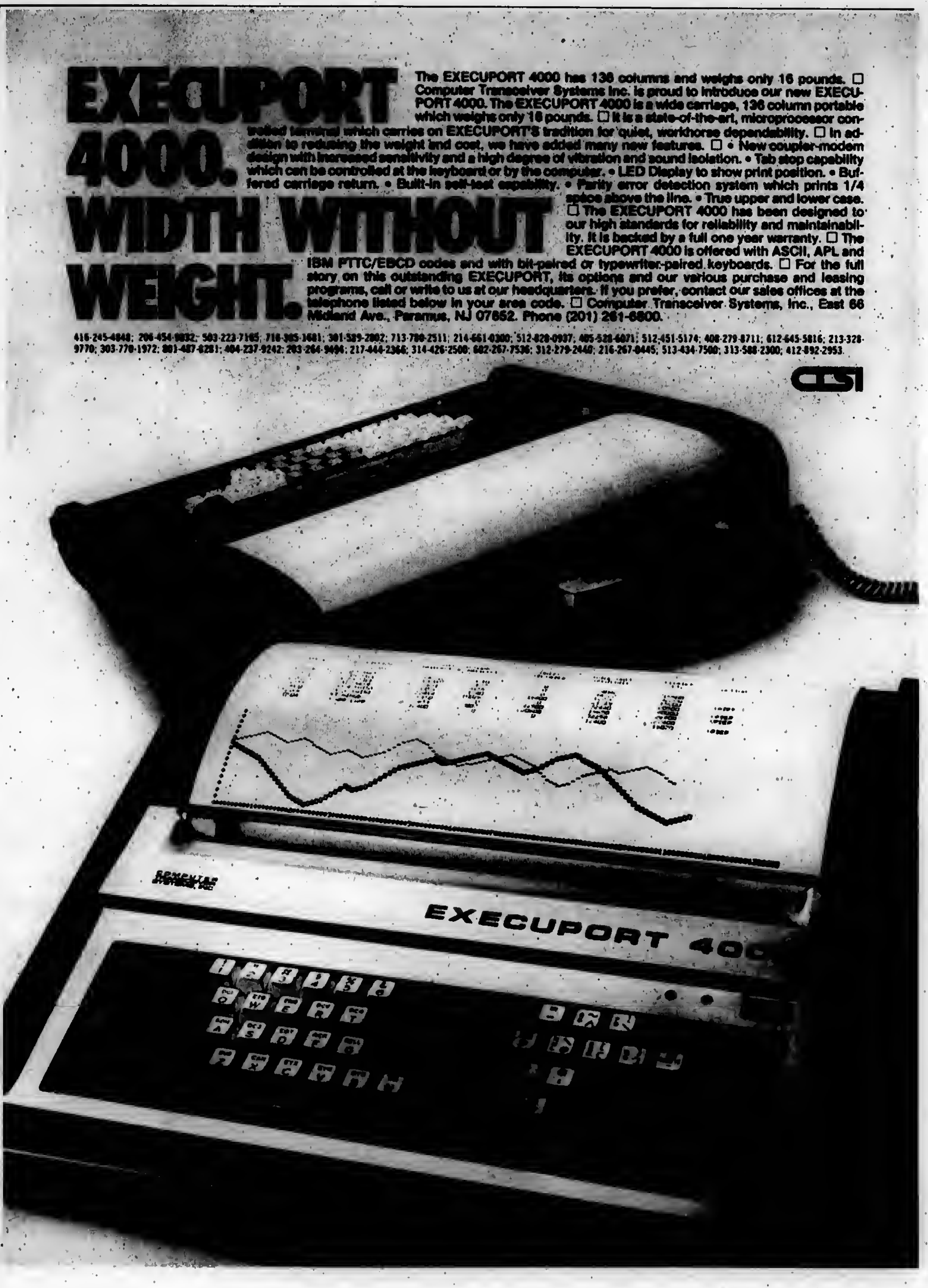
The UP-9 interface/controller provides two functions on a 4.5-in. by 7 in. circuit board, according to the firm. As an interface, the board accepts serial Ascii data at 20mA, RS-232C or the TTL level at speeds up to 300 bit/sec.

Asynchronous Receiver

A software-implemented asynchronous receiver detects the information-carrying bits and stores them in a rotating buffer large enough to accommodate a continuous stream of 300 bit/sec data.

The other board function, that of a printer controller, converts these Ascii characters into printable character format and controls the motion of the print head and the order of firing the needles to create the printed character, the firm said.

Price of the UP-9 is $190. An 8.5-in. paper width printer with stepper motor option and self-reversing ribbon mechanism is priced at $425. The firm is located at Trap Falls Road, Shelton, Conn. 06484.



EXECUPORT 4000. WIDTH WITHOUT WEIGHT.

The EXECUPORT 4000 has 136 columns and weighs only 16 pounds. ☐ Computer Transceiver Systems Inc. is proud to introduce our new EXECUPORT 4000. The EXECUPORT 4000 is a wide carriage, 136 column portable which weighs only 16 pounds. ☐ It is a state-of-the-art, microprocessor controlled terminal which carries on EXECUPORT'S tradition for quiet, workhorse dependability. ☐ In addition to reducing the weight and cost, we have added many new features. ☐ • New coupler-modem design with increased sensitivity and a high degree of vibration and sound isolation. • Tab stop capability which can be controlled at the keyboard or by the computer. • LED Display to show print position. • Buffered carriage return. • Built-in self-test capability. • Parity error detection system which prints 1/4 space above the line. • True upper and lower case. ☐ The EXECUPORT 4000 has been designed to our high standards for reliability and maintainability. It is backed by a full one year warranty. ☐ The EXECUPORT 4000 is offered with ASCII, APL and IBM PTTC/EBCD codes and with bit-paired or typewriter-paired keyboards. ☐ For the full story on this outstanding EXECUPORT, its options and our various purchase and leasing programs, call or write to us at our headquarters. If you prefer, contact our sales offices at the telephone listed below in your area code. ☐ Computer Transceiver Systems, Inc., East 66 Midland Ave., Paramus, NJ 07652. Phone (201) 261-6800.

416-245-4848; 206-454-9832; 503-223-7165; 716-385-1681; 301-589-2802; 713-780-2511; 214-661-0300; 512-828-0937; 405-528-6071; 512-451-5174; 408-279-8711; 612-645-5816; 213-328-9770; 303-770-1972; 801-487-8281; 404-237-9242; 203-264-9494; 217-444-2366; 314-426-2500; 602-267-7536; 312-279-2440; 216-267-0445; 513-434-7500; 313-588-2300; 412-892-2953.

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OEMs at NCC

Raymond Engineering, Inc.

ANAHEIM, Calif. — In Booth 1101 Raymond Engineering, Inc. will show a version of its 6409 Mini-Raycoder that offers a bidirectional capability allowing backspacing and bidirectional block searches.

The 6409-21 features a dual-channel read/write function that permits direct access to the entire storage media without physical handling of the data cassette, a spokesman stated. Data can be recorded in endless loop fashion by recording on one track in one direction to the end of tape, then reversing tape direction and recording on the second track.

The data transfer rate can be doubled by utilizing both data channels simultaneously, the firm added.

A number of other tape transports will also be on display, including a microprocessor-controlled. paper tape emulator with an RS-232C interface and switch-selectable data rates up to 9,600 bit/sec.

Further information can be obtained from the company located at 217 Smith St., Middletown, Conn. 06457.

Model 6409

Nortronics

ANAHEIM, Calif. — Nortronics Co., Inc. will exhibit the Magnetoresistive Head (MRH) — designed for reading encoded credit cards in Booth 1305.

The magnetic element of an MRH responds to the magnetic flux as in conventional inductive heads, but the output response of an MRH is independent of media scan, according to the company.

Possible Applications

The unit is useful for applications which require speed-independent reading of low-density information, such as card readers which rely upon hand-fed credit cards to pass the magnetic stripe over the face of the head, the company claimed.

The MRH features batch fabrication, dimensionable reproduction, track density, improved frequency response, low loss from media spacing at credit card densities, high output at conventional speeds, no speed compensating electronics and electronic decoding, the company claimed.

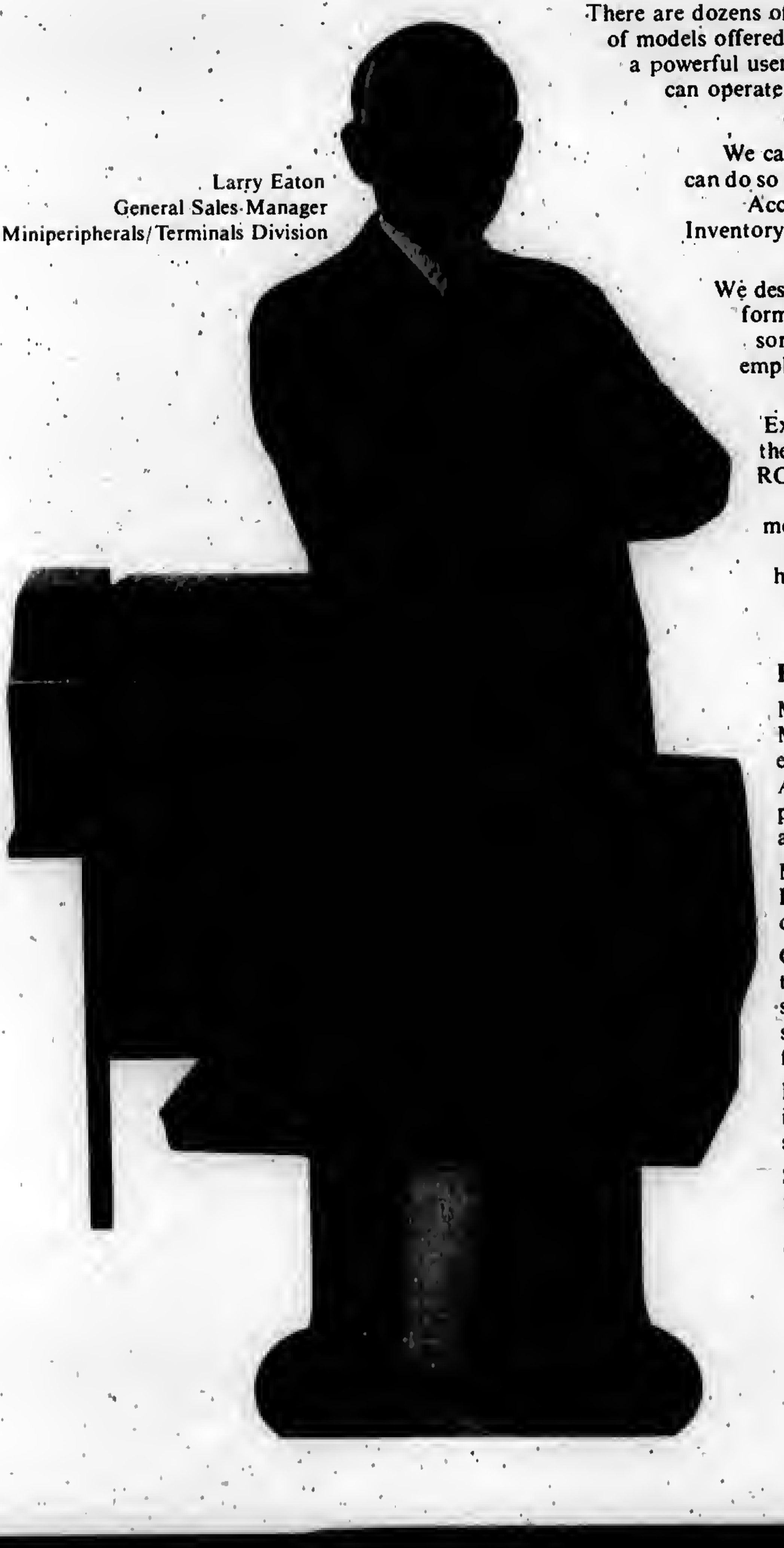
More information can be obtained form Nortronics, at 8101 Tenth Ave. North, Minneapolis, Minn. 55427.

Berger-Lahr

ANAHEIM, Calif. — The Berger-Lahr Corp. will be in Booth 3110 to demonstrate its line of permanent magnet stepping motors that utilize dual self-aligning sleeve bearings or optional dual ball bearings.

The RDM 36/8, 36/10, 50/8, 50/10, 50/12, 63/8, 63/10 and 63/12 each feature a bipolar or unipolar drive and can withstand temperatures ranging from -20°C to 80°C, a spokesman said. Torque ratings range from .6 oz./in. to 21 oz./in. based on motor size and step angle desired by the user.

The units are priced from $20 to $40 each depending on the quantity of the order. The firm is at Peterborough Road, Jaffrey, N.H. 03452.



Announcing Control Data's Multifunction Terminal, new for stand-alone and distributed processing

Larry Eaton
General Sales Manager
Miniperipherals/Terminals Division

There are dozens of terminal manufacturers. And hundreds of models offered. But only a handful of companies offer a powerful user-programmable intelligent terminal that can operate both as a stand-alone processor and as a remote station for your IBM 360/370.

We call it a Multifunction Terminal because it can do so many things. Forms generation and entry. Accounts receivable or payable. Data entry. Inventory control. Inquiries. In a stand-alone mode or as a remote station.

We designed it to be easy to use. Our interactive forms language "coaches" non-technical personnel. And your more technically-inclined employees will appreciate the features of our advanced and business-oriented BASIC.

Extensive diagnostic programs are built into the terminal. Most are entirely automatic—a ROM-resident diagnostic executes on power-up and system-reset to check processor, memory and path to the flexible disk. Other built-in diagnostics provide more comprehensive memory and communications tests. The final diagnostic works with an online test residing in the host processor.

Benefit from Control Data's experience

More than 15 years in remote computing. More than 13 years of experience in human-engineering and manufacturing terminals. And we design and make not only the display station, but also the floppy disk drives and matrix printer.

More than 4,800 Control Data Customer Engineers in our worldwide maintenance organization support our products.

Control Data's Education Company offers training courses for all levels of your personnel. And our Professional Services Division offers consultation and programming for your applications.

Even financing for your terminal purchase is available through Control Data's financial subsidiary, Commercial Credit Company.

So look to Control Data to help you implement your distributed processing strategy. For more information on our Multifunction Terminal, call 612/482-4379.

CONTROL DATA CORPORATION

More than a computer company

Power Supplies at NCC

Computer Power Systems Corp.

ANAHEIM, Calif. — System II, a second-generation and "more sophisticated" version of the Computer Power Systems Corp.'s Model S power distribution system, will be introduced in Booth 4331.

These systems were designed to accept raw power from a building source and transform it into a CPU's voltage requirements for distribution to the individual system's components via flexible conduit.

The System II, physically the same size as the Model S, has a solid-state System Status Panel (SSP) that provides a central location for readout information on the status of the system's power and the facility's safety systems.

The SSP monitors the status of each power center within its control. When an abnormal condition occurs, an audible alarm alerts the operator.

Standard features of the SSP are a Digital Panel Meter that displays voltage, current and power; System Select that provides monitoring capability for up to six power centers; Main Breaker On, a lighted indicator showing whether the main breaker is on in power centers under its control; Function Disable, an indictor showing if any monitoring function has been disabled in any power center under its control; Volt Check to indicate abnormal voltage conditions; and Over-Temp Detector to warn of transformer overheating.

Optional features include Ground Current Monitor, Faulty Ground, Building Alarm and Phase Error Monitor.

NCC attendees will also be able to view the Power Mite MKII, self-contained peripheral for the smaller computer facility.

The Power Mite MKII was designed to accept raw power from a building source and transform it into a computer's voltage requirements for distribution to the individual system components via flexible conduit.

The unit eliminates the need for special building wiring, a spokesman noted.

The average installation time is less than three hours, Computer Power Systems Corp. said from 3398 E. 70th St., Long Beach, Calif. 90805.

Boschert, Inc.

ANAHEIM, Calif. — Boschert, Inc. will introduce its 25W quad output power supply in Booth 1728.

Called the OL-25, the "switcher" features operation efficiency at 60% to 70% and little heat loss, according to the company.

Boschert OL-25

Other features include operation at 20,000 Hz, allowing the use of smaller transformers, inductors and filter capacitors, the company said. The OL-25 measures 2.5- by 4- by 6 in. and weighs about 12 oz.

The unit is "brownout-proof" because it operates over a wider input voltage range of 95- to 130 Vac than others of its type, according to Boschert. Because energy is stored at higher voltage in input capacitators, the OS-25 is less sensitive to variations in line voltage, more immune to ac interruptions and insensitive to changes in line frequency, the company claimed.

Tentatively priced at $80 each in 100-unit quantities, the OL-25 features four outputs terminated with a barrier strip. Standard features include printed circuit board construction, short circuit protection, overvoltage protection, input surge current protection, inherent reverse voltage protection and input EMI filtering.

The OL-25 incorporates a flyback design similar to that used in TV sets or automotive ignition systems. In this proprietary approach, only one power switch and one power rectifier are used for each output.

The OL-25 can be used with small microprocessor systems, mini CRTs, desktop calculators and almost any piece of electronic equipment requiring 25W.

Delivery will begin in July. For more information, contact Boschert at 384 Santa Trinita Ave., Sunnyvale, Calif. 94086.

IPM

ANAHEIM, Calif. — A series of "front-access" uninterruptible power supplies (UPS) from International Power Machines Corp. (IPM) will be on display in Booth 2501.

IPM will exhibit the 415 Hz UPS for the IBM 3032, 3033 and 370/168, as well as a 60 Hz UPS model.

More than 800 IPM units are now in service all over the world, the firm said.

IPM is located at 3328 Executive Blvd., Mesquite, Texas 75149.

Elgar Corp.

ANAHEIM, Calif. — Elgar Corp. is slated to show two products in Booth 1209 — a power supply and a series of transformers.

The 15 kVA uninterruptible power supply (UPS) with either single- or three-phase input to single-phase output capability will be displayed. Designed for use with process control or other minicomputer applications, the Model UPS-153-1 can provide five minutes to more than 24 hours of support during blackout conditions, Elgar claimed.

Representative models of the three-phase High Isolation Transformers (HIT) with 3 kVA to 60 kVA ratings are also planned for showing. The HITs are said to eliminate noise from power lines.

These models start at $900, the firm said from 8225 Mercury Court, San Diego, Calif. 92111.

Emerson Electric Co.

ANAHEIM, Calif. — Booth 2656 will be the scene of Emerson Electric Co.'s display of its line of accupower (AP) solid-state uninterruptible power supplies (UPS).

The AP series is an isolated ac voltage source and backup power source that works in case of failure to the primary power source, the company said.

The 60 Hz line consists of seven basic mechanical sizes ranging in size from 375- to 600 kVA in single module systems and up to 4,000 kVA in multimodule systems. The 415 Hz product line consists of two mechanical sizes rated 75 kVA and 200 kVA.

Components include rectifier/chargers, batteries, inverters, filters and static and electromechanical bypass synchronizing equipment.

The UPS provides simplification of logic and power blocks, high noise immunity logic and troubleshooting connections, test points and high reliability pin connectors.

Emerson Electric's Industrial Controls Division is located at 3300 S. Standard St., Santa Ana, Calif. 92702.

Clary Corp.

ANAHEIM, Calif. — Clary Corp. will be demonstrating its Mini-UPS line of Uninterruptible Power Supplies (UPS) in Booth 4009.

The four models in the series have a current rating ranging from 11A to 88A and are said to provide isolation from voltage or frequency transients from utility power.

Features of the series include convection cooling, a line-synchronizing feature which synchronizes the output of the UPS to the incoming utility power so "no break" transfer can be accomplished in the event of a power failure and a ± 15% short-term input voltage tolerance.

Prices for the UPS range from $1,650 for the smallest unit in the series to $11,100 for the largest from the company at 320 W. Clary Ave., San Gabriel, Calif. 91776.

Technical Overview of Control Data's Multifunction Terminal

Basic hardware comprises a keyboard display, one or two flexible disk drives and a matrix printer. Software includes an operating monitor, peripheral drivers, system job functions, system utilities, file manager, a forms language and BASIC.

Keyboard display. 2000 characters on 25 lines with 80 characters per line. Each character is generated from random-access refresh memory as a modified 7 x 9 dot matrix. Detachable keyboard.

Flexible Disk Subsystem. Consists of one or two drives that use standard single-side, double-density disks. Capacity is 0.5 Mbyte formatted storage per disk, 1.0 Mbyte total.

Matrix Printer. The optional printer accepts single or multipart paper, prints bidirectionally up to 132 characters per line at 70 lpm. Compressed print option.

Controller. A microprocessor-based controller in the display unit includes: ROM; up to 64 Kbytes of RAM; communications controller; peripheral controllers and keyboard display controller.

Forms Language. An extensive, operator-programmable forms language. Operator "coaching" appears on the CRT screen.

BASIC Language. Business-oriented, with features like: 14 digits precision; sequential, indexed and index-linked file I/O; character strings of up to 255 bytes; variable identifiers of up to 6 characters.

Communications. The terminal communicates with a host processor using Binary Synchronous (BSC) communication protocol. The system provides for auto answer and auto disconnect to allow the system to be polled while unattended. Speeds of 1200, 2000, 2400, 4800, 7200 and 9600 bits per second are supported. Protocol-compatible with the IBM 2770, 3770 or 3780. EIA RS-232-C Interface.

CONTROL DATA CORPORATION

More than a computer company

. . . And Other Things To See

Sycor, Inc.

ANAHEIM, Calif. — Sycor, Inc. will be demonstrating its Sycorlink networking facility at Booth 2420, along with the Sycor 405 entry-level, diskette-based system.

Sycorlink is an option which can be added to existing Sycor 445 or Sycor 405 systems, according to the company, and consists of two parts. These are a microprocessor-based hardware controller which handles network protocol and a configurable system software module.

The microprocessor provides automatic error checking and recovery, while the software provides the services necessary to connect the data set access methods of the base node to the other network nodes.

Overall system security is provided by the use of passwords which allow users access to the network itself; while file security is provided by using a "need to access" methodology. The actual implementation of this feature is via a file code.

Further security is provided by an optional key lock on each keyboard and software-lockable special keys at a data station keyboard, the firm said.

The advantage to using the Sycorlink network concept, according to a spokesman, is that it permits a business to configure power and resources equal to those of a small to medium-scale computer system and distribute them throughout its organization.

This means that while each Sycor unit in the network is a complete, stand-alone computing system, it can also access the files maintained by other systems, or nodes, linked to it.

Communications is possible between Sycorlink networks or between a Sycorlink network and a host mainframe with either asynchronous, binary synchronous or synchronous data link protocols.

Sycorlink is available for $2,500 per system from the company at 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Polymorphic Systems

ANAHEIM, Calif. — Polymorphic Systems will show a line of microcomputers designed for professional and small business problem solving at Booth 1264.

Designated System 88, the series consists of a main unit, upper and lower case keyboard with control keys and a CRT monitor for updating. Other hardware features include eight-level vectored interrupts and graphics.

System 88 Version

The main unit is based on an 8080 processor and can use one to three minifloppy disk drives.

The system includes operating software on disk plus word processor, Basic and assembler.

The software includes a file system and built-in application aids, Basic on disk that has multidimensioned strings and numeric arrays, a mat statement, a plot statement to support graphics, program chaining and variable cross-reference listing by line number.

Cost for the System 88 minus the printer starts at $2,795. More information is available from Polymorphic Systems, 460 Ward Drive, Santa Barbara, Calif. 93111.

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Edited by Tim Scannell, *Computer Output Equipment* will be focusing on ways to cut output costs, with tutorial and applications stories on the latest equipment and systems, including:

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If you want to stay up to date on the state of output, don't miss this June 26th Special Report.

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. . . And Other Things To See

Eleven From Britain

ANAHEIM, Calif. — Eleven British companies will be at NCC in a joint venture organized by the British Overseas Trade Board in conjunction with the Business Equipment Trade Association, in Booths 1129-1139, 1228-1238, 1141-1147 and 1240-1246.

A microcomputer with priority interrupts, direct memory access, integral single or dual minifloppy disk drives and serial I/O ports operating at speeds up to 19.2k bit/sec will be demonstrated by Rair Microcomputers. The system includes an operating system, advanced Basic interpreter and Fortran and Cobol compilers.

An interactive CRT terminal will be demonstrated by Data Recording Instrument Co., Ltd. Called Truedata, the terminal can communicate with an operator via fiber-optic pen-switched LEDs and can display numeric answers.

Sintrom Electronics Ltd. will be displaying four of its products including a continuous data logger designed for a variety of industrial and scientific applications; a cartridge storage system for use in communications environments; a cartridge drive; and a plotter controller for use with any conventional X-Y plotter.

Lynwood Scientific Development Ltd. will show its microprocessor-based CRT units. The units can be programmed to meet customers' requirements without hardware modifications, according to the company.

A series of low-cost CRT terminals will be showcased by Newbury Laboratories Ltd. The 7000 series displays 24 lines of 80 characters each, selectable speeds from 50 bit/sec to 19.2k bit/sec and a green-phosphor display.

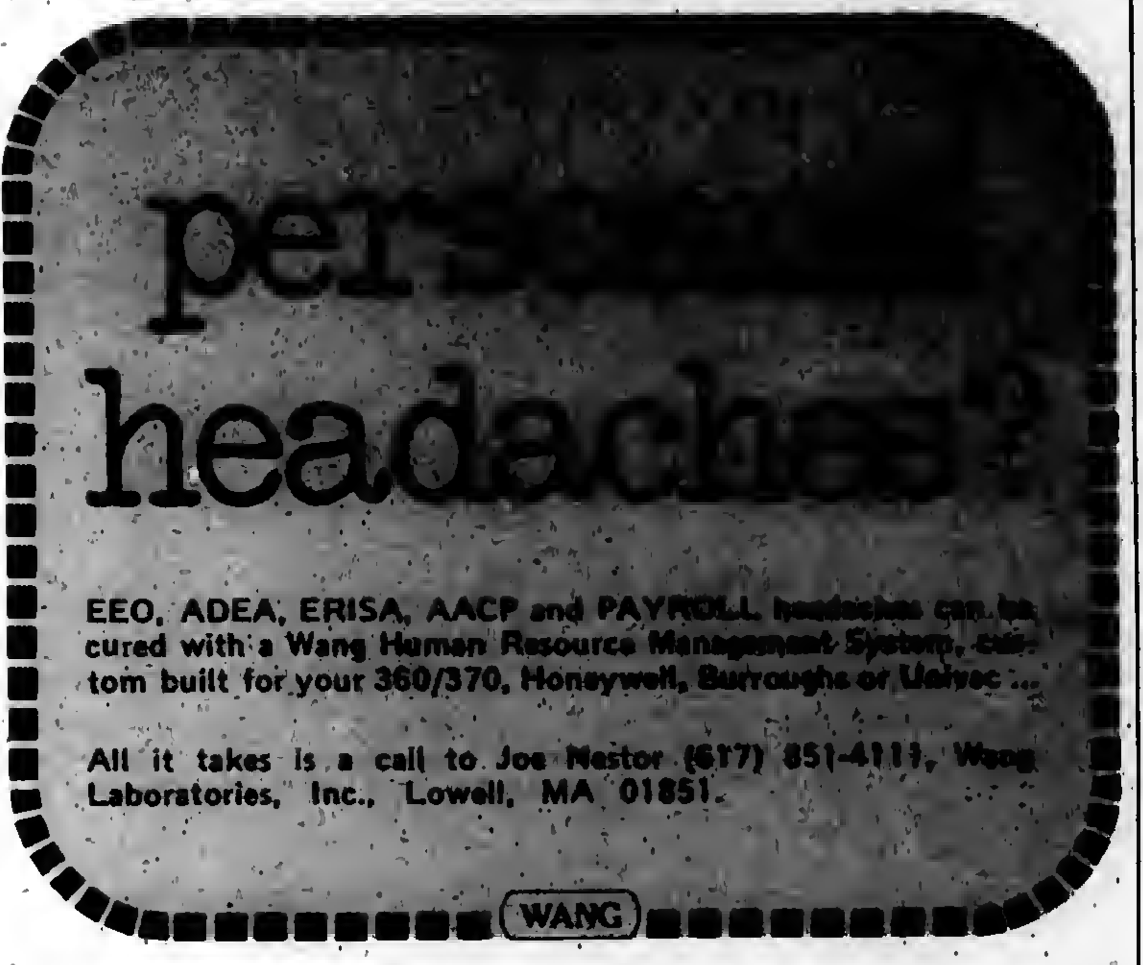
More advanced models feature cursor controls including X-Y addressing, transmission from screen by line or page, inverse video, line insert and delete and editing of text prior to transmission.

Pocket-sized diagnostic and patching equipment, powered by two 9V batteries, will be demonstrated by Modular Technology. The equipment is said to allow test of any line at any point, with audible indication of data or clock signals. The company will also exhibit a self-contained modem for asynchronous full- or half-duplex lines over dc-continuous unloaded lines.

Software will not go unheralded by the British. Management Systems and Programming Ltd. is said to have added features to its Manager series of program products.

Publications will also be represented, as *Systems International,* a monthly computer journal, will be exhibiting its publication, along with a computer with a bubble memory. IPC Electrical-Electronic Press Ltd. will be showing a product guide and will also be promoting its publication, *Computer Weekly.*

Additional information on all of these companies and products can be obtained from British Information Services at 845 Third Ave., New York, N.Y. 10022.



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Minicomputer Accessories

ANAHEIM, Calif. — Minicomputer Accessories Corp.'s (MAC) 1978 spring minicomputer product catalog will be displayed in Booth 1460 along with several other products.

The expanded 48-page catalog includes media, data storage devices, binders, racks and cabinets. Over 100 connectors and cables compatible with Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co. equipment will also be shown.

Among MCA's latest products are the Data Hilite Ruler, which spotlights one line of computer printout at a time, and a software engineering calculator that includes both hexadecimal and octal base arithmetic.

A free copy of the catalog may be obtained by writing MAC at Department P, 130 S. Wolfe Rd., P.O. Box 9004, Sunnyvale, Calif. 94086.

Infodetics Corp.

ANAHEIM, Calif. — The Infodetics Corp. 410 information system, available for viewing in Booth 3223, features automatic recovery and distribution of information captured in unitized microfilm or other unit records, according to the firm.

Each 410/45 unit stores 200,000 aperture cards or tab-sized microfiche. The 410/50 unit stores 150,000 microfiche. According to the firm, multimillion document systems can be created by increasing the number of 410 file modules under the central system's control.

One module can automatically process more than 240 request transactions per hour, the company said. Information can be presented in several ways — the document itself can be brought outside the system and into the operator's hands; the image on the document can be transmitted via CRT; a duplicate of the film image can be made; or paper copies of the information can be produced either at the file or at a remote location.

The system also has provisions for single or multiple document infiling, the firm said.

Infodetics is at 1341 S. Claudina St., Anaheim, Calif. 92805.

Emergency Power Engineering

ANAHEIM, Calif. — The Computer Power Center, designed for isolation, distribution, control and monitoring of ac power to a computer system will be exhibited by Emergency-Power Engineering, Inc. (EPE).

The self-contained unit, which will be exhibited at Booth 4021, includes all components required by a user to properly interface a building's ac power source with a computer system and eliminates wall-mounted circuit breakers, according to the manufacturer.

Further information can be obtained from EPE at 2919 21 S. Halladay St., Santa Ana, Calif. 92705.

. . . And Other Things To See

Quantor

ANAHEIM, Calif. — Quantor will show its Model Q118 minicomputer-controlled computer output microfilm (COM) recorder/processor and its 207D diazo microfiche duplicator in Booth 4207.

The Q118 COM recorder/-processor delivers cut, dried 105mm microfiche ready for display or vesicular or diazo duplication, the firm said.

The Q118 includes a 10.M-byte random fixed head disk that provides program and parameter storage plus COM application support and standard cassettes provide disk backup, Quantor said.

The Q-Mini software package accepts a variety of print image, spool or COM-formatted tapes as input, and a conversational instructional job setup module eases setup of job parameters, the firm said.

The random-access disk is said to enable the user to support cross-reference indexing and master file update applications on fiche, capabilities that previously were available on a large host computer.

The 207D is described as a high-speed semiautomatic microfiche duplicator that has an option of being integrated with an automatic collate and stack capability.

The Q207D produces cut microfiche duplicates from a single 105mm by 148mm negative microfiche master using 4- to 7 mil diazo copy film.

The unit is equipped with a two-position carriage topped with a glass platen and a clamp which automatically grips the top edge of the master fiche. To load, the operator lays the master fiche onto the glass platen emulsion side up and pushes the carriage in.

Duplicates are produced at a rate of 800 per hour.

The system uses a Xenon strobe light rather than the usual mercury vapor lamp, the company said, which automatically compensates for lamp life or power fluctuations by increasing the number of strobes per exposure.

A collate and stack operation is also available.

Quantor is located at 520 Logue Ave., Mountain View, Calif. 94043.

Power One

ANAHEIM, Calif. — Power One, Inc. will display a selection group of its off-the-shelf, open-frame dc power suppies in Booth 4108.

The units all undergo a full functional test, followed by a minimum two-hour burn-in and a final functional test, the firm said. They are also UL recognized.

The multiple application units, which can be custom-designed and modified to users' special needs come with a two-year warranty, the firm said.

Power One is located at Power One Drive, Camarillo, Calif. 93010.

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. . . And Other Things To See

Integrated Software Systems Corp.

ANAHEIM, Calif. – The use of simple commands to draw several different kinds of charts will be demonstrated by Integrated Software Systems Corp. (Issco) at Booth 2563.

The company will be demonstrating two software products this year; Disspla, a package used to generate different kinds of charts, and Tell-A-Graf, a package used in conjunction with Disspla which provides an English-like means of issuing instructions to Disspla.

The English language commands instruct the system to draw bar, pie or curve charts and detail how to label the axes of the charts.

Tell-A-Graf enables managers, engineers and scientists without an intimate knowledge of DP to produce charts or graphs suitable for presentation or publication, according to Issco.

Tell-A-Graf is priced at $19,500 or $18,500 for customers who are already using Disspla, according to the company at 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

International Mathematical And Statistical Libraries, Inc.

ANAHEIM, Calif. – International Mathematical & Statistical Libraries, Inc. (IMSL) will furnish information about its scientific libraries in Booth 2563. Featured will be a new library for the Digital Equipment Corp. PDP-11 series of minicomputers, according to the firm.

In addition to the PDP-11 library, IMSL has libraries for the IBM 360 and 370, Xerox 560 and Sigma, Univac 1100, Decsystem-10 and -20, Honeywell Information Systems, Inc. 600/6000, Control Data Corp. 6000, 7000 and Cyber, Burroughs Corp. 6700 and B7700 and Data General Corp. Eclipse series of minicomputers, the firm said.

IMSL scientific libraries include over 400 subroutines written in Fortran with abilities spanning the mathematical and statistical areas, the firm said. The subroutine library can be leased for $980/year for universities and $1,220 for others.

Those prices include one source tape, one reference manual, one general information manual and maintenance.

IMSL's address is Sixth Floor, GNB Building, 7500 Bellaire, Houston, Texas 77036.

D.A.T.A., Inc.

ANAHEIM, Calif. – Sixteen reference books dealing with semiconductors, microprocessors and microcommputer systems will be on display in D.A.T.A., Inc.'s Booth 4434. The latest book in the series, called *The Microcomputer D.A.T.A. Book*, has reference data on 240 microcomputer systems, 210 microprocessors/microcontrollers and 1,500 related memory and I/O devices, according to the company.

Included in the 564-page book are specifications and major operating characteristics of chips, cards and systems, including a listing of instruction sets of microprocessors. In addition, logic connections for 800 products are included.

The information in the book was supplied by manufacturers, and a complete list of manufacturers is provided by the company at 45 U.S. Highway 46, Pine Brook, N.J. 07058.

Houston Instrument

ANAHEIM, Calif. – In Booth 1631 Houston Instrument will show its Microplotter 2 digital plotter, designed for the personal computing market.

The Microplotter 2 has an 8.5-in. by 11-in. page size, .005- or .01-in. resolution and an RS-232C interface.

Price of the product is $1,085. HI is based at One Houston Sq., Austin, Texas 78753.

International Data Corp.

ANAHEIM, Calif. – International Data Corp. (IDC) will feature its new "Information Systems Planning Service" program in Booth 1471.

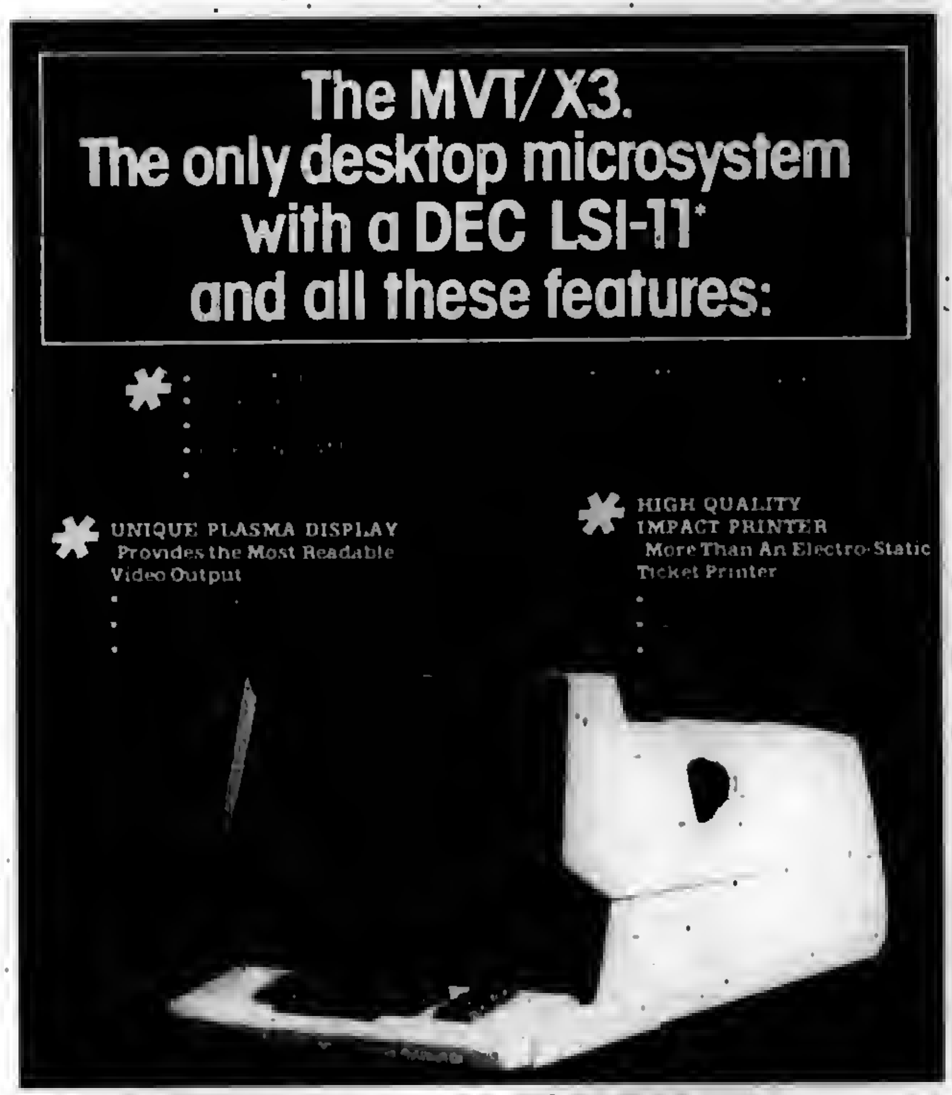
IDC's existing programs include computer installation data files, continuous information services for vendors and financial institutions, executive DP conferences, custom research and seven market-oriented newsletters covering the DP industry.

IDC is located at 214 Third Ave., Waltham, Mass. 02154.

Van San Corp.

ANAHEIM, Calif. — Peace and quiet will be featured in Booth 2369, where the Van San Corp. will be demonstrating its Quietizer Cabinet 1720 series.

The Quietizer, which is available for the 80- and 132-column Model 40, tractor or friction-feed machines, is said to feed and restack a full box of paper and provide its own filtered ac wiring, the firm said from 1180 Centre Drive, City of Industry, Calif. 91748.



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. . . And Other Things To See

3M Co.

ANAHEIM, Calif. — A rigid floor mat that drains static charge from office personnel who work around data and word processing equipment will be exhibited in Booth 2257.

The 3M Co. will show its Velostat 1850 series electrically conductive floor mats designed for anywhere electronic hardware is used. The mats form "islands of protection" around computers and electronic office equipment, preventing static-caused loss of data and alteration of memory, the firm said.

Castered chairs can be rolled over any of the mats — even if laid on thick carpeting — and the conductivity is unaffected by age and room humidity.

The mats come in three sizes. Type 1852 measures 32 ft. by 24 ft by 1/8 in. It was designed for components usually operated from single standing positions, such as electronic cash registers.

Type 1853 measures 5 t by 4 ft by 1/8 in., including a 30- by 10-in. lip, and was designed for personnel sitting on castered chairs — word processor operators, for example.

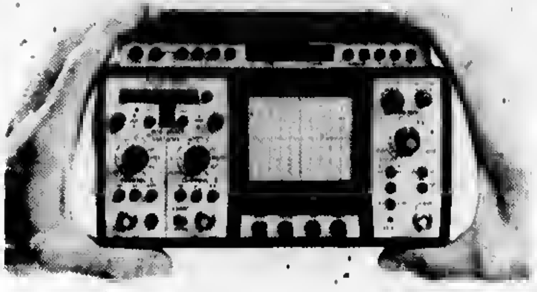
Type 1854 measures 8 ft by 4 ft by 1/8 in. It is said to protect a cluster of equipment — for example, a CPU configuration.

All mats come with a 10-ft ground cord having a 1M ohm resistor, the firm said. Types 1852, 1853 and 1854 cost $30, $95 and $105, respectively.

Further information is available from 3M Co., Department SC7-10, P.O. Box 33600, 3M Center, St. Paul, Minn. 55133.

Vu-Data

ANAHEIM, Calif. — Booth 2557 will spotlight the Vu-Data Corp. Model PS935/975 DMM-Counter-Miniscope, the dual-trace follow-on to the single-trace Model PS915/975 introduced in November 1975.



Model 975

The latest instrument has increased bandwidth to 35 MHz from 20 MHz; vertical sensitivity has been doubled from 10mV/div to 5mV/div; sweep resolution has been increased from 20 nsec/div to 10 nsec/div; and the scope trigger range extends to 50 MHz instead of to 20 MHz. The counter frequency range has been extended from 20 MHz to 50MHz.

There is also an increase in CRT acceleration voltage from 2 kV to 5kV, resulting in greater brightness, and an increase in the CRT display area, Vu-Data said.

The Model PS935 may be purchased separately or in combination with the Model 975 DMM-Counter. The Model 975 includes a 3-1/2-digit, autoranging digital multimeter as well as a four-digit, 50 MHz frequency counter.

The Model PS935 without the Model 975 sells for $1,495, while its price totals out at $1,895 with the DMM-Counter.

Vu-Data is located at 7170 Convoy Court, San Diego, Calif. 92122.

Knickerbocker

ANAHEIM, Calif. — The Knickerbocker Case Co. will show its line of computer service people's tool cases, including printed circuit board cases, in Booth 1657.

The firm is located at 2037 N. Campbell Ave., Chicago, Ill. 60647.

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At Army Management Center

Logistics Course Includes Micro Theory

By Tim Scannell
CW Staff

PETERSBURG, Va. — Army training programs are generally thought of as being limited to such areas as weapons technology, bivouacking procedures and double-time marches. One particular class here at Fort Lee, however, is using microprocessor theory as a basis for training mid-level officers and civilian managers on all aspects of the Army's computerized supply system.

The primary function of the instructors at the Army Logistics Management Center is to illustrate in detail an object or piece of equipment "from the beginning to the end of that item's life cycle," according to David L. Johnson, a logistics management specialist at the center. The program includes courses in research and development, testing and evaluation, procurement, storage and eventual disposal.

Microcomputer technology is used to demonstrate the DP angle of material supply, because many of the several thousand people who attend the seminars each year haven't any idea just how a computer works, Johnson said. "The managers that come here are often familiar only with the big IBM-type systems and the majority of them have never really 'seen' their DP facilities," he said.

The logistics center tries to bring things into perspective for them in today's world, Johnson stated. "We would like to present a microcomputer on a rolling table, fire it up before their eyes and play some business-oriented games and scientific calculations." The whole idea is to graphically convey to these managers just where microprocessors are taking us and to show them that computers are not necessarily huge machines, Johnson explained.

Although the center doesn't have a microcomputer permanently installed, it does have an Imsai Manufacturing Corp. 8080 system that is currently in a developmental stage. The system, including 32K of random-access memory (RAM); a multiple I/O board; a dual-floppy disk drive and a Texas Instruments, Inc. Silent 700 terminal, was purchased more than a year ago, Johnson said. "Unfortunately, we lost two people during the year who were going to do some developmental work on it, so we're kind of at a standstill." The system has been used for some business simulations, Johnson stated, "but that is really all we've done with it so far."

The instructions are presently limited to chalkboard diagrams and pictures. "We feel the course will be a lot more effective if the students can take the top off the system, look at the boards and say, 'Oh yeah, that's a memory chip' and things like that," Johnson said.

Johnson's interest in microcomputers doesn't stop with his job. At home, he has a Polymorphic Systems, Inc. Poly-88 microcomputer that he built from a kit in his spare time. "Specifically, I got the system for the purpose of familiarizing my children, ages five and nine, with computers," Johnson continued. "But, as everyone does, I guess I play a lot of games with it myself." The Poly-88 has also been used to develop business programs used at the center, Johnson said, and to demonstrate microprocessors at a couple of grade schools.

Johnson, who describes himself as not being "a stranger to electronics," estimated that it took him a total of 60 hours to assemble the Poly-88 system.

Some Shortcomings

The Imsai system scheduled for implementation at the center, although excellent from a design and performance standpoint, falls short on documentation and software, according to Johnson. "The software, in particular the Basic Interpreter, in my opinion is not as useful and doesn't have the features offered by some of the other microcomputer interpreters. For example, formatted print statements are very important to what we do" and the Imsai simply doesn't provide for this function. "We have, however, ordered a copy of C-Basic, which is a commercial Basic, and I understand it does have the various features we need," he said.

"The documentation really isn't very good at all," Johnson remarked. The material "just doesn't explain things well enough; there are too many holes in it and the user has to do too much digging on his own to figure out what's going on," he said.

Comparing his system at home with the Imsai 8080, Johnson commented that each of the two microcomputers is satisfactory for certain types of users and applications. "For someone with limited funds, the Poly-88 is vastly superior. But if a person can invest $5,000 or $6,000, then there's no question the Imsai is a very fine system."

However, "the Poly-88 is up and running, it's been very reliable and it does almost everything I want it to do" for a moderate investment, Johnson added.

Junior High Student Captures Prize for Income Tax Program

FORT WORTH, Texas — Prizes and ribbons are seldom, if ever, given to people for completion of their tax reports. However, an eighth-grader here did win an award for writing a program designed to guide a person, step-by-step, through the 1040-A personal income tax form.

Ralph Lipe, 14, received the award at a recent intramural science fair held at the McLean Middle School. His project captured the first-place ribbon in the "math and computers" category and was chosen "Best of Fair" out of approximately 200 entries

Subsequently, at the Fort Worth Regional Science Fair, which hosted 460 entries from 17 countries in northern Texas, Lipe won a first-place ribbon in the "math and computers" category and a first-place ribbon from the Institute of Electrical and Electronics Engineers (IEEE). He also placed "Third Best of Show" in the Junior High School Division, the spokesman stated.

It reportedly took Lipe 60 hours to write and debug the program. The idea for writing it came from his mother, Jane Lipe, a certified public accountant, who assisted him in setting up some of the equations for the tax questions. Ralph then converted the information to Basic language to program a Radio Shack TRS-80 microcomputer.

Fourteen-year-old Ralph Lipe took top honors at recent science fair in Texas for his 1040-A tax form program.

When Ralph first saw the microcomputer, he knew almost nothing about making it operate, according to his father, Gary Lipe. "The computer attracted him like a magnet," the father said. "Before I knew it, he'd weaseled his way between me and the microcomputer and was trying to program it himself."

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Single Board With Basic

Dynabyte Builds Control System

PALO ALTO, Calif. — Dynabyte, Inc. has designed a single-board programmable microcomputer system for control applications ranging from operating a model railroad train to managing a building's electrical system.

The Basic Controller allows the user to operate the computer and the external devices it controls with the firm's Basic control language, Zibl, according to a spokesman. The control functions are divided into six categories: sense inputs, flag outputs, lights, (user definable LEDs), relays, analog-to-digital and digital-to-analog.

File structures allow multiple programs written in Zibl to reside concurrently in the random-access memory (RAM), the firm said. Each program can be individually loaded, renamed or run.

A program can access other programs as subroutines while still retaining its own line numbers and variables, the spokesman noted.

Listing, printing and inputting can be accomplished from any serial or parallel I/O channel or the controller's self-contained CRT I/O, Dynabyte said. Interaction with the controller is through the user's keyboard and CRT monitor, which interfaces to the printed circuit board.

The Basic Controller costs $750 for a system including a Z-80 MPU; 32 flags; 32 sense inputs; eight relays; eight lights; two serial, one parallel I/O, a cassette I/O, a video I/O and keyboard ports; two 2716 sockets with programming capability; 4K of on-board RAM.

Dynabyte is at 4020 Fabian, Palo Alto, Calif. 94303

Language Instruction Offered

HOUSTON — A series of foreign language educational programs for "any microcomputer system" that offers instruction, testing and practice of French, Spanish, Italian and German has been announced by Musgrove Engineering.

Programs in the Foreign Language Vocabulary include separate modes for practice drills that are selectable by the user at any time during program operation, according to a spokesman.

The instruction mode displays the randomly selected word in both languages; the practice mode displays the word in one language and permits several user guesses before printing the correct answer; and the testing mode permits the user to select the number of words to be tested and returns the test score upon completion.

An Educator option is also available that permits the creation of files for the storage of student identification, test responses and test scores, for use in a classroom situation, the spokesman added.

Each volume of the Foreign Language Vocabulary, written in Basic, includes an annotated program listing and program flow chart to facilitate user loading and understanding the spokesman said.

The programs utilize single-statement lines to avoid confusion and permit ease of user modification, the firm claimed.

Each language program costs $5 with the Educator option priced at an additional $3. All four volumes cost $17.50 or $27.50 with the special option.

Quantity discounts are also available, Musgrove said from 9547 Kindletree Drive, Houston, Texas 77060.

Computerfest '78 Set For Detroit June 23-25

DETROIT — Computerfest '78, a three-day exposition sponsored by the Midwest Affiliation of Computer Clubs (Macc), will take place June 23-25 here at the Detroit Plaza Hotel.

The conference will primarily be geared toward personal computing, but emphasis will also be placed on microcomputer applications in small business, user education and the future social impact of microprocessor technology, a spokesman noted.

Seminars and technical sessions will cover business systems, graphics and art, applications for the handicapped, automotive applications and hobbyist projects.

A flea market and exhibits by various computer clubs and organizations are also planned.

The registration fee for the three-day exhibition is $5; it is $4 if registration applications are received before June 15. Information and tickets can be obtained from Semco/-Computerfest '78, Box 9578, Department Mike, Detroit, Mich. 48202.

16-Bit Module Announced by TI

DALLAS — A microcomputer module from Texas Instruments, Inc. offers up to 4K words by 16 bits of electrically programmable read-only memory (Eprom) and up to 2K words by 16 bits of static random-access memory (RAM).

The TM990/101M, an extension of TI's 990 series, also contains two serial I/O ports, one for "remote" usage with a terminal or modem, the other for "local" usage with the firm's 301 Microterminal, an EIA standard terminal or a teletypewriter, TI said.

The module is available in three versions, each differing in the type of local port I/O signal and in the amount of programming of the Eprom memory. One model, for instance, is configured for teletypewriters and contains 1K of Eprom and 1K of RAM with the firm's Tibug monitor program located in the Eprom, the firm stated.

All three versions, however, offer three programmable interval timers, up to 17 interrupts and 16 lines of programmable parallel I/O, the company added.

Optional accessories for the module include an I/O board, memory expansion boards, a prototyping board, a four-slot OEM chassis, connector kits and cables to interface to selected terminals.

Assembled and tested, the module with 1K by 16 bits of Eprom and 1K by 16 bits of static RAM costs $625. TI can be reached at P.O. Box 1443, M/S 653, Houston, Texas 77001.

Spectronics Designs Lamp To Erase Eprom Chips

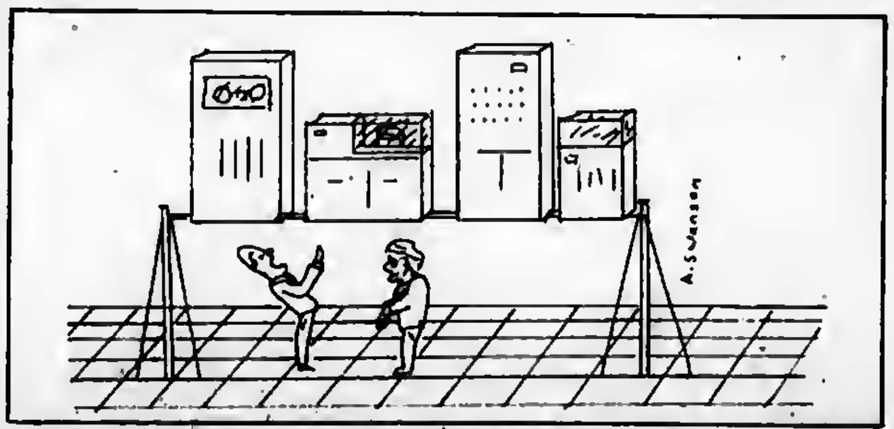
WESTBURY, N.Y. — The Spectronics Corp. has an erasable programmable read-only memory (Eprom)-erasing ultraviolet lamp that will erase up to nine chips in as few as 12 minutes, the firm said.

The unit's two high-intensity ultraviolet lamps are fully shielded. The Spectroline PE-24T has a safety interlock to prevent the unit from operating when the tray is not fully inserted.

A conducive foam pad holds the chips in place during exposure and reportedly prevents electrostatic buildup while protecting the chips from possible static charge.

A 60-minute timer is included for automatic shut-off.

The PE-24T sells for $104.50 from the firm at 956 Brush Hollow Road, P.O. Box 483, Westbury, N.Y. 11590.



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In New Jersey, California

Software Tax Opponents Make Progress

By Marguerite Zientara
CW Staff

Further progress has been made in the states of New Jersey and California in the software industry's attempts to ensure the nontaxability of software.

In New Jersey, most of the software industry has been exempted from sales and use tax, effective May 4; in California, a meeting between the Department of Taxation's Board of Equalization and software experts will take place within two weeks to review and possibly redraft State Regulation 1502, which dictates the taxation of software and services.

The New Jersey action resulted from the adoption by the director of the state's tax division of a tax regulation that interprets the law stating that tangible personal property is taxable, according to a spokesman for the Tax Counselor Division of the State Division of Taxation [CW, April 24].

The regulation, published April 6 in the *New Jersey Law Journal* and the state government's *New Jersey Register*, exempts most software and services from taxation except for data conversion services such as keypunching, where the product is delivered directly to the customer.

In exempting software from taxation, New Jersey is requiring that the programs either be modified to run in the environment of the customer's particular make and model of computer or be the result of analysis by the vendor of the customer's requirements. This position is similar to that taken by the State of New York [CW, Nov. 21].

"This is an eminently fair decision which is in line with what New York State has done. It will prevent people from switching from one state to another in an effort to avoid what was an inequitable tax," according to Sanford Goldberg, an attorney with Roberts & Holland of New York and tax counsel in the case for the Association of Data Processing Service Organizations (Adapso).

Adapso intends to continue working to further refine New Jersey's rules, particularly in the area of data conversion services, according to a spokesman.

The agreement on the California meeting was the result of a two-hour public hearing May 4 at which members of California's Sales Tax Action Group (Stag) testified against the Regulation 1502, which taxes software and services [CW, April 24].

"The hearing went very well; we got just what we wanted," Stag President Donald Mulvey said.

Stag is an unincorporated association of representatives from approximately 150 DP companies based in California or with business activities in California. The group feels the board improperly taxes intangible computer programs through "contrived logic" and is inconsistent in its application of the regulation's provisions, resulting in "selective, discriminatory and inequitable" taxation.

DP Products In Data Base

LEXINGTON, Mass. — GML Corp. here recently introduced its Computer Equipment and Systems Data Base, which it said contains about 750,000 pieces of information covering 12 product areas.

The data base's information is compiled by personal contacts between GML and manufacturers. The base currently contains data on 800 computers, 750 terminals, 1,500 disks and 1,200 printers being manufactured.

Questions from various perspectives including marketing, sales, and purchasing/selection can be addressed to the base.

Available on a subscription basis, on magnetic tape or in report form, the file is continually updated, GML said from 594 Marrett Road, Lexington, Mass. 02173.

Don't Bank Just on EFT, Report Warns Vendors

By Marcia Blumenthal
CW Staff

SAN JOSE, Calif. — While electronic funds transfer (EFT) applications will outpace all others in the banking industry, vendors should not bank solely on EFT to the exclusion of developing other new products and traditional applications, a report released recently by SBS Publishing cautioned.

EFT will account for 19% of DP expenditures in the industry by 1985, up from a 1977 share of 6%, the report noted.

The banking industry has been the second largest commercial DP market for two decades, accounting for $4.9 billion in 1977 — slightly less than 11% of total U.S. DP expenditures, the report noted.

By 1985, the industry will spend $12 billion annually, about 10% of the projected U.S. DP market of $112.7 billion, according to "Banking DP Product and Service Opportunities — The Reality Ahead For EFT."

Although this 10% growth rate will be slightly slower than the average DP growth of 12% in all industries, the study noted that banking was one of the first industries to adopt DP for business operations. The smaller growth rate therefore represents a maturing, not a major slowdown, of DP expenditures in banking, the study concluded.

However, certain product and application segments within the banking industry will grow faster than the forecast 10%. In the

(Continued on Page 59)

Study Sees Micro Systems Capturing Business World

CHERRY HILL, N.J. — Outfitted with business-oriented peripherals and application programs, the personal computer will have a more significant impact than any of the minicomputer-based business computers introduced to date, according to a report recently published in "Small Business Computer News," a publication of Management Information Corp.

Until recently, the business with annual sales of less than $2 million had three DP alternatives: to use a service bureau; to select a small business computer system; or to assume a wait-and-see attitude.

The micro-based personal computer now offers a fourth alternative, the report said. However, limited storage capacity and the scarcity of application programs are two pitfalls of using the personal computer for business purposes, it added.

The market for personal computers will soar from present annual sales of about $60 million to more than $300 million by 1980, representing a jump from 15,000 systems sold in 1976 to more than 100,000 in 1980, the report projected.

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Milacron to Sell Its Small Systems Business

By Jeffry Beeler
CW Staff

LEBANON, Ohio — Cincinnati Milacron, Inc. has entered into an agreement of intent to sell its small systems business to the employees of its computer products group, company officials announced recently.

The proposed divestment, which is slated to take effect in June, marks Milacron's departure from the stand-alone systems field, although the firm will continue to supply minicomputers as modules for its numerical control product line.

Under the divestment plan, Milacron's computer products group would reportedly become CSD International Corp. an independent company with worldwide manufacturing and marketing rights to the parent firm's George line of small business systems. The plan also calls for Wayne Sennett to leave his post as manager of Milacron's computer division and join the outfit as president.

Milacron's sale of its computer operation stemmed partly from the firm's growing belief that involvement in the small systems business conflicted with its long-range corporate goals, Sennett explained.

Since it entered the computer industry in the early 1970s, Milacron had devoted an increasingly large share of its resources and R&D expenditures to the small business systems field. But in recent years that share had grown so large that it threatened to distract the firm from its primary mission — the machine tool and numerical control equipment business, he said.

Sennett also attributed the divestment to physical expansion in the Milacron computer division, which he said had outgrown its existing manufacturing site and had long been searching for an alternative facility.

He dismissed the suggestion, however, that the firm's decision to quit the small systems business was prompted by falling profits. Although he declined to reveal the Milacron computer operation's most recent earnings, Sennett stressed that when those figures do become available "people will find them very favorable."

In becoming an independent entity, CSD International acquired all the former Milacron division's fixed assets and inventory as well as its nationwide network of sales and service offices, Sennett said. As a separate firm, therefore, CSD International would be able to provide the same level of support and maintenance for the George product line as the parent company, he assured users.

CSD International also inherited the Milacron operation's product development plans, which call for the introduction of assorted offerings including additional minis, compilers and operating systems during the coming months, he added. Sennett and his management staff members, almost all of whom are holdovers from the Milacron division, intend to begin implementing those development plans soon after the infant company occupies its new headquarters and manufacturing facility, which will open near here in July.

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CI Notes

Garcia Named to Head NCR's U.S. DP Group

DAYTON, Ohio — NCR Corp. recently named Manuel Garcia senior vice-president for the U.S. Data Processing Group. In this capacity, Garcia will supervise the sales, service and support of NCR computers, data terminals and other DP equipment.

The U.S. Data Processing Group consists of 14 regions and has about 400 district offices located in all principal cities.

Filling a vacancy created by the retirement of E.F. Shipman, Garcia joined the company in 1977 as vice-president assigned to special marketing projects.

IBM Announces Changes In Executive Lineup

ARMONK, N.Y. — IBM recently announced three executive position changes.

William W. Eggleston, formerly president of the IBM World Trade Americas/Far East Corp., is the new assistant group executive of the Data Processing Product Group.

Eggleston's former post was taken over by Terry R. Lautenbach, who had been president of the Data Processing Division (DPD).

The new DPD president is C. Michael Armstrong, previously DPD vice-president, marketing operations.

Signetics to Second-Source Intel 8021 Single-Chip Micro

SUNNYVALE, Calif. — Signetics, Inc. and its parent, N.V. Philips' Gloeilampenfabrieken, announced they will second-source the Intel Corp. 8021 general-purpose single-chip microcomputer, a new lower cost version of Intel's 8048.

A company spokesman said. "It was important to commit ourselves early to this chip because it offers the features single-chip users are looking for at the lowest price of any single-chip 8-bit microcomputer presently on the market."

Intel will provide Signetics with the 8021 mask set, test programs, schematics and engineering support, which will ensure early full compatibility of the Signetics and Intel 8021 products, which Signetics expects to sample during the fourth quarter of 1978, the company noted.

Supershorts

An exhibition of business equipment, computers and health care equipment, considered the most promising sectors for U.S. export to New Zealand, will be sponsored by the U.S. Department of Commerce in Wellington, New Zealand, on July 24-28.

The New Zealand computer and business equipment market, currently over $60 million (installed), is expected to almost double by 1981, with the best opportunities for mini- and microcomputing systems.

— — —

Connecticut Business Computers, Inc. recently became the exclusive distributor of Qantel Corp. computer systems for Connecticut (with the exception of Fairfield County).

— — —

Hewlett-Packard Co. delivered its 1,000th HP 1000 series computer system to the Products Research Division of Exxon Research and Engineering Co.

— — —

Pertec Computer Corp. (PCC) announced that the Triumph-Adler Group, a subsidiary of Litton Industries, Inc., is the PCC licensee in West Germany, Austria and Switzerland.

Also, a similar agreement was recently reached with Sociedad Espanola de Communicacions e Informatica S.A. in Spain.

— — —

Storage Technology Corp. received a President's "E" Award in recognition of its export activity growing more than 900% over the past five years, from $3 million in 1973 to $27.5 million in 1977.

Don't Bank Only on EFT: Study

(Continued from Page 57)

product area, terminals supporting on-line systems, including EFT, will account for more than 14% of total DP expenditures in 1984 vs. 10% in 1977.

In addition, the use of minicomputers will increase for both traditional banking applications, such as mortgage loan portfolio management, and for distributed data processing applications, including remote check processing.

EFT Growth

While demand deposit accounting applications will continue to dominate DP applications, the study forecast that EFT growth, despite its current lull, will outpace all other applications, accounting for 19% of DP expenditures by 1985, up from 6% in 1977.

Charge card processing will be the most widely used EFT application, growing 24% annually and reaching a hefty $940 million by 1985, compared with $172 million in 1977.

Telephone Payment

Telephone payment systems, the study projected, will be the new product within the applications sector.

However, the study cautioned vendors not to neglect the development of new products and services for traditional applications in favor of EFT. The per-transaction cost of EFT is presently quite high and will not fall below the cost of manual methods until consumer resistance is overcome, the report said.

Other important application areas noted in the report included mortgage loan and savings accounting and resale services, such as payroll and trust accounting, which larger banks offer to smaller banks and retail customers.

Aside from product and application trends, the report predicted all banks will begin to look alike to the consumer as banking systems vie to offer customers expanded services.

The banking industry consists of four segments: commercial banks, savings institutions, credit unions and commercial finance companies.

Although the study forecast all banking segments will expand services, it said the emphasis within the segments will be different.

Inside Automation

For instance, commercial banks will spend more to automate inside services — including central information files, on-line account balance inquiries and transaction processing at teller stations — than they will on automated teller machines, point-of-sale terminals and telephone payment systems.

On the other hand, credit unions and savings banks, which are already highly automated, will concentrate on EFT in order to broaden services and appeal to a wider range of customers. Credit unions were predicted to be the major EFT innovator in the commercial sector.

While savings banks and credit unions do not have the wholesale and retail contacts of a commercial bank, the study pointed out, these thrift institutions do have the flexibility and on-line systems already in place, which commercial banks lack because of their large investment in batch-oriented systems.

A Few Clouds

Although the future for DP in banking will continue to be rosy, the study painted the horizon a bit cloudy for vendors competing for large commercial bank business. The reason: IBM has been attempting to lock in users with its proprietary and complex Systems Network Architecture (SNA) and Series 1 minicomputers, the report said.

Priced at $1,250, the report is available from SBS Publishing, Suite 190, 4320 Stevens Creek Blvd., San Jose, Calif. 95129.

Executive Corner

- Sperry Rand Corp. has named Gerald G. Probst group executive vice-president for computers, business equipment, defense and aerospace operation. Richard L. Gehring has succeeded him as president of Univac, while remaining an executive vice-president of the corporation.
- Manuel Garcia has been named senior vice-president of NCR Corp.'s U.S. Data Processing Group.
- Torrey Everett has been appointed vice-president of finance at Logical Machine Corp.
- Alvin Schneider has been named vice-president of sales at STC Systems, Inc.
- Dr. Lindsay Wang has joined Inter Systems, Inc. of Arlington, Va., as technical director.
- John T.M. Pryke has been appointed manager of new markets development at Compugraphic Corp.
- Kenneth W. Draeger has been appointed a corporate vice-president of Automatic Data Processing, Inc.
- Bob Field has joined Zilog, Inc. as vice-president of marketing.
- Don Mattson has been promoted to vice-president of product operations and Milo L. Cermak has been appointed vice-president of international marketing at Information Termainals Corp.
- Gordon Peterson, director of marketing, and Sven Behrendt, director of marketing/-Europe, have been promoted to vice-presidents at Monolithic Memories, Inc. Max Chancellor has been promoted to vice-president of industrial operations.
- George A. Reed has joined Computer Systems of America, Inc. as executive vice-president, responsible for directing lease financing and documentation.
- Robert C. Ludwig, Gerald Loev and Jude T. Gartland have been appointed vice-presidents at Index Systems Inc. of Cambridge, Mass.
- Ronald E. Peeples has been appointed vice-president of finance at Continental Computer Leasing Corp.
- Thomas B. Cramp has been named vice-president of finance for the Data Services Group of Computer Sciences Corp. Edwin T. Carlson has been named vice-president of plans and programs for the firm's Commercial Division.
- Peter LaBriola has been elected vice-president of commercial services at Applied Data Research Services, Inc.
- Three executives at Pertec Computer Corp. have been promoted to corporate vice-president positions. Paul A. Busse was named corporate vice-president and treasurer; Thomas H. Elrod was named corporate vice-president and general manager of the Data Systems Operations Division; and William J. Frank Jr. was named vice-president of corporate planning. Merrill J. Ruge has joined Pertec as vice-president of industrial relations.
- Naim S. Aweida has been promoted to executive vice-president of field operations division at Storage Technology Corp.
- William R. Lennartz has assumed the presidency of Computer Power Systems Corp.
- Paul Gordon has joined Information Processing Directions, Inc. as a principal and vice-president.
- Donald E. Peeples has been appointed vice-president, network and engineering, and William R. Wofford has been appointed vice-president, customer services and systems, at GTE Data Services Inc. N.H. Hawkins has been appointed to the newly created position of vice-president of marketing for GTE Comp-Acct, Inc.

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CA to Open Irish Manufacturing Plant in July

By Marcia Blumenthal
CW Staff

NEW YORK — Computer Automation, Inc. will begin its first full-scale overseas manufacturing operation with the opening of a plant in Dublin, Ireland, in July.

Starting with production of the Syfa network processing system, Computer Automation Ireland Ltd., a wholly owned subsidiary, will phase in the entire CA product line, over the next three years, according to a spokesman for the Industrial Development Authority Ireland (IDAI).

Despite the doubling of facilities in Irvine, Calif., in early 1977, CA President David H. Methvin said, "sales continue to outstrip manufacturing capacity. It was decided to spread operations geographically in order to be closer to readily available labor pools and customers."

Output from the Ireland plant will primarily supply customers of the European Common Market.

By locating the facility in Ireland, CA will benefit both from the elimination of tariffs among Common Market members and from the financial incentives provided by the Irish government to companies establishing subsidiaries there.

One of the incentives is the absence of taxes on profits made from sales of exported goods, In addition, Irish government contributes a portion of the fixed assets (usually 25% to 35%), which is considered a nonrepayable capital grant.

Bottom Line

The bottom line for IDAI is the creation of jobs, and IDAI foots all the bills for training nationals, including transportation for U.S. trainers.

Stuart F. Dale, CA corporate vice-president for product planning, will head up the operation in Ireland. Dale, the only CA employee to be transferred to Ireland, said CA's goal is "to recruit manufacturing, engineering and administrative personnel locally and turn management over to Irish nationals as rapidly as is practical."

Employment at the plant is expected to exceed 600 within five years, IDAI reported.

Geoffrey Salkeld, CA corporate vice-president, has been assigned the overall responsibilities for European sales and marketing activities, which include direct sales and customer support by CA subsidiaries as well as agreements with international distributors.

Other computer companies — including Digital Equipment Corp., Amdahl Corp., Data 100 Corp. and Analog Devices, Inc. — have already opened operations in Ireland.

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STORAGE TECHNOLOGY
Three Monthe Ended Merch 31

	1978	1977
Shr Ernd	$.85	$.37
Revenue	54,244,000	32,182,000
Earnings	3,549,000	1,849,000

TALLY
Three Months Ended Merch 31

	1978	1977
Shr Ernd	$.17	$.21
Revenue	8,284,000	8,433,000
Tax Cred	....	182,000
Earnings	480,000	568,000

TELENET
Three Months Ended Merch 31

	1978	1977
Revenue	$1,479,000	$693,000
Loss	1,106,000	961,000

TEXAS INSTRUMENTS
Three Months Ended March 31

	1978	1877
Shr Ernd	$1.35	$1.20
Revenue	557,552,000	481,921,000
Eernings	30,699,000	27,344,000

COMPUTER AUTOMATION
Three Months Ended April 2

	1978	1877
Shr Ernd	$.89	$.82
Revenue	17,075,000	12,056,000
Eernings	1,763,000	1,821,000
9 Mo Shr	2.32	1.78
Revenue	43,601,000	29,988,000
Earnings	4,609,000	3,488,000

COMPUTER COMMUNICATIONS
Three Months Ended Merch 31

	1978	1977
Shr Ernd	$.24	$.15
Revenue	5,078,527	3,581,148
Tax Cred	360,000	220,000
Eernings	742,906	481,306
9 Mo Shr	.58	.45
Revenue	13,018,466	10,002,782
Tax Cred	820,000	840,000
Earnings	1,701,178	1,338,778

COMPUTER 8CIENCES
Year Ended Merch 31

	1978	1877
Shr Ernd	$.97	a$.98
Revenue	278,912,000	234,745,000
Spec Cred	.....	3,000,000
Earnings	13,880,000	14,635,000
3 Mo Shr	.28	s.28
Revenue	77,485,000	63,188,000
Spec Cred	.....	750,000
Earnings	3,851,000	3,870,000

a-Restated.

CRAY RESEARCH
Three Months Ended March 31

	1978	1877
Revenue	$1,331,926	$508,874
Loss	210,906	487,570

CUBIC
Three Months Ended March 31

	1978	1977
Shr Ernd	$.71	$.49
Revenue.	36,077,300	29,132,500
Earnings	2,088,000	1,433,600
6 Mo 8hr	1.26	.97
Revenue	67,078,600	56,815,600
Earnings	3,765,600	2,829,100

INFORMATION MAGNETICS
Three Months Ended April 1

	1878	s1977
Shr Ernd	$.02	$.21
Revenue	7,102,000	7,541,000
Disc Op	25,000	(178,000)
Earnings	37,000	399,000

a-Restated to reflect discontinued operations.

LEAR SIEGLER
Three Months Ended Merch 31

	1978	1977
Shr Ernd	$.88	$.55
Revenue	290,489,000	270,882,000
Earnings	11,885,000	9,114,000
9 Mo Shr	1.82	1.39
Revenue	825,518,000	627,047,000
Esrnings	30,717,000	23,157,000

DIGITAL EQUIPMENT
Three Months Ended April 1

	1978	1877
	(000)	(000)
Shr Ernd	$.87	$.72
Revenue	374,789	282,727
Earnings	36,988	27,991
9 Mo Shr	2.31	1.73
Revenue	1,024,010	728,289
Earnings	95,871	87,392

DOCUTEL
Three Months Ended March 31

	1878	1977
Shr Ernd	$.04	.....
Revenue	8,845,028	$8,208,947
Tax Cred	82,914	.....
Eernings	107,887	(157,782)

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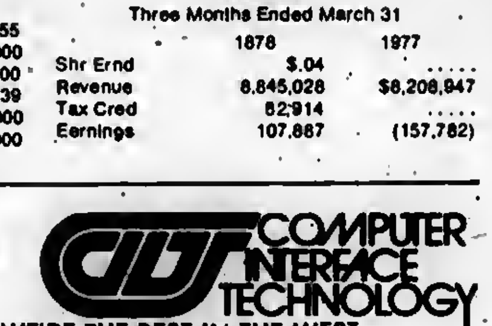

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BE AN INSTRUCTOR

If you're getting tired of pushing e pencil all dey, but you went to stey in Deta Processing, then consider e cereer in teaching young progremmers end enelysts some of the things you've learned from experience. If you ere people-oriented, if you communicete well, if you get e kick out of helping someone else echieve e goel, then teaching Deta Processing may be just the thing you need to get off the treedmill. Cell Kathy Dolen, Director of Academic Affeirs, Computer Processing Institute, East Hartford, Connecticut (203) 528-9211, or Bob Asbury, Director, Computer Processing Institute, Stratford, Connecticut, (203) 377-6714.

COMPUTER PROCESSING INSTITUTE cpi

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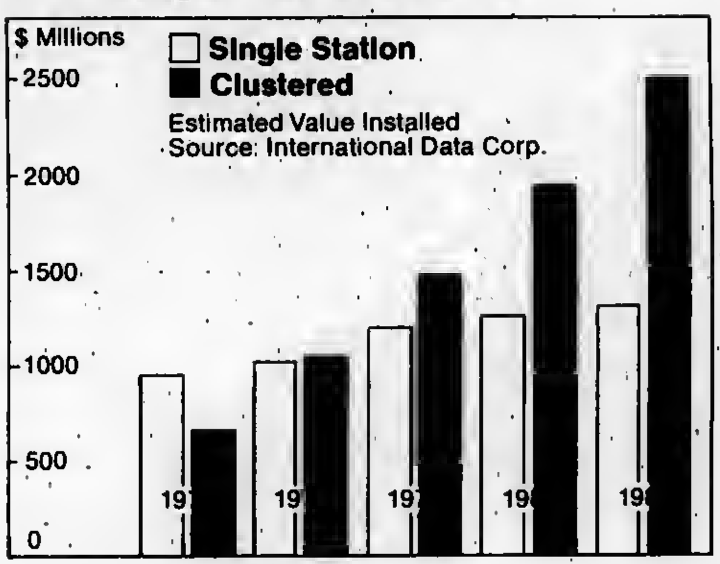

Four-Phase is a leader in Clustered Terminal Systems, the fastest growing portion of the Distributed Processing market.

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If you're an achievement oriented professional, we want to talk to you at NCC. Call (714) 752-6657 and set up an appointment with one of our key managers. Spend an hour; get a feel for the company of the future —perhaps your future as well. Four-Phase Systems, Inc., 10700 North De Anza Blvd., Cupertino, CA 95014. An equal opportunity employer M/F.

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- Corporate Marketing Staff

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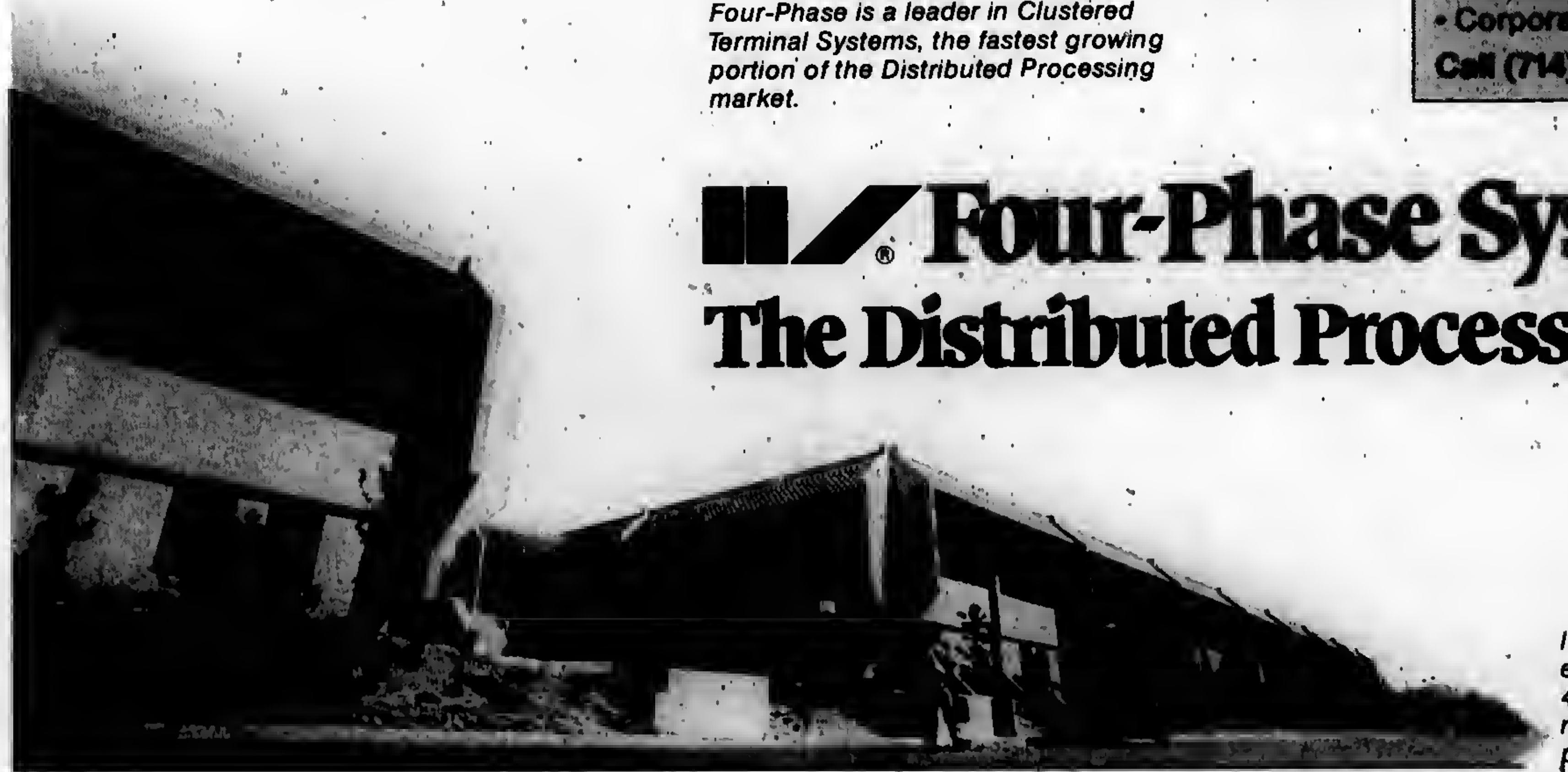

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Applicants should have experience in maintaining, modifying or extending any of the the following operating systems:

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Applicants should have experience on one of the following machines: AN/UYK-7, AN/UYK-20 (similar equipment experience may be substituted).

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Command Control Design H/W, S/W, F/W
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Electronic Switching

For immediate consideration, please send resume, salary history and geographical preference to: John N. Powers at the address below

or if you are attending the National Computer Conference in Anaheim, call Mike Pelto from June 5-8 at Sheraton, Anaheim (714) 778-1700.

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- **A bachelor's degree.**

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Robertshaw Controls-May 29

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Liberal starting salary. Excellent benefits.

Reply in writing stating qualifications to A.J. Falco, Personnel Manager

Robertshaw Controls Co.
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-San Francisco-

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- Async protocols
- X.25
- Software development

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- Assembly language

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You will be working in a fast-paced, stimulating environment with the kind of high achievers who have staked out a dominant position for NCR in the business and financial EDP markets. You can enter a crucial program at an opportune time to show your talents and move up in the rapidly expanding NCR organization.

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- CPCS Check Processing and Control Systems
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To plan, develop and lead a section in systems and programming activities. Qualified candidates should have--

Five years' experience in systems and COBOL programming. An appropriate college degree. Major system design or installation experience. Knowledge of large computer job control language.

Lead Programmers and Programmers

Qualified candidates should have--

One to three years' systems and COBOL programming experience. An appropriate college degree. Knowledge of large computer job control language.

Systems Analyst

Qualified candidates will have--

Two years' experience as a systems analyst. An appropriate college degree. Ability to interact with user personnel.

Communications/ Hardware Specialist

Qualified candidates will have--

Two years' experience programming mini computers, or Two years' experience designing hardware configurations for teleprocessing system, or A years' experience installing major information systems on minicomputers. An appropriate college degree.

We offer competitive salaries and have excellent fringe benefits.

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COMPUTER SYSTEMS ENGINEERS

NCC INTERVIEWS

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The position requires experience in minicomputer and microcomputer systems architecture. The individual we are seeking will have experience in operating system design for minicomputers preferably in a fail-soft environment.

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This position requires an individual who can work with decentralized computer installations in developing an on-going performance measurement and capacity planning program. The position requires experience in an IBM-MVS environment. Experience with IMS and/or CICS is highly desirable. Up to 50% travel is required.

Excellent salaries commensurate with experience. Fine benefits package.

To arrange for an interview at NCC call Ms. Kathy DiFiore, collect, at (212) 480-2891. If you are not attending the NCC, send your resume to Ms. Kathy DiFiore, American Express Company, 125 Broad Street, New York, New York 10004.

AMERICAN EXPRESS

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NCR's "Easy Upward Migration" describes the way our interactive, real-time "Total System" computers are designed to be upgraded into higher-level systems without scrapping equipment or programs. **And it just as accurately describes career paths at NCR.**

We're a "Big Three" computer manufacturer in a hurry. Demand for our pioneer, business-oriented distributed data processing networks and micro-mini-mainframe systems is accelerating. Upward migration paths at NCR are wide open, and we're moving people up faster than they've ever been moved before. We're searching for ambitious, impatient, upward-bound software/hardware pros who are capable of climbing rapidly into management.

We're prepared to discuss **all** of the openings listed below—and others throughout the **entire** NCR Corporation. Talk to us. Phone for interview information—

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Design and application of an advanced communications network architecture to meet distributive processing needs of the 1980's. Experience desired in teleprocessing, system architecture, network processing, transaction processing.
- **Transaction Processing**
Design/Implement transaction processing facilities—parallel tasking, interprocess communications, system recovery. Project leader position available.
- **Interactive Processing**
Design/Implement interactive processing facilities of large, general-purpose O/S—text editor, interactive compilers, program development tools.
- **Data Base**
Design/Implement DBM software. Experience desired in relational, network, or hierarchical data base internals. Project Leader position available.
- **Software Engineering**
Prepare and coordinate a plan for migrating system software development (medium-to-large scale O/S) to a high level language.
- **File Access Methods**
Design/Implement high performance access methods in a storage hierarchy environment.
- **Performance Measurement & Analysis**
Use analytical and empirical tools to identify tuning opportunities and evaluate design alternatives in areas such as distributed processing, data base and transaction processing.
- **Operating System Development**
Design/Implement multiprogramming, virtual storage O/S on uniprocessor and multi-processor configuration.
- **Compiler Design/Development**
- **Firmware**
Project Lead/Analysts
- **Diagnostic Programming**
Design, develop programs to support software testing, release and repair.
- **Test Systems Development**
- **MIS Applications**
- **Software Quality Assurance**
- **Configuration Management**
Design, Test, Integration

- **MICR Proof Of Deposit Software**
- **Design Automation**
- **Systems Architects**
Future EDP Systems

Immediate Openings—Hardware

- **MICR/OCR/OMR Engineers**
- **Design Automation Engineer**
- **Memory Device Engineer**
- **Logic Design Engineers**
CPU and peripheral controllers (microcoding for I/O subsystems)
- **Functional Specifications**
I/O subsystems; integration
- **Components Engineer Semiconductors**
Digital ICs, microprocessors
- **I/O Subsystem Configuration**
Technical lead
- **Systems Integration Test**
- **Design Engineer—Peripherals**
- **Design Engineer—R & D**
Systems architecture
- **Design Engineer—Power**
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- **Design Engineer—Communications**
Distributive processing networks
- **Mechanical Engineer—Electronic Packaging**
- **Test Systems Development**
- **Product Engineers**
Mechanical, optical, electrical associated with introduction of new computer file storage devices into factory production.

Interviews June 5-8

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If you cannot meet us at the National Computer Conference, contact the following, for specific information at these and other NCR locations throughout the country:

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NCR Corporation
Engineering & Manufacturing,
16550 W. Bernardo Dr.,
San Diego, CA. 92127

Wichita:
Professional Placement Dept.
NCR Corporation
Engineering & Manufacturing,
3718 N. Rock Road,
Wichita, Ks 67226

NCR
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data services
western union

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(And some very good jobs for some very good Engineers in our fast-growing, almost $40-million company.)

The "good life" may well be an understatement. We're located in the foothills of the scenic Ramapo Mountains so you can live the life of a country squire yet be just thirty easy miles from the glamor- and clamor-of New York City. Less than half that to the all-season Meadowlands Sports Complex. And throughout our area, the housing is plentiful, shopping and recreational facilities easily-accessible and the schools excellent. But just as our location offers ideal living conditions, our company offers equally ideal growth conditions.

A key subsidiary of Western Union Corporation, our success stems from maintaining state-of-the-art technology and applying it to leasing and servicing a full line of high and low speed teleprinter, video and intelligent terminals. This, coupled with our systems approach to service and our increasing dominance in the areas of electronic mail, communicated word processing and sophisticated word/data entry systems keeps us ahead of the competition in a very competitive industry. To stay ahead and accelerate our growth, we're seeking some growth-oriented individuals who may also be seeking that every-illusive "good life". We have it, if you have the professional skills we need:

SOFTWARE SYSTEMS DESIGNERS "INTELLIGENT" COMMUNICATIONS TERMINALS DDP

You'll have at least four years' experience backed by a BSEE or equal and the ability to design and spec multi-tasking, multi-programming operating systems. Areas of heavy concentration should include: Primitives, table layouts, queueing, calling sequences, I/O drivers and handlers and file access methods. In addition, you'll have a well-developed working knowledge of communication protocols, high level language intervals and organization techniques.

An MSEE in Computer Science, Engineering or Math will help greatly in carrying out your responsibilities which inlude the specification, design, writing, debugging and documentation of software for "intelligent" communications terminals, distributed data processing (DDP), word processing and electronic mail.

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The highly-skilled Systems Engineers needed to help us grow will have critical responsibilities in our aggressive sales/marketing program. Each should have Computer Sciences or equal. You should have communications computer systems and field sales experience with end users and know communications protocols, facilities, modems, systems design, computer operation, applications system design and programming. In addition, you'll be better able to carry out your substantial duties if you're familiar with micro-processing programming of user applications and have experience in IBM as well as other types of software.

You'll provide systems engineering support in the analysis, design and implementation of terminal communications systems and a technical support program. Responsibilities include: sales assistance, customer service, systems implmentation account responsibility, staff and field sales assistance (communications protocpl and applications software), and sales support telephones.

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Or send your resume and salary history, in confidence, to: Personnel-CW.

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The Position

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We offer a high starting salary (well above that for comparable positions) and an excellent benefits package that includes a dental plan.

The Candidate

A highly skilled career-oriented individual who possesses two-to-three years' experience with minicomputers, troubleshooting ability to the component level, and IBM or equivalent channel experience. First-hand teleprocessing and front-end or message switching knowledge is necessary.

The Contact

For immediate and confidential consideration, please contact our National Recruiter by calling collect or sending a resume:

Bob Denenberg
(213) 274-5328
9701 Wilshire Blvd., Suite 805
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Entry level position in operations software support. Will be monitoring RSTS and RSX operating environment. Must have experience OEC equipment and working knowledge of RSTS and RSX helpful. Prefer college degree in Computer Science with Business Administration emphasis or equivalent experience.

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Georgia-Pacific

Personnel Department
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PROGRAMMING

Systems Software Analyst

San Diego Opportunity

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You will be responsible for providing overall techanical coordination between our data center and on-line users, and for developing systems programs for use in technical applications.

The ideal background will include experience on the B6700 and familiarity with ALGOL. If your experience does not include use of the B6700, strong consideration will be given for experience in operating systems and compiler support

Burroughs offers career challenge in addition to an excellent salary and generous benefits package, including a liberal relocation allowance.

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Prog & P/A COBOL, DB or on-line a plus	15-22

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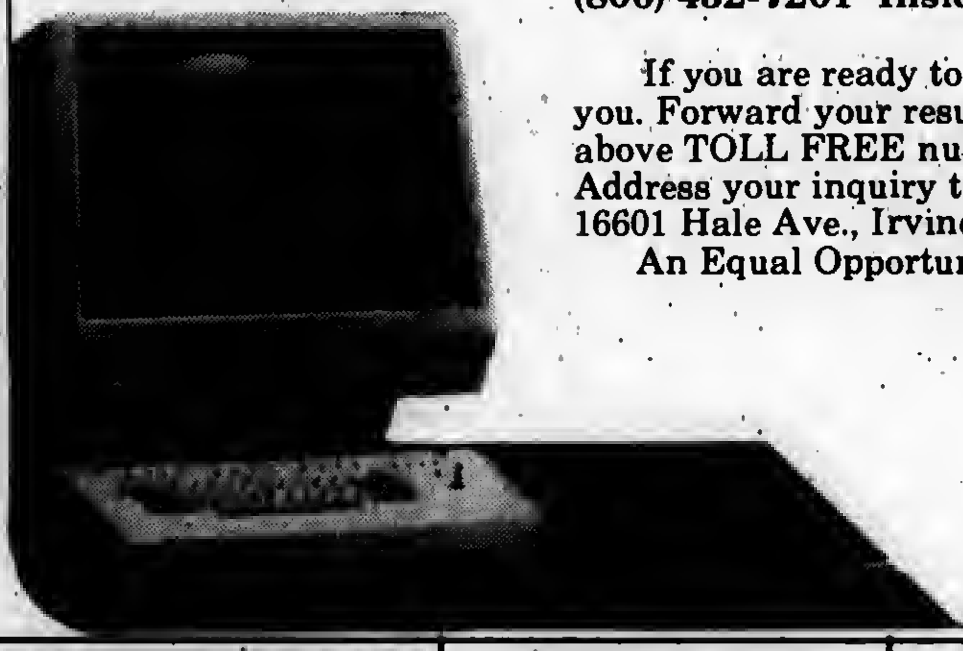

If you are ready to put your talents to work, let's hear from you. Forward your resume or summary sheet or call one of the above TOLL FREE numbers, listing your area of preference. Address your inquiry to Tod Sorensen, TEKTRONIX, INC., 16601 Hale Ave., Irvine, CA 92714.

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Insurance Personnel

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We are looking for career oriented individuals who appreciate stable employment and the opportunity for professional growth. Come work where tennis, golf, and fishing can be enjoyed year-round. Harris Semiconductor is located in the sunny Atlantic ocean community of Melbourne, just one hour East of Orlando. Send resume with salary history and requirements to:

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Bechtel Corporation
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P.O. Box 3965
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Send resume with current salary to Margaret Ives.

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The Conference Company

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Contact Bill Denny, V.P.
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with experience in

IMS

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- Proficiency in the use of COBOL and/or PL-1
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These positions are available in Corporate Systems Support at our facility in Westchester County, New York. The individuals selected will act as Internal Consultants to site and remote location groups in the design and analysis of integrated batch and on-line systems, as well as participate in the Data Base administrative function.

We are now in the process of upgrading the current twin 370/158 MVS/MP environment. An outstanding benefits package (including relocation assistance where necessary) will augment excellent salaries.

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CIBA—GEIGY

The Search Is Here

Honeywell Interviews June 5-8

Honeywell's highly successful nationwide Search for the best computer professionals in the industry is coming to The National Computer Conference.

All across the country, professionals from a wide range of large and small companies—including our chief competitors—have responded to The Search. And when they took a close look at Honeywell and where we're going, they decided that *here* is where they wanted to be.

Now The Search is coming to The National Computer Conference. Throughout the conference (June 5-8), you'll have a chance to talk with Honeywell managers and other key personnel about where Honeywell is taking computers and what we can offer you. Our Small/Medium Information Systems Division (S/MISD) and our Large Information Systems Division (LISD) are continuing to grow rapidly and have exciting career growth opportunities available in a broad range of areas.

So while you're at The National Computer Conference, find out why The Search—and Honeywell—are so successful.

LARGE INFORMATION SYSTEMS—Phoenix, Arizona

Micropackaging Engineers
Logic Engineers
Diagnostic Engineers
Quality Control Engineers
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Software System Test Engineers
Software Analyst

LARGE INFORMATION SYSTEMS DIVISION—
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Software Test Engineer
Software Systems Design Engineers
Software Technical Support Engineers
O/S and Communications Development Engineers
Networking and Communications Engineers
Terminal and Network Applications Engineers
Compiler Development Engineers

HARDWARE DEVELOPMENT ENGINEERING
Circuit Design Engineers
Terminals and Communication Definition Engineers
Software/Hardware Writers
Hardware/Firmware Engineers
Terminal Engineers

LEVEL 6 MINICOMPUTERS
Sales Engineers
Systems Analysts
Market Analysts/Planners

SMALL/MEDIUM INFORMATION SYSTEMS DIVISION—
Brighton, Massachusetts
MANUFACTURING SUPPORT
PCB Assembly Engineers
Process Control Engineers
Vendor Engineers
Process Engineers

Even if you're not looking for a new position, don't pass up this opportunity to see for yourself what all the excitement is about.

NCC Interviews

To arrange for an interview during The National Computer Conference, please call Lou Sinagra for S/MISD positions or Stel Fedor for the LISD positions at the Griswold/Anaheim at (714) 956-4978.

Or drop by our Career Hospitality Suite at the Griswold/Anaheim. Limousine service will be provided from the Convention Center to the Griswold/Anaheim all during the conference.

If you are unable to meet with us at this time, please forward your resume, including salary history, and indicating position or positions of interest to:

FOR S/MISD POSITIONS
Mr. Lou Sinagra, HONEYWELL S/MISD, BM-002, 300 Concord Road,
Billerica, Massachusetts 01821

FOR LISD POSITIONS—PHOENIX
Manager, Recruitment & Placement, HONEYWELL, P.O. Box 6000, M/S Y-150,
Phoenix, AZ 85005

FOR LISD POSITIONS—LOS ANGELES
Ms. Martha Andreani, HONEYWELL, Los Angeles Development Center,
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Manager of Data Base/ Data Communications System Software

Clemson University is seeking a person with experience in Data Base and Data Communications Software to be responsible for maintenance and enhancement of existing system software which includes IDMS data base, VSAM, TCAM DIRECT, NCP & EP. Responsibilities also include the selection, installation, modification and maintenance of TP monitors such as SHADOW II, IDMS-DC, and CICS to fit diverse needs of a large system environment of University and traditional data processing on an IBM System 370 under MVS. Desired qualifications include a Bachelors degree in Computer Science or related field and several years participation in design, development and maintenance of system software. Salary range $18,012 - 25,599. This position is designated as a System Design and Software Development Manager in the S.C. Classification System. Please send resume to:

Dr. C.J. Duckenfield, Dir., Clemson University, Computer Center, Clemson, S.C. 29631

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- customer contact?
- directing technical support?
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- you name it.

Why is GE able to tailor a job to your measurements?

- We are in a stage of widespread expansion of what has become one of GE's major market activities—DP services—so we have plenty (hundreds) of jobs to fill.
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Not only do you get a position that fits, the options remain open after you're in. Again, the large-scale expansion makes on-the-job changes possible—for example, from Technical Representative to Account Representative, from Programmer to Technical Representative, and so on. If you're now on the wrong track, GE offers an opportunity to re-route your career onto paths that lead to greater rewards.

Of course, we need only point to the other advantages of a GE assignment: a distinguished name that opens doors at the highest levels, a reputation for quality and effectiveness in all GE products, and matchless technical support resources.

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We have opportunities for experienced **Sales Representatives** and **Programmer/Analysts** (with emphasis on FORTRAN) in major cities coast-to-coast.

In Maryland, at our Headquarters center, we have opportunities for IBM and Honeywell large-systems **Programmers, Application Programmers and Programmer/Analysts** with FORTRAN and other hi-level language backgrounds; **Senior Marketing Specialists** who know how to develop a product and get it to the customer; and many other DP opportunities for ambitious people who want to match their own rapid growth rate with ours.

• • •

Send your resume and salary history to Manager-Employment, General Electric, Information Services Business Division, 401 N. Washington Street, Room 48D, Rockville, Maryland 20850.

GENERAL ELECTRIC

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ANNOUNCING A NEW POSITION:

DIRECTOR, INFORMATION SERVICES DEPARTMENT

For a Major California County Government

The emphasis is on management and administrative skills, attitudes and orientation.

In a location overlooking San Francisco Bay, a group of department heads, a member of the Board of Supervisors, and the management consulting team of Jan and Paul Weber met recently to define the qualifications for a very special person: the Director of a new Information Services Department for Alameda County.

This new Department will play a major role supporting the delivery of criminal justice, welfare, health care, and other essential services to over one million people. It will combine the existing centralized Data Processing Center with a new Information Management Division, which will coordinate Countywide distributed systems, data bases, standards and training.

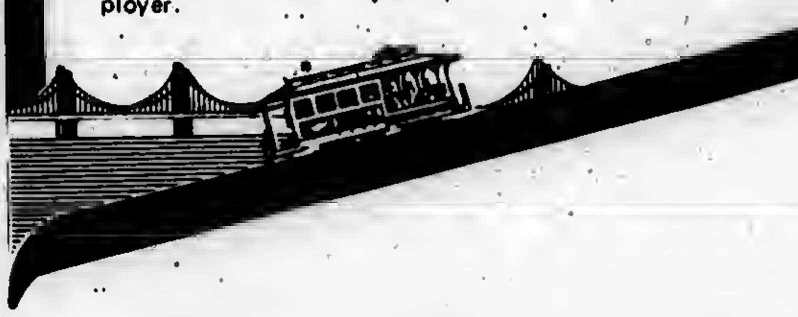
The Department's budget of ten million dollars will include a staff over over 200, two 370/158's and a 370/155 serving more than 600 terminals in eight Bay Area counties. Distributed equipment will incude twelve minicomputers, and more installations are planned.

Alameda County is located in a lively, beautiful, varied area of great culture, climate, history and dynamic change. It encompasses thirteen cities, including Berkeley, site of the University of California.

To meet the challenge of this position, the Director of the Information Services Department must have strength, intelligence and a flexible, innovative approach; be a good listener and an articulate, dynamic communicator; display and inspire trust; have a broad management background including data processing; work effectively in County government; understand current issues and future trends of this technical field; have a service philosophy and be able to instill it in others; be able to attract, select, and retain quality personnel; and be committed to affirmative action.

The position offers great challenge and equally great potential for success. Over a year of studies has set the stage for creating the Information Services Department on July 1, 1978. The Director should be aboard soon thereafter to take charge of the new Department and oversee the selection of an Assistant Director for the new Division. Recognizing the need for an exceptional individual, the County is offering a salary negotiable to $45,000 and an extensive package of management benefits.

If you feel that you are this special person and that this challenging position will provide you with the growth and job satisfaction you are looking for, act now. Mail your resume to Tom Duncan, Alameda County Personnel, 1221 Oak St., Oakland, CA 94612. Or call him at (415) 874-7111. Alameda County is an Equal Opportunity/Affirmative Action Employer.



PROGRAMMER/ANALYST

The Central Moloney Transformer Division of Colt Industries, a leading manufacturer of distribution transformers, seeks a responsible, aggressive professional to join in the development of manufacturing systems. Rapid growth requires staff expansion and offers challenging and rewarding opportunity for the successful applicant.

Central Maloney is located in both the southwestern sun belt area and southern Florida, offering pleasant living and working conditions.

Qualifications should include a B.S. degree in Computer Science or related field, at least three (3) years COBOL programming experience, working knowledge of IBM S/370 and DOS/VS, and experience in the development of manufacturing systems such as Inventory Control, Work-in-Process, Labor Costing and MRP. Knowledge of CICS and DL/1 also desirable.

Starting salary commensurate with experience, education and ability. Excellent fringe benefit package. Contact in confidence:

William R. Austin
Div. Mgr. Personnel
& Community Relations
Central Moloney Transformer Div.
P.O. Box 6608
Pine Bluff, Ark. 71601

Colt Industries
Central Moloney Transformer Division

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APPLICATIONS PROGRAMMERS

Requires 2-4 years current COBOL business applications programming.

We utilize OS/VS 1 systems on 370/158 and TONE/TSO. We offer competitive compensation and benefits, a challenging state-of-the-art environment, plus excellent location!

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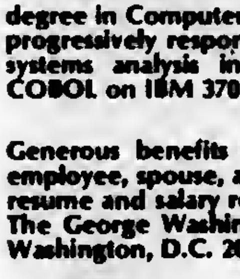
SYSTEMS ANALYST — responsible for development, implementation, testing and maintenance of payroll/personnel systems and other applications. Requires 3-5 years' progressively responsible experience in systems analysis, including 1-2 years' computer programming in COBOL.

SR. SYSTEMS ANALYST — requires Bachelor's degree in Computer Science or equivalent, at least 5 years' progressively responsible experience in programming and systems analysis including 2-3 years' programming in COBOL on IBM 370 OS/VS 1.

Generous benefits including FREE TUITION for eligible employee, spouse, and dependent children. Please submit resume and salary requirements to: Employment Division, The George Washington University, 2125 G Street, N.W., Washington, D.C. 20052.



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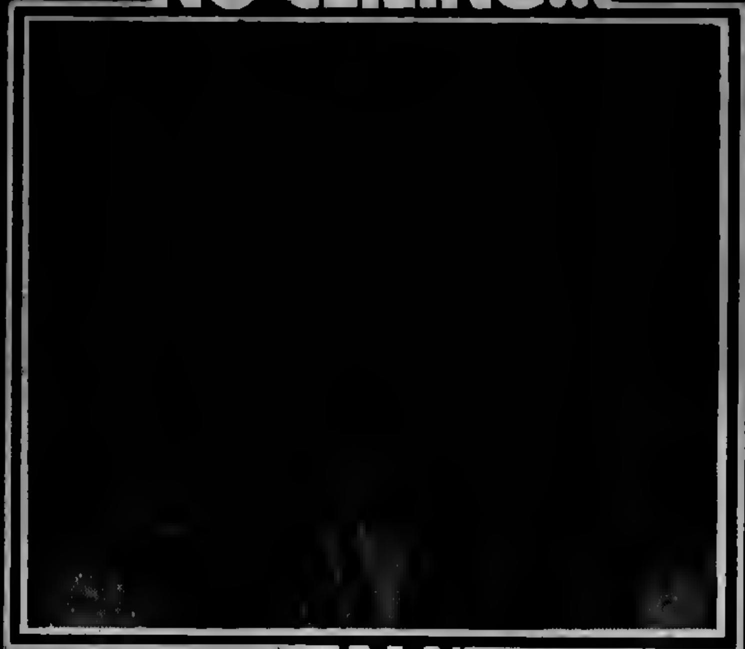

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The Sycor marketing program has set new industry records. With more than 30,000 installations coast to coast, we have barely scratched the surface of the diverse array of business applications where our at-the-source data entry and distributed data processing systems have been highly successful. Perhaps you should talk with us to find out what you're missing.

Tony Fazio
Vice-President, Sales

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SYSTEMS ENGINEERS — You should have a technical degree or the equivalent plus experience in the use or support of terminals, intelligent terminals or micro/mini systems. Experience programming terminal data applications in a 3270 compatible environment would be ideal. Knowledge of COBOL is important. Be on the leading edge of technology with the LEADER in distributed data processing. This is very definitely an advancement oriented technical sales support position.

For information about specific area openings, please call or write: [illegible], Corporate Employment & Staffing.

Call 1-800-521-1532
In Michigan Call: (313) 995-1156

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SYCOR

PROGRAMMER/ANALYST

The Electronic Systems and Geosciences Division of the Southwest Research Institute, one of the nation's largest independent organizations supplying applied R & D services in engineering and the physical sciences has an immediate opening for:

A Real Time Minicomputer Applications Programmer.

The position requires a desire to develop experience in using scientific instruments, data processing, data acquisition and process control. BS Computer Science degree with emphasis on Assembly language programming on real time systems are minimum requirements.

Send resume in complete confidence to:

Director of Personnel
P.O. Drawer 28510
San Antonio, TX 78284

SOUTHWEST RESEARCH INSTITUTE

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This may persuade you to join ADR...

The Company

ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed $20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

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ADR's diverse product line is state-of-the-art. Our systems range from on-line programming systems to language translators; from text processing to performance measurement. IBM technological advances are usually heralded by new ADR products. ADR software products are rated #1 in the 1977 Datapro survey — surpassing every other company in the number of products (4) honored by Datapro.

The Environment

ADR offers the comfortable, informal surroundings best suited to system development. At ADR, members of the technical staff average twelve years of computer experience. They constantly have opportunities to expand their professional skills into new technological areas. Our role as a pioneer in the software products industry gives our employees a unique position in the computer industry. At ADR, you are part of the leading edge of technology, not a follower.

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If you are a capable IBM Assembly language programmer and consider yourself a System Software Specialist, then you definitely should consider ADR. We have openings at all levels for qualified programmers and analysts who have the capabilities for developing sophisticated, state-of-the-art software. Experience with on-line systems (CICS, TSO, etc.) or knowledge of OS internals is a definite plus. If you have participated in the development of any type of software packages — system, utility, or application — we would really like to talk to you.

Please send your resume in complete confidence, including current salary and position desired, to: Director, Software Products Division. Or call 609-921-8550.

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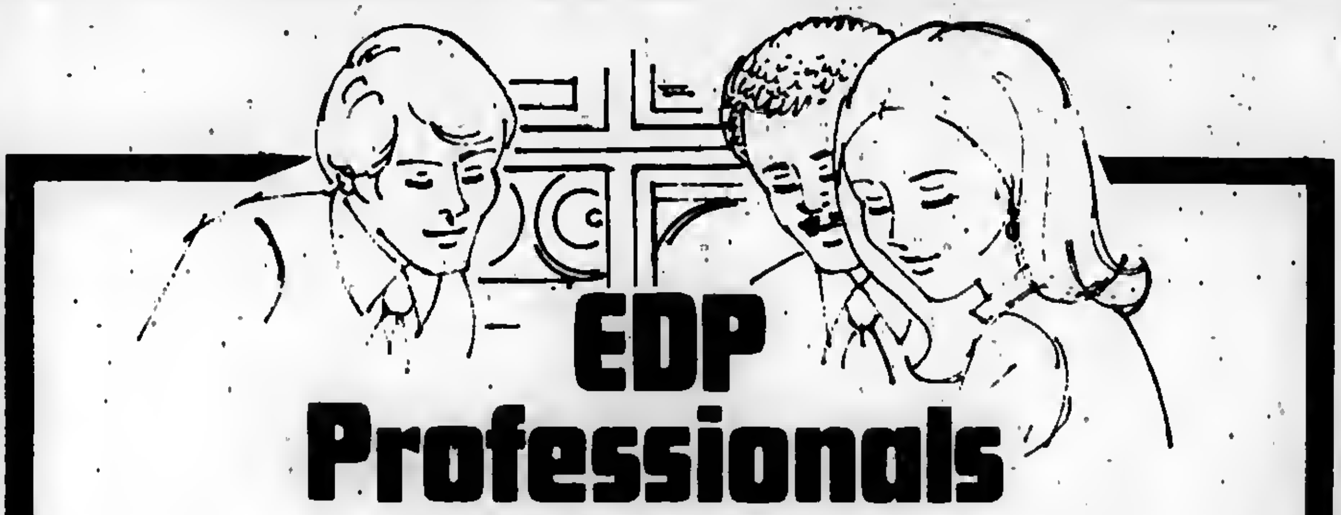

EDP Professionals

The career path you want is at ISO

Insurance Services Office, a leader in providing data processing support to the major property and casualty insurance companies throughout the U.S., is seeking additional EDP professionals to help us continue to grow in our ultramodern NYC Data Center.

You'll work in a state-of-the-art IBM 370/158, 168 MVS, CICS, DL/1 environment that is converting to mass storage and implementing a nationwide communications network. Immediate openings in our WORLD TRADE CENTER location include:

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Opportunity to develop a nationwide communications network. Two years experience in either TCAM, VTAM internals; 3705 internals; IBM communications internals; IMS internals or mass storage installation.

SYSTEMS ANALYSTS

Four-plus years EDP experience in a large-scale IBM OS environment with good working knowledge of ANSI COBOL, OS/JCL, PROCS and at least 1 year of systems design.

PROGRAMMERS-Senior & Intermediate

One to 4 years programming experience in an IBM 370/OS environment utilizing COBOL with good knowledge of TSO, OS/JCL and Utilities. CICS background a definite plus.

Appropriate degrees helpful; salaries are commensurate with level of responsibility and backgrounds offered. To investigate these opportunities, please send resume with salary history/requirements to Mr. David C. Rosner.

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Immediate openings in Orlando, Florida*

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- **Data Base Systems Coordinator**—Candidates must be capable of conducting basic and detailed design classes, customer interfacing, terminal and communication research and design data base application. 8 years experience or more.
- **Data Base Performance Specialist**—Candidates must be knowledgeable in data base recovery, IMS internals, utilities, accounting, transaction analysis, data base system maintenance, and problem determination. Hardware/Software. 5 years experience or more.
- **Data Base System Programmer**—Candidates must be knowledgeable in IMS internals, utilities, data base system maintenance and update and problem determination. (Software).
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Our operating environment consists of a 3033, dual 370/168 and a 138 running MVS/JES2, interfacing with TSO, IMS, S2K, COMTEN and other 370's (155's, 145's and 138's). The individuals we are currently seeking should have experience in one or more of the following disciplines:

- **Prime Language**
  - COBOL
  - Assembler
  - MVS
- **Telecommunications**
  - TCAM
  - RTAM
  - BTAM
  - VTAM
- **Data Base Management**
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  - System 2000
  - IDMS
  - CICS

We offer an excellent fringe benefit package, including pension, performance sharing plan, major medical, vacation and holidays.

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- Regional Planner Systems Analyst
- Sr. EDP Supervisors
- Data Base Administrators

The positions all are working with state-of-the-art hardware and software. They offer 18 to 24 month contracts for Tehran. Fee Paid.

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Systems design, applications analysis, programming, and operations; Technical Services does it all – backed by Sperry Univac, a world leader in the design, manufacture, and application of state-of-the-art computer systems.

Join forces with the Technical Services Division in any of the following locations and give your career and talents the opportunities they deserve!

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- **Weapons Systems Fire Control**
- **Shipboard Command and Control Systems**

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- **Univac military computers or 16-Bit mini's**
- **Real Time Assembly language**
- **Bachelor's Degree or equivalent experience**

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Sr. Programming Analyst

Work on business applications for a hardware manufacturer. Requires six years of OS COBOL and business applications.

Salary to **$25,000**

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Work in a corporate services group of this large California bank. Requires five years of OS COBOL plus an understanding of corporate banking functions.

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Work in a small (1 man) group for now, in support of order processing for this hardware manufacturer. Requires strong IBM OS COBOL and assembly language in developing on-line systems.

Salary to **$29,000**

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Work on development of new IMS internals software for this prestigious software company. Requires strong IMS DB/DC internals experience.

Salary to **$32,000**

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Requires 2-4 years current experience with OS Assembler language. Excellent salary + benefits + challenging espirt de corps!

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Century City 90067

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We are seeking an individual who has worked on an IBM System 3 or Honeywell Level 62 computer system. Must have RPG II and Cobol experience. Experience in a retail or Home Center environment plus courses in computer science or business related field desirable but not required. Send resume to:

Personnel Manager
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Programmer

Systems Analyst/ Programmer

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If you're in the kind of situation where other people are getting the credit for your hard work, maybe it's time you changed your situation. As a software specialist at Digital, you'd get all the credit you deserve. Because to us, software people are important and highly visible members of the customer support team.

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So if that's you, give us a call us at **800-526-3877** (in N.J. 800-352-4986) between 9:00 AM and 5:00 PM, May 30 to June 6. Or send your resumé to: Digital Equipment Corporation, U.S. Rt. 1, CN-2, Princeton, New Jersey 08540, Attn: Mr. Lee Adrian. And find out why our customers aren't the only ones that get the best deal.

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You will join a medium-sized shop with the latest IBM 370 equipment (3031 on order), where your efforts will be recognized and you will remain current in the field.

Anchorage offers an area of unsurpassed beauty, wholesome, family-style living, excellent schools, and unlimited recreational opportunities. Live only 10 minutes from work! Leave the big-city hassles behind!

Send resume, including salary history, in confidence to V.F. Garvy, Personnel Director, P.O. Box 600, Anchorage, Alaska 99510. An equal opportunity employer, male/female.

NATIONAL Bank of Alaska

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Electro-Optical Products, a Division of International Telephone and Telegraph Corporation, is seeking highly talented, self-motivated computer specialists to lead state-of-the-art projects involving:

- virtual machines (VM/370)
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Selected candidates will have the opportunity to design and implement creative systems.

We offer an excellent starting salary, commensurate with education and experience, comprehensive benefits and generous relocation assistance.

Please forward detailed resume, including salary history in utmost confidence to: Mr. Danny Fisher, Manager, Recruiting, ITT Electro-Optical Products Division, P.O. Box 7065, Roanoke, Virginia 24019.

ITT Electro-Optical Products Division

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A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:
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  - Excellent programming experience in RPG II and COBOL.
- Who has excellent communications skills.

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WANG is looking for software technical writers to document our new state-of-the-art 2200VS computer system. We need people with the technical ability to understand the various facets of a modern computer system and the writing ability to explain them clearly and coherently to others. We offer plenty of growth potential and the opportunity to work in a creative, challenging environment where individual achievement is recognized and rewarded. Our requirements are:
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- Familiarity with a major computer operating system .
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- The initiative and creativity to follow a project through from initial research to final copy.

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Computer Optics, Inc., a leading manufacturer of display terminal systems, is expanding its marketing force throughout the United States. The ideal candidate should have a minimum of three to five years experience selling computer peripherals (or mainframes) and be currently producing above average results.

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Whathar seaking the right job or changing jobs, you ara faced with a difficult and crucial decision in carear growth. Houser, Martin, Morris and Associates, the leading Northwest data processing placament specialist, are interested in finding you the right opportunity-position, company, and location - to enhance your professional and personal growth. If you are interested in Northwest or Alaska D.P. opportunitias we can help you look at (or for) the best available positions fitting your background and desires. A sampling of presently available positions includes:

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Programmer/Analyst: Banking, insurance, distribution, COBOL, BAL and/or RPG, IBM 360/370.

Senior Process Control Supervisor: PDP 11 or Xarox systems axperienca.

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Director of Personnel
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RAYTHEON PTS1200 PROGRAMMER/ ANALYST

Progressive industry specialized national data processing service company pursuing leading edge technology in distributed processing is seeking a talanted professional for their PTS1200 document preparation project. Company enjoys a highly profitable exceptional growth rate. Require extansive Raytheon PTS1200 experience. Computer science degrea highly desirable. SVS/MVS, HASP, CICS, RJE experienca a definite plus. Exciting opportunity with an exceptional company, little travel, attractive low cost sunbelt city, profit sharing, ESOP/TRASOP plans. CW Box 1579, 797 Washington St., Newton, MA. 02160.

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Our intention is to bring the most advanced, sophisticated, **useful** capabilities to even the smallest offices--at the smallest prices. For example, our Qyx typewriter right now can incorporate modules to make it a memory typewriter, a mini-diskette text editor, a communicating typewriter, and a display typewriter. The capabilities we next build into it depend, to a large degree, on **you,** and what you contribute.

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We want experienced people, familiar with: Hard/Soft Copy Input Text Editing ■ Displays ■ Operating Systems ■ Computer-Aided Instruction ■ Diagnostic Software ■ Communications. A BS or MS degree in Electrical Engineering or Computer Science, or the equivalent, is required.

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DIAGNOSTIC PROGRAMMER
★ Los Angeles ★

THE COMPANY

Computer Communications, Inc., a Southern California based corporation and leader in state-of-the-art data processing.

THE POSITION

Diagnostic Programmer to develop and maintain diagnostic programs for field support and repair module test functions. Individual will also be responsible for providing necessary documentation and assistance.

THE CANDIDATE

Career-oriented individual with a minimum of 2 years experience in digital logic or systems software in mini- or micro-assembly language. Candidate should have diagnostic programming experience and BSEE or BSCE; data communications experience would be a plus.

THE CONTACT

For immediate consideration contact our National Recruiter by calling collect or sending resume in confidence:

Anthony Hattenback
(213) 274-5328
9701 Wilshire Blvd., Suite 805
Beverly Hills, CA 90212
Equal Opportunity Employer M/F

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programming

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Qualified candidates are invited to direct their response to Employment Department, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086. We are an equal opportunity employer.

DIAGNOSTICS SOFTWARE ENGINEERS

Amdahl is committed to state-of-the-art in diagnostics and is currently seeking Diagnostics Software Engineers at all levels. You will design, develop and maintain diagnostic system software for our large-scale computers. You should have knowledge of logic design and large computers, experience in high level language programming and the ability to work with large and mini systems. Please indicate 435-E on your response.

DESIGN AUTOMATION MANAGER

We are seeking first level managers to join the DA development team involved in an advanced product design effort. Successful candidates will manage various aspects of a new integrated computer-aided design system including language design, data base management, simulation, physical packaging and graphics. You have managerial experience on large engineering software projects and the desire to organize a team involved in quality software systems. Please indicate 4272-E on your response.

SOFTWARE DEVELOPMENT LANGUAGE TOOLS MANAGER

You will be managing one of several software development organizations that support the design, development and marketing of our products. You are experienced in managing software development and will be involved in the application of language tools to the software development process. You must be knowledgeable in state-of-the-art software engineering developments and, ideally, have experience in systems programming and compilers. Please indicate 437-E on your response.

ENGINEERING SOFTWARE INTEGRATION MANAGER

You will be responsible for providing in-process QA for specifications and code, implementing final test/regression testing procedures, and coordinating the release of software, including diagnostic and small systems control programs, to users. You have technical management experience in a large software project and will find it helpful to have hardware experience. Please indicate 4273-E on your response.

DESIGN AUTOMATION ENGINEER

We seek Software Engineers with experience in developing large software systems as part of a hardware development effort. Opportunities are available in data base, automatic test generation, graphics, design analysis, physical design, routing and placement. You should have applicable experience and interest in developing ideas as part of a team. Please indicate 4271-E on your response.

SMALL COMPUTER SYSTEMS PROGRAMMING MANAGER

You will be responsible for writing control programs for small computers that function as master controllers for Amdahl's CPUs and special test equipment. Your background should include machine and higher level languages, system software/control programs experience, and technical management experience in a large software project. Please indicate 4274-E on your response.

CPU DIAGNOSTICS DEVELOPMENT MANAGER

Your department will specify, review and implement diagnostics for Amdahl's large CPUs. You will use Amdahl's unique diagnostic hardware and will operate in the environment provided by Amdahl's advanced diagnostics systems. Your background includes knowledge of large system hardware and technical management experience in a large software project. Please indicate 4275-E on your response.

PROGRAMMING ASSISTANT

We have an immediate need for an individual who will assist software programmers in the development of minicomputer systems. Your responsibilities will include performing program assemblies, compilations and system generations on a minicomputer system. You should have at least a high school education and 2-3 years' experience in operating computer systems. You will find it helpful to have experience with TSO, JCL, and NOVA minicomputer operation. Please indicate 4276-E on your response.

amdahl

Realtime Software Developers & Digital Design Engineers:

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Then call collect (415) 966-2995 weekdays and join the GTE Sylvania excursion as we advance the state-of-the-art ON THE SAN FRANCISCO PENINSULA.

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We're looking for individuals involved in realtime command and control, data base, test and integration, signal processing, communications, or text processing, with experience in one or more of the following: PDP 11, NOVA, ROLM, UYK 7 & 20, HP, INTEL 8080 and Z-80 with knowledge of FORTRAN, ASSEMBLY, PASCAL, or CMS-2. Requires BS in Computer Science, EE, Math, or equivalent expenence, master's degree desirable.

Digital Design Engineers

Successful individuals will have background in distributed microprocessor, architecture, realtime software, digital processor, and digital bus interfaces. Should possess good experience in signal processing and signal analysis, and computer system design.

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Interested and qualified individuals should call collect (415) 966-2995, 8AM-5PM PDT, weekdays. If unable to call, please forward your resume, including salary history and requirements to Dept. CW-585, GTE Sylvania, P.O. Box 188, Mountain View, California 94042. An equal opportunity employer, minorities and females encouraged to apply. U.S. citizenship required.

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Computer Operations

MANAGER

Wells Fargo Mortgage Company has an immediate opening for an experienced Computer Operations Manager at its servicing center in SANTA ROSA, CA.

The individual chosen must have the technical expertise to manage an IBM 370/125 DOS/VS installation as well as previous supervisory experience. Ability to communicate well with technicians and managers of all levels is essential. Distributed Data Processing background would be helpful.

Salary and Benefits competitive. Please submit Resume including salary requirements to:

Personnel Department
Wells Fargo Mortgate Co.
1701 4th St.
P.O. Box 937
Santa Rosa, Ca. 95402

ASSISTANT PROFESSOR

Computer Science

The Mathematical Sciences Department of Florida International University has an opening for an Assistant Professor, starting in September, 1978. This position may be either a visiting or permanent continuing faculty member. Applicants should have their Ph.D. degree by Fall, 1978, (for permanet position) and should have demonstrated teaching ability. Duties include teaching of advanced undergraduates and research. Of particular interest are the areas of compiler construction, programming languages, operating systems, and computer organization. Salary is competative. Please send resume and the names of three references to:

Dr. Samuel S. Shapiro, Chairman
Dept. of Mathematical Sciences
Florida International Univ.
Tamiami Trail
Miami, FL 33199

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Murphy, Symonds & Stowell is the oldest, largest, and most respected executive search firm in the Northwest. Our success is based upon long term relationships with our client companies and the professional manner in which we handle sensitive career changes. Many of our clients use our firm as the sole sources for filling their manpower needs.

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MCI Telecommunications Corporation is a specialized common carrier offering a variety of communications services to business and industry. We have immediately available, in our Washington, D.C. corporate headquarters, openings for a Manager and Programmers to develop and enhance several billing systems.

MCI's computer facilities include an IBM 360/65 under OS/MVT with HASP, and a multi-terminal Datapoint 6600. The company plans to upgrade its IBM facilities shortly.

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This manager will lead the activities of analysts and programmers in developing, enhancing and maintaining accounting, inventory control, materiel management and order entry systems for MCI's communications service.

The successful candidate should have at least seven years progressively responsible experience in the analysis and programming (COBOL) of financial and billing systems for a utility or service-oriented industry (i.e. insurance, distribution, brokerage, etc). At least two years should be at a supervisory or project leader level.

PROGRAMMER/ANALYSTS

Openings exist at the intermediate level for persons having at least two years of COBOL programming in an IBM 360/370 commercial environment. They should be capable of being part of a team effort and work with a minimum of direct supervision. Positions require frequent user contact, and the ability to participate in several projects simultaneiously. All programming is done via interactive low speed terminal connected to the 360/65. Most applications utilize nationwide distributed processing techniques.

MCI offers challenging and pleasant working conditions with excellent opportunities for advancement. Salaries and benefits are competitive and include an employee stock purchase plan. Interested applicants are requested to submit resumes to: PERSONNEL DEPARTMENT

MCI TELECOMMUNICATIONS CORPORATION
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Programmer Analyst/ Instructor

A unique opportunity exists for an experienced innovative and seasoned Programmer Analyst who would like to teach as well as work in an environment conducive to professional growth and development.

Responsibilities involved in this position include directing training and evaluating programming personnel in the effective design of computer business application programs.

The successful candidate will spend seventy percent of their time as an instructor and approximately thirty percent in a production work environment.

Position requires at least two years' experience as a programmer/analyst with three to four years' business applications exposure and the ability to instruct programming personnel.

Tektronix, Inc. develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Larry Green, TEKTRONIX, INC., P.O. Box 500, 161, Beaverton, Oregon 97077.

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Marietta College Computer Center

Entry Level Analyst-Programmer

This position will develop into the primary interface between the Computer Center and various College administrative offices, assisting in the design and development of new applications, and training non-technical personnel in the use of these systems. Excellent verbal and writing skills and demonstrable proficiency in FORTRAN required. Prior 360/370 assembler and/or DBMS experience highly desirable. Excellent employee benefits are provided, with salary around $1,200 per month. Write to: Roy Williams, Director of Data Processing, Marietta College, Marietta Ohio 45750. An affirmative action, equal opportunity employer.

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DATA PROCESSING PROFESSIONALS

The Medical College of Wisconsin and Froedtert Memorial Lutheran Hospital are establishing the joint Medical Computer Center in the College's new facility in suburban Milwaukee to support the patient care, teaching and research missions of health care delivery institutions and all missions of the Medical College. The center has been designed to the highest level criteria for reliability, low response time, and comprehensive on-line support to all functional components of its users. The on-line data base driven software will run on a completely multiplexed hardware configuration established in a first class environment and supported by an uninterruptable power source. Remote terminal devices will be similarly supported by uninterruptable power sources at each user's installation. Present staffing requirements are identified below. Growth is assured.

CALL COLLECT 414-272-5450 Ext. 204

To Discuss The Following Openings

CONVERSION SUPERVISOR

Bachelor's degree in Computer Science, related field or equivalent experience. Must have been lead in prior computer conversion. Ideally conversion would have been to Burroughs large systems. OMS-II, GEMCOS knowledge desired. This is a permanent position for a supervisor in the Systems and Programming area.

DATA BASE ANALYST

Bachelor's degree in Computer Science, related field or equivalent experience with one-two years in application system design and analysis. Two years experience in data base technology.

MEDICAL COLLEGE OF WISCONSIN
Computer Center
1725 West Wisconsin Avenue
Milwaukee Wisconsin 53233

An Equal Opportunity Employer M F

SENIOR SYSTEMS ANALYSTS

Bachelor's degree or equivalent experience with 3 to 4 years experience as a systems analyst DMS-II experience; hospital and educational applications background a plus.

SYSTEMS PROGRAMMER

Bachelor's degree or equivalent experience with 2 to 4 years in systems programming; at least one year in B6700-B6800 systems support programming desired.

ANALYST/PROGRAMMERS

Bachelor's degree or equivalent experience; two years as programmer/analyst; experience with COBOL required. OMS-II experience desired.

The Medical College of Wisconsin, a private institution, offers an exceptional salary and benefit package. If unable to call, please send a letter or resume in complete confidence.

FLORIDA POSITIONS

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Fine career opportunities for security and surveillance software product development. Public company with International headquarters in Coral Gables, Florida.

SOFTWARE ENGINEER

Lead technical responsibility for detailed design, coding, integration, checkout and documentation of software packages for industrial access control and alarm monitoring. Three to five years mini-computer real-time operating system and assembly language programming experience is desirable.

SENIOR PROGRAMMER

Mini/Micro computer assembly language programmer with heavy debugging and troubleshooting background. Experience with I/O handlers for Nova 3 equipment preferred. Responsible for development, checkout and documentation of customized software for real-time access control and intrusion detection systems.

Send Resume and Salary History to:

MR. JOHN A. HAVERFIELD
THE WACKENHUT CORPORATION
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Experience in chemical plating processes for precision printed circuit boards.

SYSTEMS PROGRAMMERS

Experience in peripheral devices, operating systems, networking and redundant systems, communications systems, and language development.

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Manager, Operations Analysis

The responsibilities for this position require an innovative, creative manager to manage Operations Analysis within the Business Analysis unit for our Test and Measurement group. Position includes responsibility for the design and preparation of meaningful financial analysis as needed for management to improve decision making processes; and to coordinate— Test and Measurement Group financial data for all submissions dealing with the fiscal plan.

The successful candidate will have five years' related work experience, knowledge of analytical techniques and management theory, proven ability to clearly present financial data in an concise and useful manner, working knowledge of budgeting and planning processes and excellent communication skills.

A bachelors degree, MBA desirable, in business with emphasis in accounting or finance or equivalent professional. User knowledge of EDP is desirable.

Engineering Operations Analyst

Opportunities exist for a person on the group level who will be oriented toward solving systems problems and coordination information flow and planning.

In Engineering Operations Analysis the person we seek will have a minimum of three years' experience in accounting and financial analysis, preferably in an engineering environment. This person will function as the Division Financial Analyst for Test and Measurement group's engineering support activities.

Tektronix, Inc., develops, manufactures and markets internationally recognized precision electronic measurement instruments, computer peripherals and related electronic instrumentation. Located near Portland, Oregon we are within a two hour drive of the Cascade Mountains and Ocean Beaches. The close-by natural playgrounds and the City of Portland provide a variety of recreational and cultural interests.

Salary is open. Benefits include educational support, insurance and profit sharing programs.

Send detailed resume and salary history to Larry Green, TEKTRONIX INC., P.O. Box 500, Q62, Beaverton, Oregon 97077.

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✱ SYSTEMS ANALYSTS

Five years or more experience with IBM and/or Honeywell background in systems design and implementation. Our corporate languages are COBOL and FORTRAN. We are looking for the professional analysts who can design and provide specifications for all major business applications. Skills in TSO, HIPO and structured programming, CICS and IMS very desirable. We also need analysts for our time sharing environment with experience on Honeywell systems especially IDS2. Degree desirable.

✱ PROGRAMMER ANALYSTS

Candidates must have very good working knowledge of IBM or Honeywell COBOL and/or FORTRAN. IBM experience in an MVS environment with a good working knowledge of JCL, Utilities, Syncsort. Honeywell experience for GCOS system. Degree also desirable.

We will be in the following cities to talk to interested candidates:

CITY	DATE	LOCATION	PHONE
MIAMI, FLA.	JUNE 5	Holiday Inn 112th St. Biscayne Blvd.	305/893-4110
JACKSONVILLE, FLA.	JUNE 6	Holiday Inn 555 Stockton St.	904/387-4661
ATLANTA	JUNE 8	Holiday Inn I-75 N. NW Expressway Howell Mill Ext.	404/351-3831
CHICAGO	JUNE 9 & 10	Holiday Inn 1 Mid-City Plaza	312/829-5000
DALLAS	JUNE 12	Holiday Inn I-35 & 1955 N. Industrial Blvd.	214/747-9551
HOUSTON	JUNE 14 & 15	Holiday Inn 2100 Memorial Drive	713/869-8261

Please forward a resume or call 1-800-237-2774 or 5 or 6 to arrange for a personal interview or contact N. Fitzpatrick or J. Muth at the above numbers when we are in your city.

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for the Social Science Research Institute, U of Maine at Orono, staff at Pittsfield facility of the Maine Department of Transportation, to take charge of real-time data system to determine rural highway driver behavior. Need Assembler & FORTRAN exp. (RDS 500 preferred); ability to translate experimental design specs into working systems of real-time data collection & analysis programs, utilities, & system software. $14-16K for 1 yr appointment (renewal likely). Resume & letter to: SSRI, 164 College Av, Orono, ME 04473. The U of Maine is an Equal Opportunity Employer.

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The person we seek must be seasoned in progremming, systems, and supervision of the Date Processing function with System 3 experience and preferably, MOD 15D with teleprocessing.

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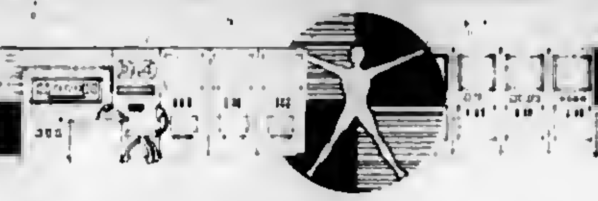

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We're looking for a broad spectrum of computer professionals who can learn and utilize a wide application of programming principles, theorias end concepts to meet a variaty of both intraorganizational and outside client needs.

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Positions are available for the individual with proven management experience in Oata Processing.

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Extansive data processing experience in health care claims processing or heavy file design with large complex data structures. Team responsibilities for structured walk throughs, testing, and systems enalysis.

SENIOR ANALYST

Working in health administration and claims processing, you'll be involved in support systems design for health cere; on-site customer support at management levels; and interface with OSI's technical steff. Required is a degree in Computer Science or equivalent experience, including 3 years' in programming and 3 years' as an analyst, with heavy COBOL end IBM 360/370 experience. Health care experience is desirable..

PROGRAMMER/ANALYSTS

Several opportunities are available here involving many diverse activities, some of which include designing and coding structured COBOL programs, walk-throughs, testing and systems analysis, and other duties related to health care/claims processing. We have openings for the following experience levels:

- B.A. or B.S. degree, with a minimum of 2 years' ANS-COBOL using an IBM/OS system, or 2-years' large scale IBM/OS or VS experience.
- B.A. or B:S. degree, plus 3-5 years' data processing experience, including COBOL, (ANS), IBM/OS, utilities, CFMS, CICS.

PROJECT MANAGERS

We have several openings in this area to manage technical staffs developing large file designs and data structure projects, and supervision of systems enalysts. The work involves haalth care; claims processing; tachnical project control; interpretation and definition of customer requirements at managament levels. Qualifications should include a B.A. or B.S. in math, enginaaring or science, 5 years' data processing experience including OS, COBOL and JCL, plus related healtb care experience.

LEAD SOFTWARE PROGRAMMER

This position involves the implementation of a large CICS MVS installetion with over 600 CRT terminals and a massive date base. Preferred is a B.A. or B.S: in math, engineering, or science, plus 5 years in a systems software OS-VS environment. Heavy experience in CICS communications, SOFTWARE AND VSAM a must.

SYSTEMS ANALYSTS

We have many opportunities in this area; most of which involve the analysis and design of large, complex data files, with multiple entrypoints, all within the health care field. B.A. or B.S. in math, engineering or science is required including the following specific duties.

- 3-5 years in lerge complex data processing environments. Heavy file design experience is required.
- 2 years as a programmer/analyst, preferably with experience in health claims processing.
- 4 years data processing experience, and 1-2 years' in systems enalysis/customer interface. Health care experience is desirable.

INDUSTRIAL ENGINEER

You'll develop and implement an optimum work flow system and assist in staffing all levels of personnel for health care clients. You must be familiar with work flow systems and procedures and man-motion studies. An Industrial Engineering degree is required and a background in health insurance claims processing/clerical functions preferred.

SYSTEMS ENGINEER

You'll provide customer support in the area, converting and installing systems on the OSI large scale IBM computers. Required is a B.A. or B.S. and 5 years related experience in systems analysis with MVS and interest in a Marketing environment.

Positions Available Nationwida

For immediate and confidential consideration, please send resuma and salary history to: Employment Manager, OPTIMUM SYSTEMS INCORPORATED, 2801 Northwestarn Parkway, Santa Clera, California 95051. (408) 987-4444

Optimum Systems Incorporated

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- Must writa and speak fluently - English, Garman, and Franch.
- 6 months to one year experianca in data processing.

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SALARY: $16,000

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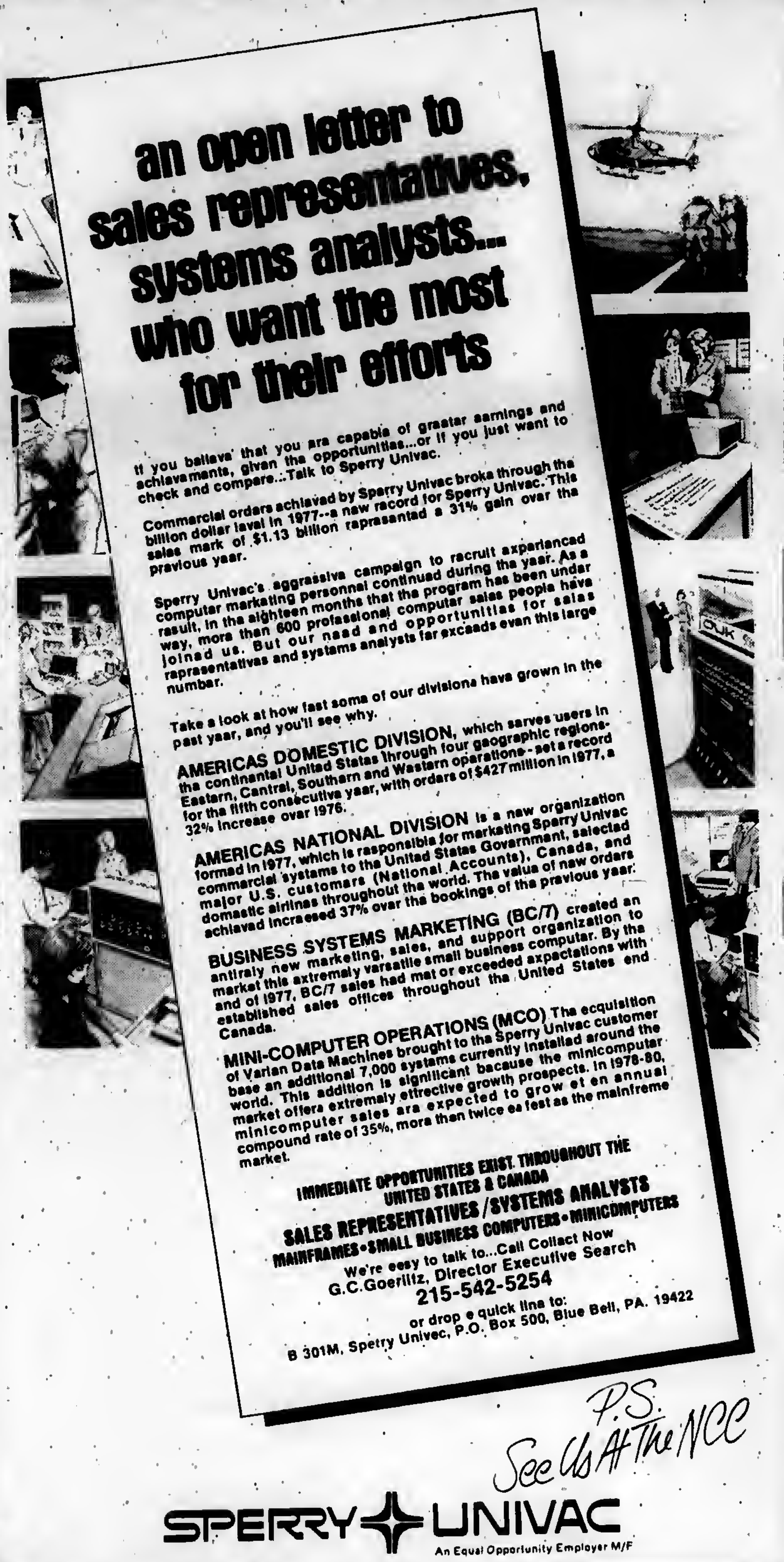

an open letter to sales representatives, systems analysts... who want the most for their efforts

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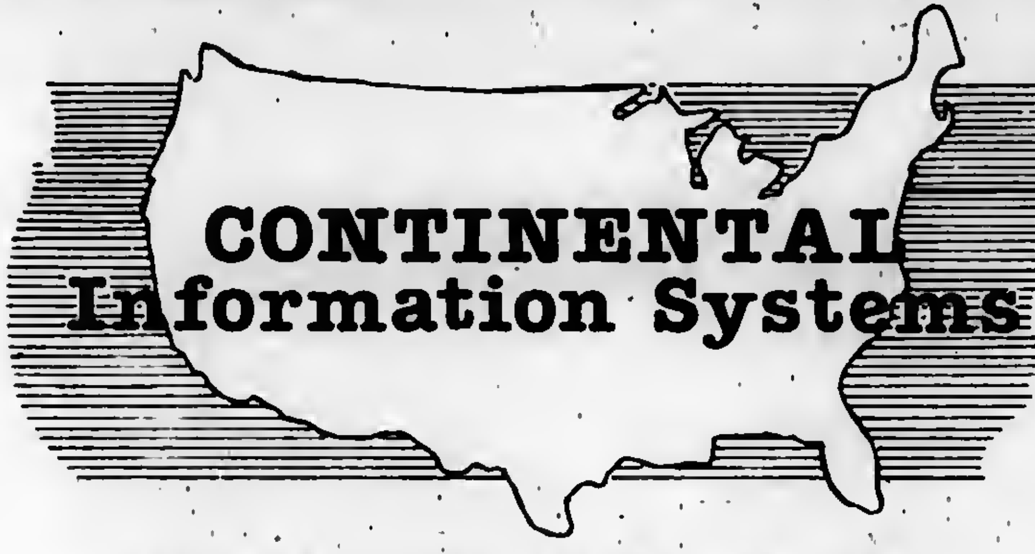

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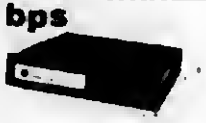
9600 bps 	**MODEM 5500/96** Dedicated line with optional multiport operation for up to four 2400 bps channels.	$7990 $185/mo.*	**$2995** **$120/mo.***

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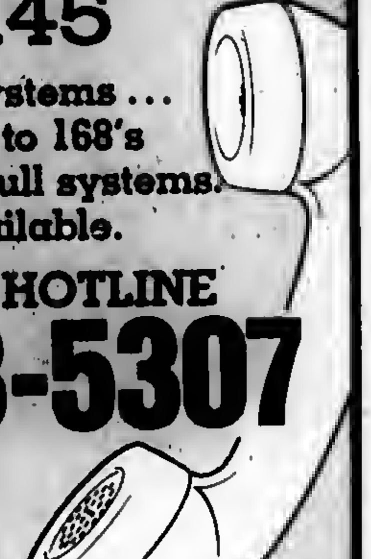

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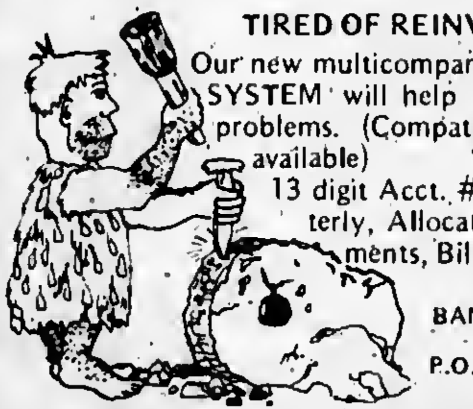

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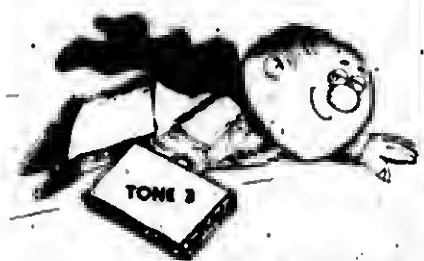

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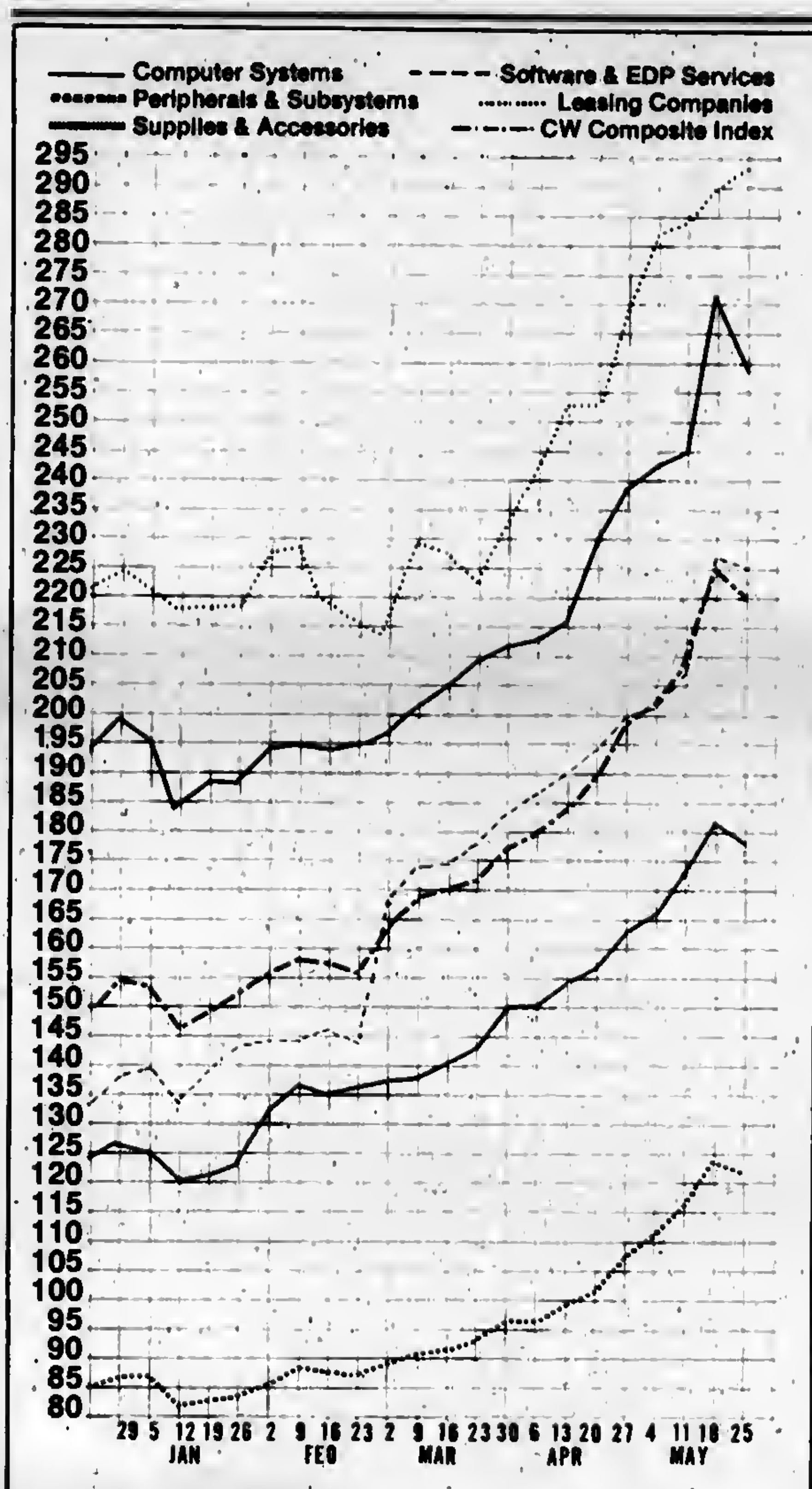

Earnings Reports

NUCLEAR DATA
Year Ended Feb. 28

	1978	a1977
Shr Ernd	$1.13	$1.89
Revenue	22,847,490	18,474,853
Tax Cred	.....	400,000
Earnings	1,089,220	1,814,067
3 Mo Shr	.15	.66
Revenue	6,192,000	5,053,188
Earnings	144,781	606,517

a-Restated

SPERRY RAND
Year Ended March 31

	1978 (000)	1977 (000)
Shr Ernd	$4.60	$4.11
Revenue	3,649,487	3,270,008
Earnings	178,818	156,828
3 Mo Shr	1.53	1.25
Revenue	1,071,175	897,096
Earnings	59,583	47,811

SYSCO
Three Months Ended April 1

	1978	1977
Shr Ernd	$.75	$.88
Revenue	212,463,000	182,036,000
Earnings	2,529,000	2,292,000
9 Mo Shr	2.29	1.82
Revenue	603,211,000	511,372,000
Earnings	7,727,000	6,147,000

TELECOM
Three Months Ended March 31

	1978	1977
Shr Ernd	$.09	$.34
Revenue	27,365,000	22,131,000
Earnings	171,000	622,000

TERMINAL DATA
Three Months Ended March 31

	1978	1977
Shr Ernd	$.18	a$.10
Revenue	2,298,000	1,745,300
Earnings	143,900	78,200
6 Mo Shr	.30	a.28
Revenue	4,224,000	3,545,700
Spec Cred	.....	21,500
Earnings	238,800	218,500

a-Adjusted for a 10% stock dividend paid in February 1978.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 24, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 34	32 1/2	-1 5/8	-4.7
N	BURROUGHS CORP	55- 91	71 7/8	-1 3/4	-2.3
O	COMPUTER AUTOMATION	18- 36	35	+ 1/2	+1.4
N	CONTROL DATA CORP	20- 33	31 1/2	-1	-3.0
C	CRAY RESEARCH INC	15- 46	42 3/4	-3	-6.5
N	DATA GENERAL CORP	35- 59	55 3/8	-3 1/8	-5.3
N	DATAPOINT CORP	18- 56	52 3/8	-1 3/8	-2.5
N	DIGITAL EQUIPMENT	37- 53	47 3/4	-1 1/2	-3.0
N	ELECTRONIC ASSOC.	2- 8	7 1/4	- 1/2	-6.4
A	ELECTRONIC ENGINEER.	8- 17	16	- 5/8	-3.7
O	FOUR-PHASE SYSTEMS	13- 32	30 3/4	-1	-3.1
N	FOXBORO	29- 54	34 7/8	-1 1/4	-3.4
O	GENERAL AUTOMATION	6- 12	11	+1 1/4	+12.8
C	GRI COMPUTER CORP	1- 1	1 1/8	0	0.0
N	HEWLETT-PACKARD CO	62- 87	79 1/4	-2 1/8	-2.6
N	HONEYWELL INC	43- 58	55 5/8	-2 1/2	-4.3
N	IBM	236-286	262 1/2	-3 1/2	-1.3
O	MANAGEMENT ASSIST	5- 18	17 1/8	- 7/8	-4.8
O	MICRODATA CORP	7- 18	15 1/2	+1 1/4	+8.7
O	MINI-COMPUTER SYST	5- 12	7 1/4	- 3/4	-9.3
C	MODULAR COMPUTER SYS	5- 15	12 3/4	-1 3/4	-12.0
N	NCR	32- 57	53 5/8	-2 7/8	-5.0
O	PRIME COMPUTER INC	12- 39	20 1/2	-18 5/8	-47.6
N	PERKIN-ELMER	17- 23	21 7/8	-1 1/4	-5.4
N	RAYTHEON CO	16- 47	43 3/4	-1 7/8	-4.1
N	SPERRY RAND	30- 44	42	-1 7/8	-4.2
O	SYCOR INC	8- 24	24	+ 1/8	+0.5
A	SYSTEMS ENG. LABS	5- 19	17 1/2	-1 1/8	-6.0
A	WANG LABS.	10- 23	21 1/8	-1 7/8	-8.1

LEASING COMPANIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	5 7/8	0	0.0
E	BOOTHE COURIER CORP	8- 18	16 7/8	-1 3/8	-7.5
O	COMDISCO INC	9- 17	14 3/4	- 1/2	-3.2
A	COMMERCE GROUP CORP	1- 3	7/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1	+ 1/8	+14.2
M	DATRONIC RENTAL	0- 2	1 5/8	+ 1/4	+18.1
A	DCL INC	1- 4	3 3/4	- 1/4	-6.2
N	DPF INC	6- 12	11 1/8	- 1/2	-4.3
N	ITEL	13- 27	24 7/8	-1 7/8	-7.0
N	LEASCO CORP	19- 34	32 3/8	- 1/4	-0.7
O	LEASPAC CORP	1- 2	1 7/8	0	0.0
A	PIONEER TEX CORP	5- 11	6 1/2	+ 3/4	+13.0
N	U.S. LEASING	10- 16	15	- 1/4	-1.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ADVANCED COMP TECH	0- 2	1 3/8	+ 1/4	+22.2
O	ANACOMP INC	7- 14	13 1/2	- 3/8	-2.7
A	APPLIED DATA RES.	5- 14	12 3/4	- 3/4	-5.5
N	AUTOMATIC DATA PROC	23- 31	30 3/4	- 1/2	-1.5
C	COLEMAN AMERICAN COS	1- 2	1 1/2	0	0.0
O	COMPU-SERV NETWORK	7- 15	10 1/2	- 1/2	-4.5
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
C	COMPUTER HORIZONS	1- 2	3	+ 3/4	+33.3
O	COMPUTER NETWORK	6- 11	9 7/8	- 1/8	-1.2
N	COMPUTER SCIENCES	7- 12	11 1/4	- 1/2	-4.2
O	COMPUTER TASK GROUP	1- 2	3 1/2	+ 1/4	+7.6
O	COMPUTER USAGE	1- 4	3 3/8	- 1/8	-3.5
C	COMSHARE	5- 15	14	-1	-6.6
O	DATA DIMENSIONS INC	3- 5	4 3/8	- 1/4	-5.4
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 23	20 3/8	-1 1/8	-5.2
O	INSYTE CORP	2- 3	1 1/8	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 3/4	+ 1/8	+3.4
O	KEYDATA CORP	1- 3	2	- 1/4	-11.1
A	LOGICON	7- 17	13 3/8	- 7/8	-6.1
A	MANAGEMENT DATA	1- 2	1 1/4	+ 1/8	+11.1
A	NATIONAL CSS INC	10- 26	24 1/2	- 3/4	-2.9
O	NATIONAL DATA CORP	4- 12	10 3/4	-1 1/4	-10.4
A	ON LINE SYSTEMS INC	16- 25	22 7/8	-1 5/8	-6.6
N	PLANNING RESEARCH	3- 7	6 3/8	- 5/8	-8.9
O	PROGRAMMING & SYS	1- 1	7/8	- 1/8	-12.5
O	RAPIDATA INC	2- 5	5	+ 1/4	+5.2
O	REYNOLDS & REYNOLD	17- 26	25 1/4	- 3/4	-2.8
O	SCIENTIFIC COMPUTERS	1- 6	5 3/8	- 1/4	-4.4
O	TYMSHARE INC.	14- 27	24 1/4	-2 5/8	-9.7
A	UPS SYSTEMS	4- 7	6 1/4	- 1/8	-1.9
N	WYLY CORP	1- 5	5	- 1/4	-4.7

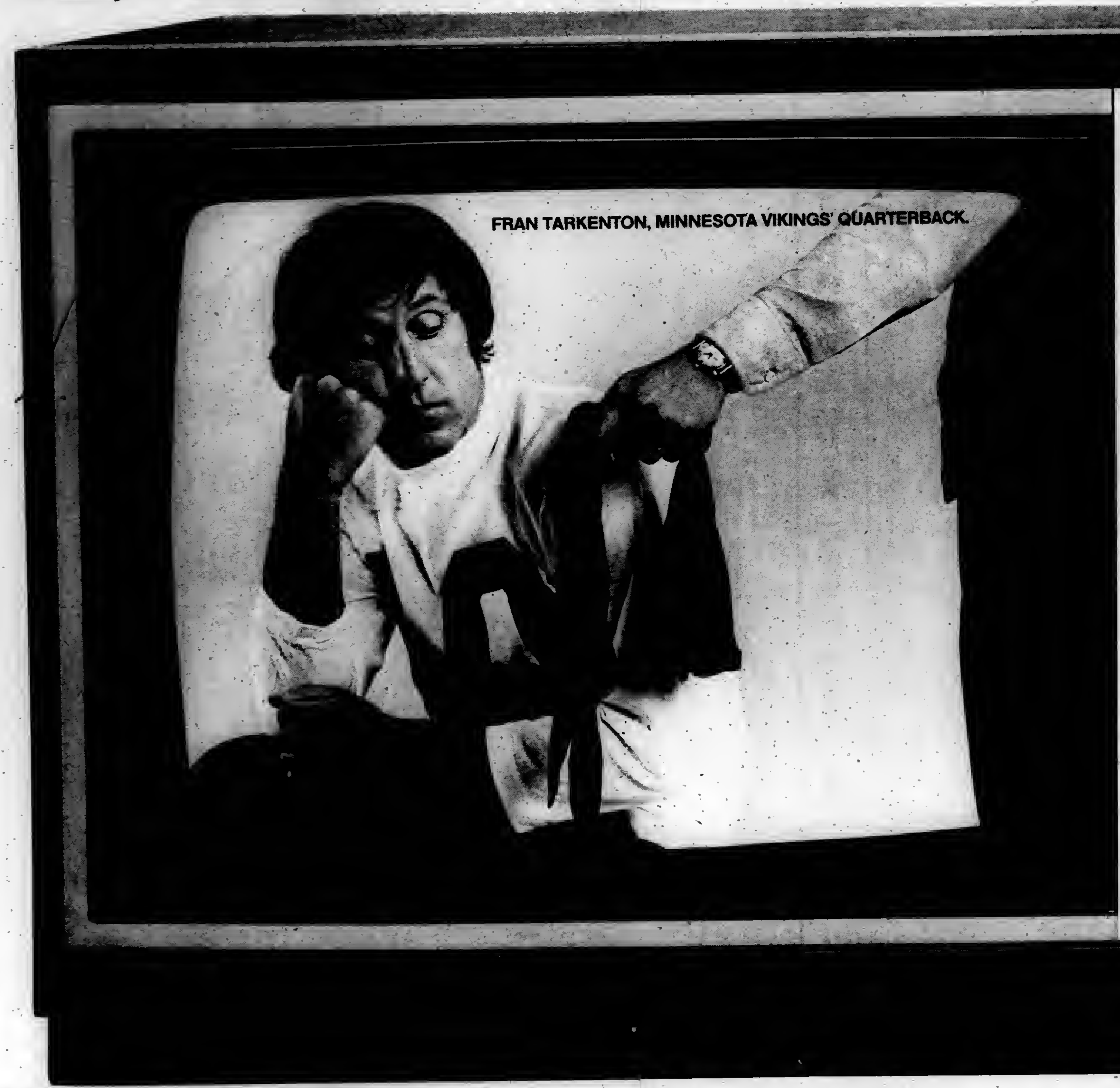
PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 24	21 5/8	-2 1/4	-9.4
O	ADVANCED MEMORY SYS	7- 14	12 5/8	-1 3/4	-12.1
N	AMPEX CORP	8- 16	14 3/4	- 1/2	-3.2
O	ANDERSON JACOBSON	3- 8	7 1/2	+ 1/4	+3.4
N	APPLIED DIG DATA SYS	10- 20	16 5/8	+ 1/2	+3.1
O	BEEHIVE INT'L	5- 12	5 3/4	- 1/8	-2.1
A	BOLT,BERANEK & NEW	6- 10	8	-1 3/8	-14.6
N	BUNKER-RAMO	8- 17	17	+ 1/4	+1.4
A	CALCOMP	3- 9	8 1/4	- 1/8	-1.4
O	CAMBRIDGE MEMORIES	1- 6	5 1/2	- 5/8	-10.2
N	CENTRONICS DATA COMP	16- 30	24 3/4	- 5/8	-2.4
C	COGNITRONICS	1- 2	1 3/4	+ 1/2	+40.0
O	COMPUTER COMMUN.	5- 10	8 7/8	- 3/4	-7.7
C	COMPUTER CONSOLES	4- 7	7 1/4	+ 3/4	+11.5
A	COMPUTER EQUIPMENT	2- 6	5 3/8	+ 3/8	+7.5
C	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
C	COMTEN	9- 24	23 1/4	+3 1/4	+16.2
N	CONRAC CORP	19- 28	23 3/4	-1 1/4	-5.0
O	DATA ACCESS SYSTEMS	4- 5	4 1/4	- 1/4	-5.5
O	DATA 100	6- 17	16 1/8	- 5/8	-3.7
A	DATA PRODUCTS CORP	9- 20	18 3/4	- 1/4	-1.3
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 4	4 1/8	+ 1/8	+3.1
O	DECISION DATA COMPUT	2- 3	2 7/8	+ 1/8	+4.5
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 20	19 3/4	+ 7/8	+4.6
O	DATARAM CORP	2- 24	22	-2	-8.3
N	ELECTRONIC M & M	4- 7	6 5/8	- 5/8	-8.6
O	FABRI-TEK	1- 2	1 1/4	-	-4.7
O	GENERAL COMPUTER SYS	0- 2	1 3/8	+ 3/8	+37.5
N	HAZELTINE CORP	8- 15	13 7/8	-1 1/8	-7.5
N	HARRIS CORP	28- 58	53 1/4	-5 1/8	-8.7
O	INFOREX INC	4- 9	8 7/8	- 3/8	-4.0
O	INFORMATION INTL INC	8- 14	9 1/2	- 1/4	-2.5
O	INTEL CORP	38- 59	53 1/2	-4 1/2	-7.7
A	LUNDY ELECTRONICS	3- 6	3 1/4	0	0.0
O	MSI DATA CORP	6- 19	17	-1 5/8	-8.7
N	MEMOREX	23- 47	46 1/4	-1	-2.1
N	MOHAWK DATA SCI	5- 12	10 7/8	-1 3/8	-11.2
C	PENRIL CORP	2- 9	8 5/8	- 1/8	-1.4
N	PERTEC CORP	7- 14	12 1/2	-1 1/8	-8.2
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3 1/8	- 1/4	-7.4
O	RECOGNITION EQUIP	6- 10	8 5/8	- 3/8	-4.1
O	SCAN DATA	1- 4	2 1/2	- 3/4	-24.0
N	STORAGE TECHNOLOGY	10- 39	37 1/2	-1 1/2	-3.8
O	T BAR INC	7- 19	13 1/4	-2 1/2	-15.8
O	TALLY CORP.	4- 9	8 1/8	- 5/8	-7.1
A	TEC INC	6- 10	8	+ 1/8	+1.5
N	TEKTRONIX INC	29- 44	41 1/2	-2 1/2	-5.6
N	TELEX	2- 6	5 7/8	- 1/8	-2.0
C	TESDATA SYSTEMS CP	13- 20	17	-2	-10.5
O	WILTEK INC	1- 1	5/8	0	0.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977-78 RANGE (1)	CLOSE MAY 24 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	8 3/8	- 7/8	-9.4
O	BALTIMORE BUS FORMS	1- 4	3 1/4	- 1/4	-7.1
A	BARRY WRIGHT	10- 27	25 5/8	+ 7/8	+3.5
C	CYBERMATICS INC	1- 1	1 1/8	+ 1/8	+12.5
O	DUPLEX PRODUCTS INC	14- 25	24 3/8	- 5/8	-2.5
N	ENNIS BUS. FORMS	6- 16	15 1/4	+ 1/2	+3.3
N	3M COMPANY	43- 56	53 3/4	-1 5/8	-2.9
O	MOORE CORP LTD	24- 37	32 1/4	0	0.0
N	NASHUA CORP	16- 31	27 7/8	-3	-9.7
O	STANDARD REGISTER	18- 26	24 3/4	0	0.0
O	TAB PRODUCTS CO	8- 19	10 1/2	- 1/8	-1.1
N	UARCO	18- 27	24 7/8	-2	-7.4
A	WABASH MAGNETICS	10- 15	13 1/2	0	0.0
N	WALLACE BUS FORMS	17- 24	23 1/8	- 1/4	-1.0

OK, FRAN, NOT PANTYHOSE. FIXED ASSETS.



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COMPUTERWORLD

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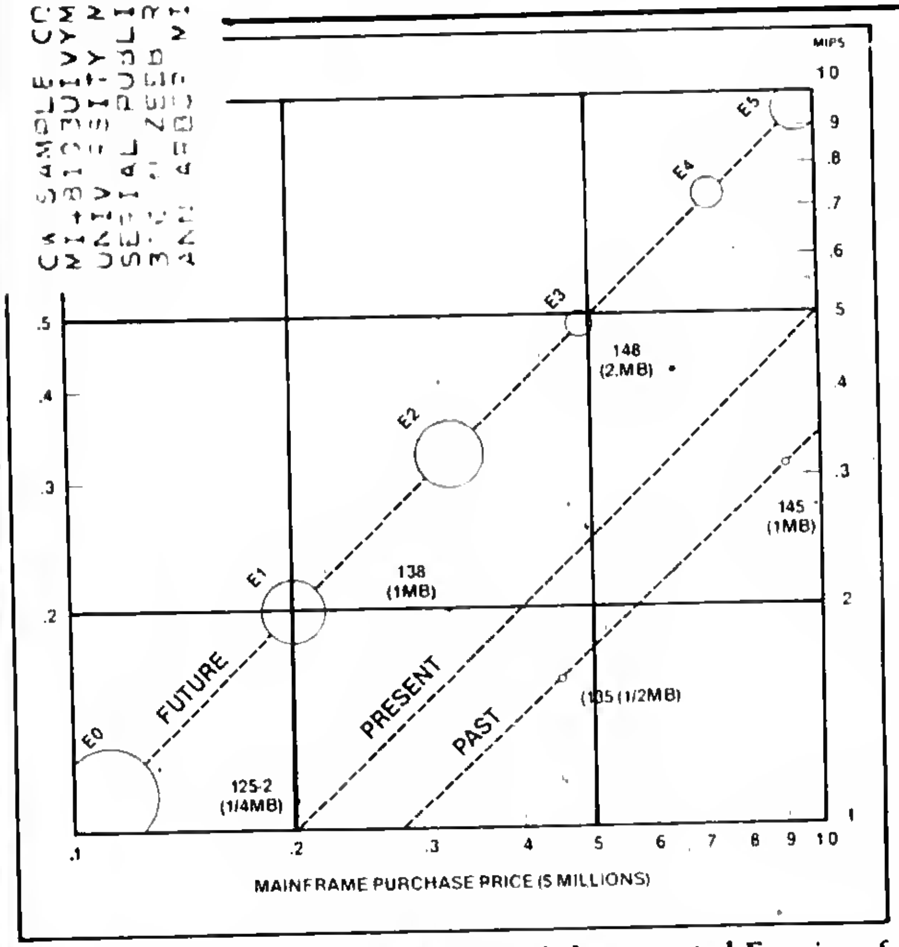

Shown above is the probable range of the expected E series of computers from IBM. The circled areas indicate where individual products will fall along the E series line, since the prices and performance of the individual machines may be fine-tuned by IBM as their announcement dates near. The chart was compiled by Advanced Computer Techniques Corp.'s Technology Analysis Group for a study entitled "IBM Systems in the '80s."

IBM Expected to Unwrap Double-Powered 'E Series'

By E. Drake Lundell Jr.
CW Staff

Users of IBM's small and medium-scale computers will be able to get at least twice the power of their present systems — and possibly much greater price/performance gains — when IBM announces its E series later this year or early in 1979.

The E series will also offer these users expanded memory capacity and new software/-firmware functions, according to industry watchers interviewed by *Computerworld.*

The series, which will range in processor power from about 100,000 instructions per second to 1 million instructions per second (Mips), could be based on a bus structure much like that used in the recently announced Magnuson Systems Corp. M80 Model 3 and Model 4 [CW, May 22].

Ultimately, the industry experts agree, there probably will be six machines in the series (see chart at left), but most feel IBM will initially announce only the first three processors, with the upper level machines announced six months to a year later.

IBM's present production schedule (see story on Page 4) tends to confirm this view; the mainframer is not producing any new machines at the lower end of the 370 line. The 370/138 and 370/148 are still being manufactured, however, and it is these machines which would compete with the top of the E series.

The six units in the E series — known at IBM as the E0, E1, E2, E3, E4 and E5 — will probably be based on just two new CPUs, with the E1 and E2 based on the E0 processor and the E4 and E5 based on the E3 processor, according to Robert Fertig, vice-president of Advanced Computer Techniques Corp.'s Technology Analysis Group (ACT/TAG).

Upgrading within the E series might be accomplished in the field, Fertig noted, by simply replacing boards in the machines — without any user disruption.

More Than Raw Processor Power

At the same time ACT/TAG predicted the E series machines' price/performance ratio may be significantly increased above that for raw processor power by operating system and firmware additions to the line, which may be introduced with first shipments of the series.

While the raw processor improvements will show approximately a 2:1 improvement over the Mips rates available with the present 370 equipment, the operating system and firmware enhancements could add 50% to 100% more performance to the E series, according to ACT/TAG.

The first units will supersede the 370/115 and 370/125 — "clearly the weakest link in the 370 line" — and will be announced as early as the fourth quarter of this year or as late as the first quarter of next year, Fertig predicted. The follow-ons, replacing the 370/138 and 370/148, will be announced about the third or fourth quarter of 1979, he believes.

The low-end systems will probably provide bridges for System/3 users, Fertig said — but, he added, the problem of "contention" between IBM's General Systems Division and Data Processing Division is stalling the E se-

(Continued on Page 5)

Federal Study Group Finds

Government Treating DPers Ineptly

By Don Leavitt
CW Staff

WASHINGTON, D.C. — The government is doing a poor job of hiring, classifying, training, working with and retaining DP personnel.

That's the message that comes through loud and clear from a draft report just issued by the personnel team of the Federal DP Reorganization Study group.

There are ways of reversing the situation, the report suggested, but not much time: "The personnel who perform DP functions are a vital resource and their problems directly influence the efficiency and effectiveness of the government's operation. It is therefore imperative that [the problems] be identified, recognized and solved without further delay."

The problems start because in many government installations, "DP and senior management's perspective of information technology's function and significance to the mission [of the agency] impacts negatively on the ability of DP personnel to effectively contribute to the goals and objectives of

(Continued on Page 8)

CCITT Committee Drafts Transborder Network Links

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — Two protocol standards for connecting public data networks across national boundaries were among the achievements of the Consultative Committee on International Telephone and Telegraph's (CCITT) Study Group 7, which recently met in Geneva, Switzerland.

Work also progressed on a datagram standard and a newer concept called the Frame Mode Data Terminal Equipment (DTE) standard.

One of the completed standards is X.75, the gateway interface for public packet-switched, virtual-circuit data networks operating under the X.25 standard.

The X.75 standard establishes uniform procedures under which public data nets can be interfaced.

Technically, X.75 is now subject to the 90-day balloting procedure but, according to Harold Folts, chairman of the American National Standards Institute (Ansi) X3S37 task group on public data networks here, acceptance of the standard is virtually assured.

Implementation of X.75 will be trans-

(Continued on Page 8)

IN DEPTH
IN DEPTH
IN DEPTH

CW offers a double-header this week: Charles P. Lecht begins Chapter III of Tsunami on Page 82 and Ronald G. Ross looks at current offerings in Part 3 of "Data Base Systems: Design, Implementation and Management," beginning on Page 105.

Memorex Case Going to Jury

By E. Drake Lundell Jr.
CW Staff

SAN FRANCISCO — By this Wednesday evening, the issue of whether IBM monopolized the computer industry will be in the hands of 11 jurors who are hearing Memorex Corp.'s antitrust case against that firm.

Their decision will have wide-ranging consequences for computer users and the industry alike.

On Wednesday, Judge Samuel Conti will mount the bench of the Federal District Court here and read those jurors 87 separate charges and explanations of the law governing such cases. The 11 will then retire for what is expected to be quite a while to reach their decision in the $1 billion case.

Among the judge's charges is one that is apparently a victory for Memorex, even though it will not know whether that victory was meaningful or not until the jury comes in with its decision.

In charge No. 50, Conti will instruct the jury that IBM did not have to price products below "average variable cost" in order to be de-

(Continued on Page 4)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
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End Long Contract Dispute

Schaefer, EDS Settle Out of Court

By Ann Dooley
CW Staff

NEW YORK — The F&M Schaefer Brewing Co. and Electronic Data Systems Corp. (EDS) ended their lengthy legal battle over a disputed facilities management and software development contract in an out-of-court agreement over the Memorial Day weekend, settling for significantly smaller amounts than had been asked.

EDS paid Schaefer $2.3 million in the settlement and EDS retained the $1.3 million sum Schaefer had paid the DP firm under a prior court order [CW, March 21, 1977]. Schaefer's payment was a final termination payment claimed by EDS under a former contract between the two parties.

The settlement was for much less than Schaefer's suit, which had asked for actual damages of $45 million and punitive damages of $70 million. The brewing company had claimed that EDS was negligent in supplying an "inadequate" system and also that it was not significantly different from Schaefer's original system [CW, Sept. 13, 1976].

In its countersuit, EDS asked for $19.3 million, charging that Schaefer conspired to defraud and deceive the facilities management firm [CW, Feb. 21, 1977].

Both parties settled to avoid the continuing cost of prolonged litigation, according to an EDS spokesman. Since Schaefer has now met all of its contractual obligations, it will keep and continue to use the disputed system, the spokesman added. Schaefer had no comment except to say that the suit had ended.

Although the suit never came to trial, several pretrial hearings were held in the Federal District Court of New York with Judge Constance Baker Motley presiding.

At one point, Motley ruled that software was a "tangible" commodity and that Schaefer must return the system and its software to EDS or pay the $1.3 million remains of the contract pending the outcome of the trial [CW, March 21, 1977].

In the course of other pretrial hearings, Motley also declared that computer specialists and their clients have a "special relationship" which makes them liable to malpractice claims even years after the contract has ended [CW, Nov. 28].

EDS announced its net income for the quarter ending June 30 will be reduced by $750,000 as a result of the settlement.

ACM Asks USSR to Allow Sharansky Trial Observer

NEW YORK — The Association for Computing Machinery (ACM) has asked Soviet President Leonid I. Brezhnev that an ACM observer be allowed to attend computer scientist Anatole Sharansky's upcoming trial.

Sharansky is accused of working as a spy for the U.S. Central Intelligence Agency (CIA). Although his trial on those charges is expected to take place soon, no date has yet been set.

Although ACM president Herbert R.J. Grosch sent the telegram to Brezhnev in early April, there has been no response and none is expected, according to ACM officials.

In his telegram, Grosch said he made his request because of guidelines in the ACM constitution which include promoting "freedom in interchanging information about computer technology."

Grosch made no comment on Sharansky's guilt or innocence in his appeal to Brezhnev, but expressed strong support for fair and open conduct of the trial.

There are several qualified computer scientists within ACM who could serve as observers, according to Grosch, who also noted that ACM could cooperate with other scientific societies, such as the National Academy of Sciences, that have made similar requests to send observers.

ACM has previously sent messages concerning Sharansky to Ambassador Anatoly F. Dobrynin in Washington and President of the Soviet Academy of Sciences A.P. Aleksandrov [CW, Dec. 12].

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5	Texaco
6	Standard Oil of California
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8	Gulf Oil
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10	Chrysler
11	International Tel. & Tel.
12	Standard Oil (Ind.)
13	Atlantic Richfield
14	Shell Oil
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16	E. I. du Pont de Nemours
17	Continental Oil
18	Western Electric
19	Tenneco
20	Procter & Gamble
21	Union Carbide
22	Goodyear Tire & Rubber
23	Sun
24	Phillips Petroleum
25	Dow Chemical
26	Westinghouse Electric
27	Occidental Petroleum
28	International Harvester
29	Eastman Kodak
30	RCA
31	Rockwell International
32	Caterpillar Tractor
33	Union Oil of California
34	United Technologies
35	Bethlehem Steel
36	Beatrice Foods
37	Esmark
38	Kraft
39	Xerox
40	General Foods
41	R. J. Reynolds Industries
42	Ashland Oil
43	LTV
44	Monsanto
45	Amerada Hess
46	Firestone Tire & Rubber
47	Cities Service
48	Marathon Oil
49	Boeing
50	Minnesota Mining & Manufacturing

How many of the Fortunate 50 sort with SyncSort? Thirty-four companies—or 68% of the total. (A comparable percentage of the other 450 firms on the Fortune 500 list are likewise lucky in their choice of a sort program.)

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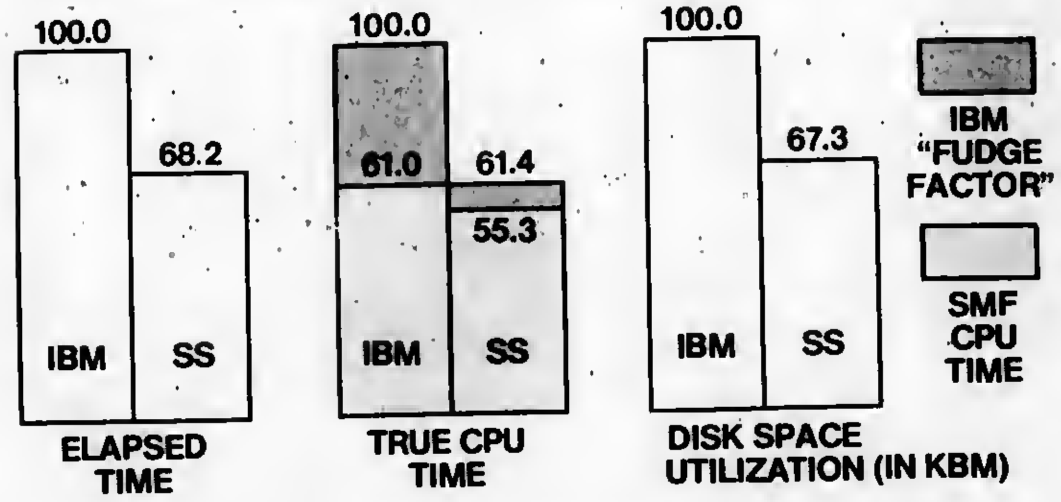

If that's the case, why doesn't everyone sort with SyncSort? Frankly, we don't know. That's the biggest puzzle of all.

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Three Minis in the Works At IBM, Observers Certain

By E. Drake Lundell Jr.
CW Staff

In addition to its small- to medium-scale E series, IBM is currently working on three new minicomputers as well as improvements for its Series/1 minicomputer, according to industry observers.

The new minis will be announced later this year or early next year, industry analysts believe, and will put IBM firmly into the minicomputer marketplace.

The minis will also place IBM's Data Processing Division (DPD) in direct competition with its General Systems Division (GSD), which until now has had sole IBM responsibility for penetrating this market.

The new minis will offer up to three or four times the performance of comparable present products, the industry obsetvers indicated. They include the Aztec system under development in the Systems Products Division and expected to be marketed by DPD; the Orbit system being developed by the System Communications Division, also targeted for DPD marketing; and the Pacific system, which will be developed and sold by GSD.

The Aztec system will be "IBM's main distributed data processing thrust into the 1980s," according to Robert Fertig, vice-president of the Technology Analysis Group at Advanced Computer Techniques Corp. Aztec will offer users greater processing power than that currently available with the 3790 systems and will also have greater memory and greater disk capacity, the industry observer said.

The Orbit system will be a minicomputer-based intelligent terminal or remote job entry system, observers said, and should be ready for announcement this year.

GSD's Pacific system will be a more traditional follow-on product for the firm and will be used to migrate some System/3 users as well as users of the System/32 and System/34.

This system will follow the System/32 and System/34 architecture and will have bridges to the System/3 base, the industry observers indicated. It may be announced as a System/35 or 36 and should be out later this year or next year.

At the same time, GSD is not putting all its eggs into the Pacific basket. It is working on improvements to the Series/1 that should also be ready within 12 months, making that system more powerful and better suited to commercial applications, the observers predicted.

The Basis for Speculation

WHITE PLAINS, N.Y. — Of the 14 central processors in IBM's 370 line, only five are "in new production" and these are concentrated at the medium- to large-scale end of the line.

IBM uses three categories to indicate the production status of its machines. Systems it is producing from scratch are called "in new production"; those for which the firm is making only some parts are said to be "in limited new production"; and systems on which all production work has stopped are "not in new production."

At present, the only processors in the 370 line classified as "in new production" are the 370/138, 370/148, 3031, 3032 and 3033. The rest of the 370 line is classified as "not in new production," the lowest status IBM assigns to equipment.

This is one fact industry observers use in trying to predict the announcement of new machines.

The firm is not currently producing any machines below the level of the 370/138 and 370/148, leading industry sources to speculate IBM will announce the lower end of the E series to fill this gap (at the 370/115 and 370/125 level) first. Those upper end machines would compete with the 370/138 and 370/148 IBM is still producing.

Memorex Case Going to Jury This Week

(Continued from Page 1)

termined a monopolist — a contention that is often made by IBM.

The wording used by the judge — which he worked out in conferences with the lawyers for each side — is sure to be appealed by IBM if it should lose.

Monopolization could be shown, Conti will tell the jurors, "by evidence that IBM charged a price which, although above marginal or average variable costs, was below its short run profit-maximizing price and that barriers to entry were great enough to prevent other entry before IBM could reap the benefits of its market position."

Issue Arose Earlier

This problem has come up before in antitrust cases involving IBM.

Judge A. Sherman Christensen held in the Telex vs. IBM case that IBM had monopolized the market even though he did not find that IBM had priced its products below their costs.

However, on appeal, IBM forcefully argued that it could not be found to be a monopolist unless it priced below cost, convincing the 10th Circuit Court of Appeals that its position was right.

In spite of this, Conti, in meetings with the lawyers here, insisted on leaving that instruction in the charge to the jurors, noting that later cases have upheld that position.

"I'm going to say it," the judge told the lawyers in a recent meeting, and "having said it, I will let somebody else tell me whether I am right or wrong.

"But I think this. I think as a matter of philosophy, you don't have to have below-average marginal cost. I mean, if a company sacrifice[s] its profits now in order to exclude competition or, to control prices, takes lower costs and then later on when the competition is out, raises the prices, it doesn't make any difference whether [the prices are] below [the firm's] costs or not . . . as long as they accomplish the end of being able to control the prices.

"You can control prices by having them above your costs," he added over objections of IBM lawyers.

Questions to Jurors

In all, the 11 jurors will have to answer — unanimously — several questions that will be put to them on the "verdict form" they will be given on Wednesday.

The first question will be on the general-purpose computer market: "Does a relevant general-purpose computer systems market or submarket exist?"

If they answer "yes," then they are asked "Did IBM monopolize this market or submarket?" and "Did IBM attempt to monopolize this market or submarket?"

If the answers are "yes" to either of those questions, then the jury must determine what, if any damages Memorex suffered as a result of IBM's antitrust violation or violations in this market or submarket and put in a dollar figure for those damages.

If the answer is "no" to any of those questions, then the jury finds IBM not guilty of that charge and goes on to the next questions, which are identical but cover the plug-compatible disk market, the communications control unit market and the disk pack market.

The Memorex case is the most ambitious of the antitrust cases brought against IBM by plug-compatible manufacturers in that it asks for a ruling on the general-purpose systems market — which Memorex tried to enter — as well as the separate peripheral submarkets.

High Stakes

And the stakes are high. Memorex claims damages of more than $300 million, alleging that its business suffered that much by IBM actions in the various markets.

Since antitrust damages are tripled in private cases, the amount of the award could run to almost $1 billion if the jury accepts all of the Memorex contentions.

In addition, if a decision adverse to IBM is reached by the jury and upheld by higher courts, the case could set a precedent that would encourage other competitors and users to sue IBM on antitrust grounds.

That is one reason IBM is sure to challenge the judge's charge to the jury. Jury cases are rarely overturned on appeal, unless the appellate courts find clear error on the part of the judge in the case, and if it loses on this round, IBM is sure to zero in on any possible errors on the judge's part when it appeals.

Juries do not have to list their reasons for finding a firm or company guilty, as does a judge if he is hearing a case without a jury.

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Year-End Announcement of 'E Series' Possible

(Continued from Page 1)

ries announcement. The use of bridges is one of the reasons for such contention, he said.

On memory for the systems, ACT/TAG predicted that at least a fourfold increase in main memory capacity over the present systems is likely and that this memory capacity upgrade will be announced with the initial E series introductions.

When all the microcode improvements are available with the systems, users can expect 2.5 to three times the performance of their present machines for approximately the same price, Fertig said.

Indicating that "even IBM doesn't know the exact price of the E series" machines yet, Fertig said users should be able to get a machine offering 100,000 instructions per second for about $100,000 and a 1 Mips machine for approximately $1 million. However, he noted that IBM can fine-tune the price/performance of the machines as their announcement date nears.

On the software side, ACT/TAG indicated the E series will have more functions built into firmware, offering greater performance and increased reliability.

"IBM has to offer more functions per dollar," Fertig said, since competitors could "quickly respond to announcements that just offered more processor power per dollar or a lower price."

Therefore, functions such as increased "reliability, availability and serviceability (RAS)" might be part of the package in addition to the increased performance, ACT/TAG predicted.

In addition, IBM may buy 16K chips from outside vendors for use in the E series, Fertig said, packaging them into 32K memory modules. The firm is presently investigating two sources of supply for such chips, he noted.

By buying 16K chips outside, IBM would be free to gear up for internal production of 64K chips for use on later machines, expected in the early 1980s, he added.

Greater Interactivity

Another observer, Drexel Burnham and Lambert, Inc. Vice-President Harry Edelson, expects the E series to be announced by the end of this year with an operating system different from that of the 370 line, although it could run 370 programs. The operating system will allow more interactive applications, he predicted.

At the same time, Edelson said he expects the firm to announce a separate machine — perhaps a System/4 — to serve as the bridge system between the System/3 base and the E machines.

Further, he mentioned the possibility of a 3M-byte System/3 under development in IBM's General Systems Division.

A bit more bullish on the power of the systems is Gideon Gartner, vice-president for technology in the research department at Oppenheimer and Co., Inc. Gartner thinks that the E series systems will offer at least a 3.5:1 performance improvement over the current offerings in the 370 line and that IBM will offer a system at the top end of the E series with better performance than the 370/148 for less money.

At the same time, he feels the E series will be particularly price- and performance-competitive at the lower end of the line, where the "megamini people" are eating into the IBM preserve.

Separately Priced Software

At International Data Corp., Vice-President James Peacock also expects the E series later this year — perhaps as early as the third quarter. He predicted the systems will offer a 2:1 price/-performance improvement at the upper end and a bit better ratio at the lower end.

The E series, he said, will have a larger reloadable control store than present IBM products and will be much more tailorable in the field for individual applications and uses.

At the same time, IBM will put more of its software into firmware, Peacock forecast, and will separately price more of its software and operating systems.

By the 1980s, Peacock said, most of the components of the operating systems from IBM will carry price tags because this is the firm's "only defense" against the plug-compatible CPU makers.

William Easterbrook, a research vice-president specializing in computers for Kidder, Peabody and Co., also expects to see more modularity in pricing of software from IBM.

"IBM needs nonprice reactions" in order to slow the impact of the plug-compatible manufacturers, he said.

McCracken Gets Top ACM Post

NEW YORK — Daniel D. McCracken, current vice-president of the Association for Computing Machinery (ACM), was elected ACM president for a two-year term beginning July 1.

McCracken is an internationally known consultant, lecturer and author of 15 books on computers and programming language.

Peter J. Denning, professor of computer science at Purdue University, was elected-vice president and David H. Brandin, executive director of the Computer Science and Technology Division at Stanford Research Institute, was elected secretary.

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Mid-Range IBM Users Offered More for Less

SYSTEM / CHARACTERISTICS	IBM 370/138	MAGNUSON M80 Model 3	NATIONAL SEMI System 400	NCSS 3200	IBM 370/148	MAGNUSON M80 Model 4	IBM 3031
Relative CPU Power[1]	10	15	15	18[4]	20	32	52
Memory Size in Bytes (Minimum to Maximum)	512K to 1M	512K to 16M	256K to 16M	256K to 4M[5]	1M to 2M	1M to 16M	2M to 6M
Purchase Price[2]	$333,600	$245,000	$200,000[3]	$230,500[6]	$548,450	$395,000	$830,000[7]
Monthly Lease[2] (Lease Term)	$10,460 (4 Years)	$9,500 (Monthly)	$5,266 (4 Years)	$5,363[6] (5 Years)	$17,280 (4 Years)	$18,500 (Monthly)	$21,320[7] (4 Years)
Memory Cycle Time (Nsec)	715 - 935	300	400	650	405-540	300	345
Machine Cycle Time (Nsec)	275 - 1,485	100	100	250	180-270	100	115
Channels (Minimum to Maximum)	3 Standard	3 to 16	0 to 12	1 to 8	5 Standard	5 to 16	6 Standard
Cache (Buffer) Size	None	None	None	None	None	None	32K
Bus Architecture?	No	Yes	Yes	Yes	No	Yes	No
Price per 1M Byte Of Main Memory	$110,000	$80,000	$70,000	$60,000[6]	$110,000	$80,000	$110,000

NOTES

1. International Data Corp. estimates for the IBM machines based on IBM 3033 = 200. CW estimates for compatible manufacturers based on company claims.
2. Prices are for CPU, 1Mbyte of main memory, console and power supply and were supplied by the manufacturers.
3. Price for a System 400 including two I/O processors (equivalent to two channels), a 200M-byte disk, magnetic tape unit and printer in a single quantity.
4. Relative power of the Two Pi machine configured into a 3200 system with the VPS operating system from CSS.
5. Can be extended to 16M bytes in OEM configurations with the addition of circuitry. As marketed to end users by NCSS, the present memory maximum is 2M bytes.
6. End-user price including the VPS operating system, a 5% software license credit, installation service and three channels as quoted by NCSS.
7. Price for a 2M-byte configuration, which is the smallest available from IBM; 1M byte of memory from IBM sells for $110,000 and rents for $3,460/mo on a four-year lease.

By E. Drake Lundell Jr.
CW Staff

Users of IBM mid-range computers have been deluged since mid-April with offerings from a growing list of suppliers making CPUs compatible with the 370/138 and 370/148.

The upshot of the activity is that users now can get compatible machines that offer 50% to 80% more performance than their IBM gear — at a savings of up to one-third the price of the IBM systems.

National CSS, Inc. (NCSS) started the ball rolling when it announced it would market a system made by Two Pi Co. with NCSS' VPS operating system, which is compatible with the IBM 360 and 370 series [CW, April 17].

Then, in the first week of May, National Semiconductor Corp. jumped at least part way into the business with the announcement of its System 400 processor, a replacement for the IBM 370/138 and 370/145 [CW, May 8].

Most recently, the furious activity in this area was capped with the introduction of two systems — the M80 Model 3 and M80 Model 4 — from Magnuson Systems Corp. to emulate the 370/138 and 370/148 [CW, May 22].

In order to put some of these systems in perspective, *Computerworld* compiled the accompanying chart to compare these systems with their competitors in the IBM 370 line.

All of the independent systems offer users clear price breaks over their competitive IBM units, with user savings amounting to more than $150,000 — or about 30% of the purchase price in some cases.

Performance Evaluated

In addition, almost all of the units provide performance increases over their IBM counterparts, with the Magnuson and National Semi machines offering increased memory and machine cycle times.

The Two Pi system, however, comes in just under the level of the IBM machines in both of these categories, but the more efficient NCSS operating system is said to provide users with a machine capable of almost twice the throughput of the IBM 370/138.

When compared with the IBM 370/138, for example, the competitors from Magnuson and National Semi boast about 50% more performance than the IBM unit, while the CSS machine with the CSS operating system is estimated to provide around 1.8 times the IBM performance. The performance of the others is based on running IBM operating systems.

The Magnuson machine will cost users almost $89,000 less on a purchase price, while the National Semi system undercuts the IBM price by about $133,000. The NCSS 3200 with software will cost the user $103,000 less than the comparable 370/138.

The major competition at the Model 148 Level is the Magnuson M80 Model 4, although some of the other plug-compatible machines can be configured to provide IBM with competition in this area. The Magnuson Model 4 gives users a 50% performance increase while letting them save $153,000 on a purchase basis — a savings of about 30% over the IBM offering in this area.

All of the independent systems offer IBM users another important plus — the possibility of more main memory than IBM offers. All of the systems from Magnuson, National Semi or Two Pi can be configured with up to 16M bytes of memory, while the IBM 370/138 can only go up to 1M byte, the 370/148 only to 2M bytes and the 3031 only to the 6M-byte level.

Users who have run out of memory space but who do not need more computer power may turn in some of their larger IBM systems for these plug-compatibles configured at their maximum memory size, according to industry observers.

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TRW to Service Docutel Tellers

DALLAS — Docutel Corp. has signed a letter of intent with TRW, Inc. for field maintenance service on Docutel products.

Under the agreement, which is expected to become effective by mid-July, TRW will assume responsibility for maintaining more than 3,700 automated teller products.

Docutel will continue engineering support of its installed products and plans to add products to the arrangement, according to a spokesman for the company.

Seeks Position From Carter

Senate Urges Policy on International Data

By G. Russell Pipe
Special to CW

WASHINGTON, D.C. – The Carter Administration is being prodded by Congress to develop a comprehensive U.S. policy on international communications including the problem of transborder data flow.

In a new section added to the appropriations bill for the State Department and the International Communications Agency, the Senate Foreign Relations Committee called on the President last week to report to Congress on "the procedures he has established by which to develop and maintain a comprehensive U.S. policy regarding international communications and information issues.".

If the Foreign Relations Committee addition to S-3076 is adopted by the full Congress, the President would have to submit that report by January 20.

The President would also have to define the U.S. goals and positions that will be taken at several upcoming international meetings on the subjects.

It is "imperative," the committee said," for the U.S. government to formulate a comprehensive policy regarding various communications and information issues."

Agreement From White House

The White House has apparently agreed to the proposal, Senate sources said. If the amendment is passed, the subject may be taken up in a special Presidential memorandum, they said.

Sen. George McGovern (D-S.D.) focused on the need for a coherent international communication-information policy during hearings held last June, and more recently, a staff report prepared by Senate aides George Kroloff and Scott Cohen indicated the U.S. is unprepared for debates and decisions to be taken at several important conferences.

These meetings, taking place in the next 14 months, include the general conference of the United Nations Educational, Scientific and Cultural Organization (Unesco), the fall meeting of the UN General Assembly, the UN Conference on Science and Technology and the World Administrative Radio Conference (Warc).

"Although the U.S. is the leading user of communications channels and information in the world, the U.S. government has neither formulated a comprehensive policy regarding the various communications and information issues that have entered international discussion, nor even established an effective mechanism by which to develop and coordinate U.S. policy on these issues," the proposal stated.

McGovern, Percy Cosponsors

An accompanying explanatory report noted that the proposal was sponsored by Senators McGovern and Charles Percy (R-Ill.) in order to accelerate preparation of "a necessary policy-making mechanism, the goals and general policy (not negotiation) positions of the U.S. with regard to several crucial international meetings."

If the President is called upon to assemble the machinery and policy framework asked for by Congress, a cadre of officials and private individuals is likely to be utilized.

The National Security Council and the Department of State are working on transborder data flow problems, and strictly privacy issues are being considered by a Cabinet-level committee due to report soon.

The recently established National Telecommunications and Information Administration (NTIA), under Assistant Secretary of Commerce Henry Geller, along with several existing agencies such as the Federal Communications Commission, the National Bureau of Standards and the General Services Administration, have a hand in the mix of computer and telecommunications issues, most of which have international dimensions.

Group Studying Shared Facility For DP Backup

NEW YORK – Coopers and Lybrand has been selected to do a feasibility study on establishing a shared contingency computer center for use by 16 area companies with large DP installations.

The study will cost approximately $250,000 and take about six months to complete, according to Lee W. Spitler, executive vice-president of Irving Trust Co. – a member of the New York Contingency Facility (NYCF) – and chairman of the NYCF steering committee.

"Individual backup facilities are simply too costly for even the wealthiest corporations, and that leaves only the shared-facility concept," according to Robert Jacobson, staff director for the project group. "The purpose of this study is to find out if a variety of complex problems can be solved and if such a facility can prove to have alternative uses for the participants when not in an emergency mode," Jacobson added. [See related story, CW, Feb. 13.]

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Report Slams Government Treatment of DPers

(Continued from Page 1)

the agency," the report noted as it examined, first of all, the organizational role of DP.

There is no consensus within the federal government on where DP should be placed organizationally or what role it should play in the management scheme of things, the team said.

"In those instances where it is considered to be a significant element, DP management is looked upon and treated as an important facet of the management team," the report said, adding, "In large part [however], this is attributed to the capability of the incumbent, his/her demonstrated management talent and responsiveness to [upper] management."

To bring DP and other elements of the agencies closer, the team suggested several options. The first is to require information systems training for high-ranked functional managers, with an emphasis on how technology can be used rather than the mechanics of DP.

As either an alternative or an addition to that requirement, the report said the government might require that an impact analysis be performed on DP operations before major policy or procedural changes are implemented. The analysis should identify the effects, if any, on the personnel needs, skill changes and hardware/software considerations, the team added.

A third option, the report suggested, is that agencies establish in-house mechanisms for setting DP priorities and making policy decisions when conflicting demands for DP resources cannot be resolved at the operating level.

Finally, it might be well to assign responsibility for information systems policy and overall operations at the deputy assistant secretary level or higher, the report said.

Treatment of DPers

Then the team focused in more detail on how DPers are treated and what that treatment means to them:

"Problem: The nature of DP work and the jobs being performed are not adequately reflected in the standards by which positions are classified, resulting in ineffective position management . . .

"Problem: The examining and hiring process and noncompetitive salaries for [both] entry-level programmers and highly technical jobs adversely affect the federal government's ability to recruit and retain qualified DP personnel . . .

"Problem: Neither training nor career development programs are organized and administered to achieve the most effective development of personnel or utilization of DP technology."

After substantial discussion of each of these problems — including background material and one or more possible solutions for each — the report took note of several "other issues" which it said were not unique to DP but were nonetheless of major concern to many.

The report said, for example, that personnel ceilings are restrictive, inhibit flexibility and establish artificial barriers to adequate staffing. These ceilings force agencies to seek contractual assistance without regard to cost/-benefit considerations, thereby reducing the level of in-house expertise, the team contended.

Several pages later, the same point reappeared in slightly different words. "Excessive use of contractual DP support services is required by federal procurement policy and personnel ceiling limitations. It is more costly, degrades in-house capabilities, skill levels and morale," according to the team, and it "creates problems in assuring the quality of DP products."

Still deeper in its report, the team said that existing formal incentive systems are not properly set up or utilized for rewarding or motivating employees.

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CCITT Committee Drafts Two Internetwork Protocols

(Continued from Page 1)

parent to network users and will be the responsibility of the carriers. X.75 is needed because public data nets may be compatible from a service standpoint, but they are implemented in different ways internally, according to Dr. Barry Wessler, vice-president of systems management and control at Telenet Communications Corp.

The internetwork protocol looks just like X.25, but with some minor additions., In X.25 there are some differences between the functions performed by the terminal and the functions performed by the network. These types of differences are eliminated under the X.75 protocol, Wessler said.

An example is in the area of "clearing causes," which define the reasons a device is cleared from the network. The net can send a number of clearing causes into a host CPU on the net, under X.25, but the host has only one such signal under X.75, Wessler explained.

On the other hand, the packet formats and the basic procedures are exactly the same in most areas where X.25 and X.75 are compared, he said. The Link Access Procedure B (LAP. B) is basically the same under both protocols, he noted.

Meaning to User

The significance of X.75 to the user of a public data network is that it sets up the mechanism by which a message can be sent from one network to another network. A message from Telenet or Tymnet in the U.S. to Transpac in France, for example, would be sent to one of three U.S. International Record Carriers (IRC), which would handle the transatlantic portion of the route.

The IRC would hand the message to the overseas administration of the French postal, telephone and telegraph (PTT) authority, which in turn would interface with the domestic French Transpac net. Transpac would send the message to the called host or terminal on that network.

In practice, some of the required services for completing this particular sequence are not yet in place. Transpac is scheduled to begin operations this year and the IRCs do not yet offer packet services, although RCA Globecom will inaugurate this type of offering within the next month.

Numbering Scheme

Another accomplishment of the CCITT meeting was completion of X.121, a worldwide numbering scheme to be used for public data nets. The numbering scheme includes four digits, with three of those digits making up the country code.

The formal name for the number is the Data Net Identification Code (DNIC). Directories of the assigned numbers will be published and the scheme will begin soon.

At present, Tymnet and Telenet customers can access Datapac through a provisional interfacing scheme. Both X.75 and X.121 will be implemented for these services as soon as the carriers can complete the necessary arrangements, Ansi's Folts said.

The numbering plan was a key element for international interconnection of public data networks. As such, it is remarkable that a worldwide scheme was finalized with relatively few differences, according to one source who attended the meeting.

Datagram Protocol

A more forward-looking project considered at the Geneva meeting was the development of a datagram protocol. The U.S. delegation presented a proposal supporting a datagram standard and the French came in with a counterproposal, Folts said.

There was general acceptance at the meeting that a datagram protocol "will be pursued" with the objective of having a recommendation by the end of the study period — the spring of 1980, Folts explained.

Support of datagram is growing, Folts said, noting Germany and The Netherlands now back the project. More and more people are realizing that the virtual call of X.25 does not satisfy all of the requirements of operating on a public data network.

Frame Mode DTE

Frame Mode DTE is a subject actively under debate, according to Folts. In the long term it will provide a universal interface that will work for all services under all modes of operation. In concept, such an interface would work with packet-switched, circuit-switched, datagram, virtual call and any other types of services.

The goal is to come up with one universal interface which probably would have minor subsets. Such an interface would supersede the divergent interface standards now required, Folts explained. This project, not yet fully understood by standards-making participants, is not expected to be finished until the 1980s, he said.

The next full meeting of CCITT Study Group 7 will be held in the spring of 1980, at the end of the current study period. This meeting will be in preparation for the CCITT plenary meeting.

Police Indicted for Using Net to Plan Thefts

By Catherine Arnst
CW Staff

NEW YORK — Two police officers here were recently indicted for "official misconduct" in separate incidents after each allegedly obtained information from a police department computer system for the purpose of obtaining stolen goods.

Ronald Ragone and James Ziede both were charged with using the Field and Administrative Terminal Network (FATN) with the intent to obtain a benefit for either themselves or another, "which constituted an unauthorized exercise of [their] official functions," according to the indictments.

Ragone, about whom more information is available supposedly used the system to obtain the address of the owner of an automobile that had some expensive radial tires he wanted.

The officer then allegedly gave the information to a thief so he could steal the tires and sell them back to Ragone. Ragone planned to pay $15 each for the five tires, which were valued at $90 each, according to an article in the *New York Post.*

New York police officials refused to comment on the details of either case, saying they were the subject of a "secret" investigation.

The network has been in operation since July 1976, but these incidents were the first abuses of their kind involving the system, a police department spokesman said.

FATN is tied into the New York State Department of Motor Vehicles system and the National Crime Information Center. The teleprocessing system is controlled by three Data General Corp. Nova 840 minicomputers, and there are 210 Olivetti Corp. CRT and

(Continued on Page 11)

USC Students Charged in Gear Rip-Off

By Brad Schultz
CW Staff

LOS ANGELES — The Los Angeles Police Department (LAPD) has arrested two University of Southern California (USC) students who allegedly tried to sell computer hardware stolen from the university.

The stolen equipment is worth from $16,000 to $23,000, although the students were apprehended trying to sell the goods for only $3,000, police sources said.

In a car belonging to one of the students, the LAPD also discovered a computer printout that documented an earlier attempt to surreptitiously alter their grade records and financial aid status by accessing the USC registrar's computer system, according to a university spokesman.

The students have confessed to the latter scheme, telling USC authorities that the attempt, made last February, failed largely because the students did not know enough of the necessary system passwords, Burt Wuttken of the USC news bureau said.

The students have been accused of stealing a Microdata Corp. A200 printer worth $11,000 as well as a Microdata "system" worth at least $5,000 that includes a disk drive, four circuit boards and terminals, according to the arresting officer, LAPD detective Bill Buck. Neither LAPD nor USC sources were able to identify model numbers for this system, but Buck said its street value could reach $12,000.

The students allegedly broke into a USC building, stole the devices and later offered to sell them to an individual described as a part-time USC instructor and computer hardware dealer.

The students did not tell this individual that the equipment was stolen, but he became suspicious anyway and alerted the LAPD to the situation, Buck said.

Buck and another officer posing as the dealer's associates arrested the students when they brought the equipment at the dealer's invitation, another police source stated.

As for last February's attempted grade alteration scheme, the students tried to access the grade transcript files stored on the registrar's system to award themselves good grades and credit for courses not taken, Wuttken said.

The students also tried to access the registrar's financial aid files in order to change their need status, which is based on personal or parent's income. If successful, they could have received unwarranted financial assistance, he indicated.

USC declined to describe how these files are protected, explaining that such disclosure would itself impair this security.

After the students face court action on the alleged larceny, USC authorities will convene a special hearing to decide their academic fate, Wuttken noted, explaining that suspension or expulsion from the university will be among the possible outcomes.

The students face no legal sanctions for their activity on the registrar's system, but the forthcoming hearing will consider the matter along with the alleged theft, Wuttken indicated.

LAPD and USC sources declined to identify the students or instructor involved.

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States' Action on Privacy 'Miniscule': Nasis

By Nancy French
CW Staff

LEXINGTON, Ky. — Despite the fact that legislatures of 15 states have seen fit to pass privacy laws that affect the recordkeeping of state DP agencies, little of that mandate has been translated into positive action to protect either data or access to DP centers, according to the National Association for State Information Systems (Nasis).

This finding appeared in Nasis' eighth annual report for the 1977 calendar year published here recently. The report is based on a survey of the DP departments of all 50 states and the Canadian province of Quebec.

Nineteen states have issued and implemented data security plans; 15 enforce them and 16 audit them, while 22 states reported no such plans at all, according to the report.

In the area of physical security, 32 states reported having issued and implemented such plans, while 30 enforce them and only 18 audit them, the report said. Twenty-eight rely for security on identification badges for entry into the DP center and 19 use guards instead.

Nasis called the progress made in this area over the past year "miniscule" with "the brightest note" being the 33% increase in the number of states auditing their total data security plans.

Nasis attributed this lack of attention to privacy and security of data to financial difficulties which have become increasingly bothersome since 1976.

The survey covered many other aspects of state DP activities including personnel, consulting expenditures and trends in computer inventories.

It also asked states to focus on internal and external problems. Here, 40 states reported missed programming schedules as the number one internal difficulty. This problem is being "exacerbated," they said, by the difficulty of recruiting qualified personnel on the one hand and tight budgets on the other. In fact, since 1974, high costs moved from fifth to fourth and then to second place in the problem ranks, where it has remained since 1976, the report indicated.

Cost overruns ranked third on the difficulty scale and that problem too, was voted more serious in 1977 than 1976 — this time by 21 compared with 11 states.

External Difficulties

But DP departments are also faced with external problems over which they have no control, the report said. Here, 43 states ranked management's lack of understanding as the number one external problem.

"Management understanding has been the number one problem since this data has been collected" in 1970, the report said, adding that the states reporting this situation have reversed last year's opinion that it is less serious than in previous times and now report it to be more serious by 4:3."

Lack of management interest and lack of a definitive DP plan continue to be among the most significant problems in this category; however, their seriousness has declined somewhat from prior reports, Nasis said. Lack of management interest in DP has also declined as a problem, falling from fourth to sixth place, while resistance to consolidation remains almost static over the years covered.

Recruitment of qualified personnel is shown to be a more serious problem by more than a 4-to-1 margin since 1971, moving from last (12th) to fifth place in ranking.

Long-range formalized state plans for DP and written standards and documentation for the various subactivities of the overall DP function have been goals of Nasis since it began its annual reports, Nasis said. "While the lack of definitive plans rates high in the order of external problems already discussed, the fact that each year more states report the development of long-range plans indicates this problem is being addressed, the report said. This year, 36 out of 50 states reported having plans compared with 16 out of 41 reporting in 1970.

However, the drafters of the report question why so many states rank this item as one of their most serious difficulties when so many show they have a plan.

It suggested some additional questions that might clarify this anomaly in future surveys. Among them was whether the plan once developed has been accepted and or endorsed by the governor and the legislature. A second question might be whether the user agencies played a part in developing the plan and whether they accept and assist in implementing it. Finally, the report said, the states might be asked how the plan is updated and kept current.

This year, 12 states reported having updated the plan during the current year. This is encouraging in Nasis' view, since "it suggests that the plan "is not merely a piece of paper to be placed on a shelf, but rather a document actively used in the decision-making process and is consciously kept current to make use of the latest state-of-the-art technology and to keep up with ever-changing state government programs."

In the area of equipment the report noted that absolute comparisons cannot be made among all years because of the changes in the states that report. However, the absolute growth between the years of 1976 and 1977 was 15 systems. The increase was made up of 16 large systems and 12 minicomputers, and the reduction was based on elimination of nine medium-scale and four small systems. This led Nasis to conclude that a number of medium-size installations have upgraded to larger equipment and that the majority of growth has been in the mini sector.

Further, the report pointed out, states are continuing to move away from leasing as a method of equipment acquisition, replacing it with a mix of a purchased CPU and leased peripheral equipment.

States also reported a continued increase in the use of software packages for information systems management needs such as project management, systems balancing and computer performance evaluation. Nasis found this indicative of "the ever-increasing quality of information systems management in state government."

Of the 44 states reporting on package use this year, 38 indicated use of some type of data base management system, and 16 of these said that by using a data base system they had been able to integrate series of records. An additional 30 states are planning to implement some type of integration, the survey indicated.

Answers to questions about transfer projects evince the mutual support and assistance Nasis members give one another in reducing the cost of implementing new applications, the report said. Many such transfer projects that in previous years were reported to be "in process" were reported "done" in 1977. Both system design and programming are included for applications ranging from exam validation and bridge structure to legislative bill status-reporting systems and medical and financial accounting systems.

The Nasis report includes a several-hundred-page appendix containing an application inventory along with descriptions as well as a listing of computer hardware and peripheral equipment.

The report can be obtained for $17.50 from Nasis at P.O. Box 11910, Lexington, Ky.

States Have More DP 'Chiefs'

LEXINGTON, Ky. — The number of people listed on the employment rosters of state DP departments continues to rise, but at a slower rate than even two years ago, and more such individuals are being classified as management, according to a report issued recently by the National Association for State Information Systems (Nasis).

In 1975 and even in 1976, the Nasis state survey showed a growth rate of almost 4%, compared with a 3.2% growth rate reported this year.

The Nasis report for 1977 attributed this drop partly to a reduction in the number of data entry employees and partly to the increase in the number of new types of managers for data base, data communications and security, the report said.

Salaries for various job categories varied widely, according to the report, with third-level management being paid as much as $42,501 per year in some states and as little as $20,000 in others. Second-level managers earned from a high of $34,669 to a low of $15,938 and a first-level managers earned from $29,800 to $14,140.

Salaries for systems analysts ranged from a high of $28,156 to a low of $12,000; systems programmers, from $26,738 to $13,650; application programmers, from $19,216 to $8,700; computer operators, from $14,904 to $7,500; and data entry personnel from $12,593 to $5,612.

The report said 46,250 people are employed in information systems work in the 50 states.

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Job Losses Predicted

Growing Service Imports Seen Hurting Canada

By Edith Holmes

CW Washington Bureau

WASHINGTON, D.C. — Canada estimates that by 1985, over half of the computing services its users acquire outside their own DP operations will be imported, Dr. Peter Robinson, chairman of the Canadian government's Interdepartmental Committee for Computer/Communications, said here recently.

That figure — approximately $1.5 billion or 52% of the "outside" computer services the nation uses — is based on a present trend of increases in imports that puts services obtained by Canada from foreign sources at about $155 million in 1975 and projects their value to $560 million by 1980, he stated.

Addressing TDF '78, the first international conference on transnational data flows to be held in the U.S., Robinson suggested this increase in imports calls into question the healthy forecasts made for Canadian Computer/Communications activities in the 1980s and raises concern about the number of jobs that will be created abroad rather than in Canada.

Canada's study of this situation, completed in the last two months, is one of the first to put dollar and job opportunity values on the complex flow of information and services across national boundaries.

The Canadian government estimated that 4,400 DP jobs — about 4.5% of the 95,000 DP-related jobs in that country in 1975 — were filled abroad by firms which provide computer services for Canada.

Canada's appetite for outside services should provide work for about 11,000 new systems analysts, programmers and computer operations and management personnel in 1980 — 8% of the 133,000 Canadian jobs in the field by then, Robinson continued.

This figure is expected to climb to 23,000 new jobs or 14% of Canada's 165,000 DP jobs in 1985, he said.

The nation's concern about jobs being exported through the use of foreign computing services is not limited to employment in the computer/communications field, Robinson said. The importation of simple computing services is often followed by the importation of computer-based management or professional services, thus lessening the need for Canadian managers, planners, accountants and management support workers.

The Canadian official acknowledged that in 1975, 90% of these imported services were supplied to Canadian subsidiaries by foreign parent companies. "But we expect [this proportion] to decline to about 85% by 1980 and to between 75% and 80% by 1985," he said.

In addition, "it is not very likely that we will be able to offset this growth in imports by greater exports from Canada," Robinson stated. "We have found no evidence to suggest that even by 1985 our exports will be greater than about $60 million."

Canada has made projections about its computer services imports against a backdrop of increasing computer/communications use, Robinson said. The government's study estimates that Canadian users spent almost $2.7 billion on these goods and services in 1975. More than 80% of this cost was incurred by in-house producers of data services to acquire and maintain the necessary staff, equipment, supplies, accommodations and data transmission facilities.

These total Canadian user costs will increase from the 1975 total to about $5.6 billion in 1980 and to $9.5 billion in 1985, he said. In addition, the government expects that more and more of these services will be obtained from other than in-house sources, growing steadily from 19% in 1975 to 25% in 1980 and to about 30% in 1985.

He warned against the use of "emotionally-loaded words" in discussing the issues — economic and others — involved in the movement of information and the provision of services across borders. "Protectionism" is one such word, he suggested.

Police Indicted For Net Abuse

(Continued from Page 9)

printer terminals throughout the city.

To obtain information from the system, a police officer makes a request to the officer on duty to operate the keyboard, according to Sergeant Edward Sharp, technical support manager of the Management Information Systems Division of the New York Police Department. The officer operating the terminal must keep a log of all requests for information, Sharp added.

Both police officers reportedly obtained the information they planned to use for unlawful purposes in October 1977. The indictments were the result of a joint investigation conducted by the office of the special prosecutor and the police department's Internal Affairs Division. Neither agency would comment as to how the system abuses were discovered.

If convicted, Ragone and Ziede could be sentenced to a maximum of one year's imprisonment.

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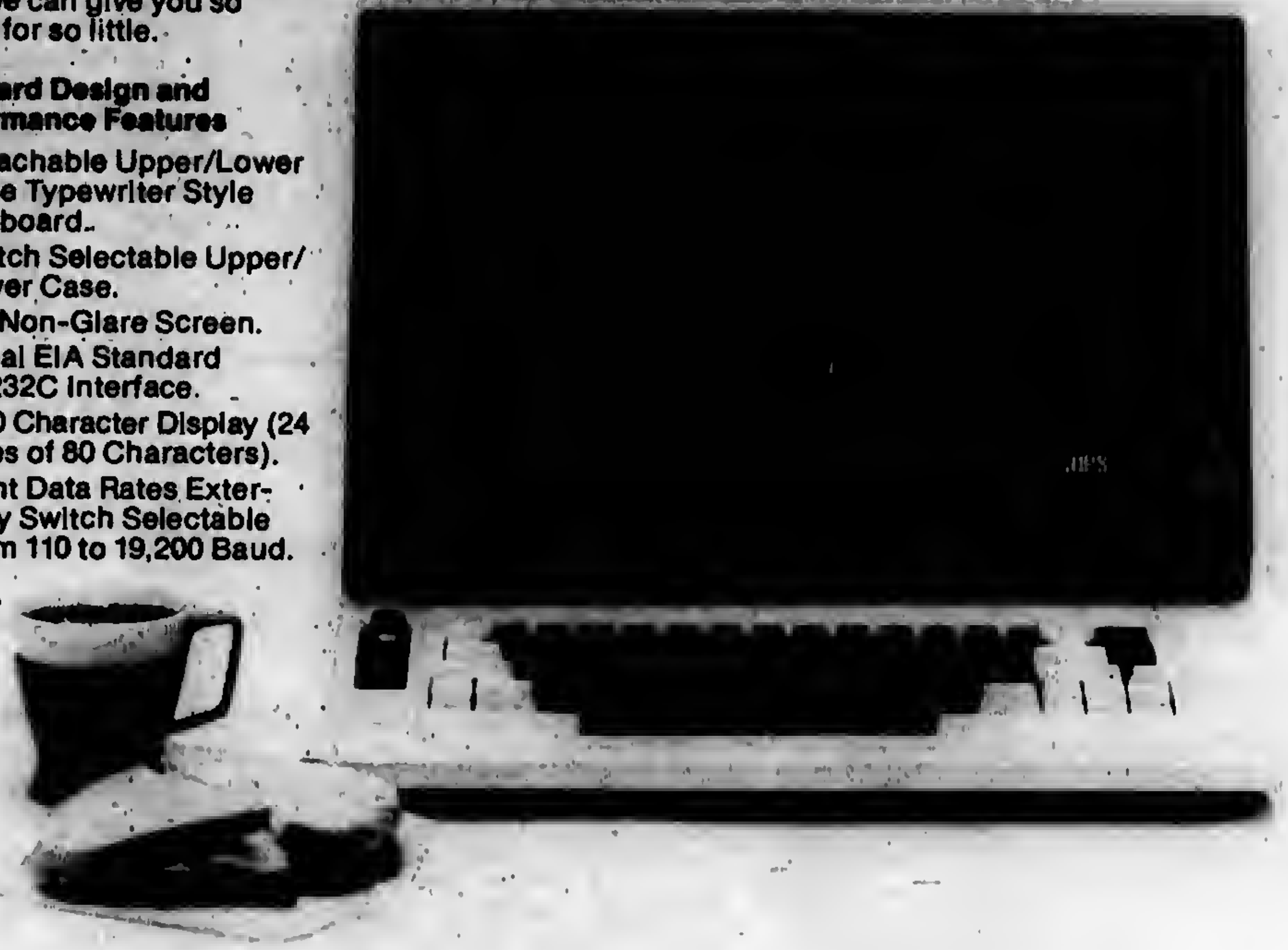

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Transborder Data an Economic Issue in Canada

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — When asked at a recent conference here to summarize Canadian legislation that regulates the flow of data across national boundaries, Dr. Peter Robinson, chairman of Canada's Interdepartmental Committee for Computer/-Communications, replied simply, "There is none."

No legislation, that is, that specifically addresses this amalgam of economic, social, political and legal issues. But Robinson warned the audience attending TDF '78, the first U.S.-hosted conference on transnational data flows, that Canada has a number of statutes that could be applied to the flow of information across her borders or to obtaining data services from sources outside her boundaries should the concern over these issues become great enough.

Canada's concern, Robinson stated, is growing on several different transnational data flow fronts. In its report entitled "Branching Out," the Canadian Computer/Communications Task Force expressed worries voiced by the nation's citizens "about the attraction of U.S.-based data processing and data communications services."

The task force concluded that positive competition and stimulation of Canadian efforts would best meet this challenge by advancing the development of computer and communications services in Canada.

But it also went on to say that "if a trend to increasing losses to Canadian data processing activities gains momentum, certain measures for protection might be considered."

Robinson also cited his government's "green paper on computer/communications policy," which stated the nation's concern about maintaining jurisdiction over companies operating in Canada that store and process business data outside the country and about the impact multinational corporations in the computer and communications fields have on Canada's general economy.

Business Losses

A third report authored by Canada's task force on "privacy and computers" put the concern being felt this way: "The principal problem . . . is not one of the privacy of Canadian data subjects being invaded by data about them stored in the U.S.

"It is rather that data processing and communications business may be lost to Canadians as a result of this foreign flow; that data in U.S. data bases might be peremptorily withheld abroad for a variety of reasons, including security regulations, court injunctions and so forth; that U.S. laws might change and leave Canadians less well protected.

" . . . As a sovereign state, Canada feels some national embarrassment and resentment over increasing quantities of often sensitive data about Canadians being stored in a foreign country," the report said.

Corporations would do well to remember that the concerns of governments are similar to their own, Robinson suggested. "No corporation — if it wants to stay alive — is willing to rely on its competitors to supply it with vital information, nor will it rely on the 'gentlemanly' behavior of its competitors and allow its own data and information to be stored by them."

Most of Canada's own examination of legislation that might affect transnational data flows stems from a desire to exercise some jurisdiction over companies operating in Canada while storing and processing their data outside.

There are laws defining the conditions under which Canadian government authorities and Canadian courts may have access to data stored abroad.

In addition to these disclosure laws, which Robinson acknowledged do place multinational corporations and others storing records abroad in a difficult position when they conflict with the legal requirements of another country, Canada has a human rights act, which was passed by its parliament last October. This statute applies only to federal government data bases, however, and does not refer to the problems associated with data stored abroad, he stated.

Several of Canada's provinces have privacy laws as well, as they have statutes controlling the activities of credit reporting agencies.

"Perhaps the Ontario act is the one with the most direct impact on transnational data flow," Robinson said. "Under this act, except for a written report of oral information obtained in accordance with the act, no information may be reported by an agency unless that information is stored in Canada." Furthermore, a credit reporting agency cannot sell or lease its files to any agency not registered.

Robinson noted that there is a great deal of additional legislation — such as the Canada Corporations Act and the Loans Company Act on the federal level and the Trust Companies Acts and the Insurance Companies Acts on the provincial level — that could, but haven't yet had significant impacts on transnational data flows.

"In other words, there are more questions, than answers at this time," Robinson said. "However, corporations should be aware of the growing concern of the Canadian government." He quoted Frank Maine, the parliamentary secretary to the Minister of State for Science and Technology, on the matter: "While the government of Canada, like many other governments in the developed world, has not yet completed its study of all the elements of a policy concerning transborder flows of data, it seems quite unlikely that a Canadian cabinet will decide in favor of an entirely unregulated regime.

"It appears to me that there are too many forces at play to allow ourselves, indefinitely, the luxury of zero regulation, no matter how reluctant we might be to leave such a stance," Maine said.

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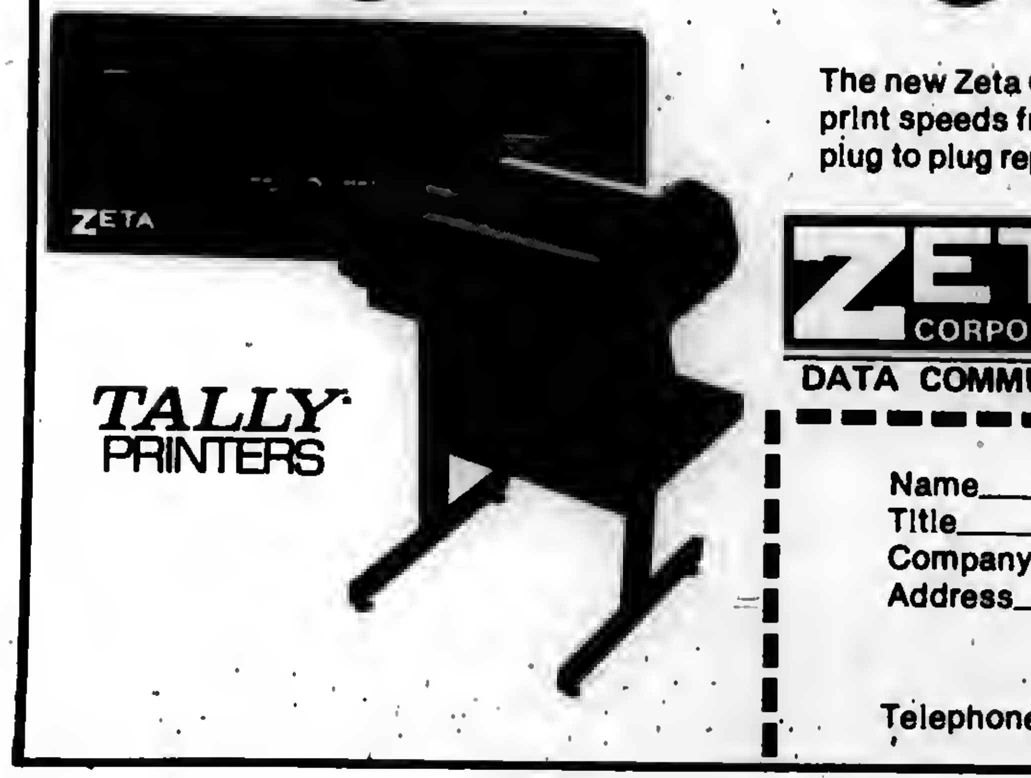

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Adams Receives Auditing Award

NEW YORK — The EDP Auditors Association (Edpaa) will present its first annual Joseph J. Wasserman Memorial Award to Donald L. Adams for his contributions in the field of auditing electronic data processing systems.

Adams is managing director of administrative services for the American Institute of Certified Public Accountants (Aicpa) and since 1975 has supervised Aicpa's computer services, office services and personnel divisions.

"In 15 years of service to the DP auditing profession, Don Adams has made an unparalleled contribution as practitioner, author and lecturer," John A. Gatto, president of Edpaa's New York chapter, said.

Adams is credited with assisting Aicpa's computerization of accounting bibliographic information, helping the society to produce annual topical indexes covering approximately 15,000 books, pamphlets and articles related to accounting.

For Juvenile Justice Program

Ind. County Prosecutor Gets First Mini Promis

By Howard A. Karten
CW Staff

INDIANAPOLIS — The first version of the Prosecutor's Management Information System (Promis) that can be customized by users and then run on a minicomputer was installed here recently in the Marion County prosecutor's office.

The system, which was installed by personnel from the Institute for Law and Social Research (Inslaw) in Washington, D.C., is being used to run a version of Promis devoted exclusively to the administration of juvenile justice. Inslaw, a nonprofit group, originally developed the system for use on mainframes in 1971 under contract to the Law Enforcement Assistance Administration (LEAA) of the U.S. Department of Justice.

Promis was designed to bring the advantages of DP to judicial systems throughout the country. The idea behind the system, according to Inslaw, is to use DP techniques to collate, cross-reference and track much of the paperwork involved in the administration of justice, thereby freeing prosecutors to exercise more control and creativity in pursuing their cases.

An additional goal of the package is to bring prosecutors more modern management techniques such as better scheduling of manpower, cases and witnesses.

The mini Promis system in use here is already providing benefits for Marion County, Chief Prosecutor James F. Kelley said. The system has centralized the data collected for use in setting bail and has eliminated the duplication of effort which was formerly required. It produces subpoenas, which used to be manually produced, and provides data on the average length of sentences which can be used to compare different courtrooms.

Marion's Special Aspects

The system here has two unique aspects. First, it is the first installation of Promis software on a minicomputer. Second, the minicomputer version of Promis comes with an interactive, tailoring program which allows the user to customize the software to the exact specifications of his jurisdiction. The program is designed to provide a customized version rapidly, without the need for extensive modification and testing of the system by DP technical personnel.

The system installed here is a Digital Equipment Corp. PDP-11/34 with 256K bytes of memory, two 14M-byte disk drives, two DEC VP-52 CRTs, a DEC LA 180 printer and a TJE 16 800/1,600 bit/in. tape drive.

The operating system used to run the equipment is DEC's CTS 500, while the data management system is RMS 11K, which is a multikey, Isam record management system. All software for the system, which was produced by Inslaw, is written in a subset of ANS '74 Cobol.

The concept of tailoring a piece of software has long been familiar to DP users. In most cases, programmers encode parameters which are then read by the system in a batch run to generate ("gen" or "sysgen") the particular software. Making the process interactive was considered more palatable and less formidable to users in the jurisdictions, who are less familiar with DP.

The interactive customizing ability of the mini Promis system allowed Inslaw to "tailor the system [for Marion County] in five days, as opposed to the 26 weeks it would have taken to alter the code," according to Dean Merrill, vice-president of Inslaw. The system can also be retailored by a user after it is installed.

In addition to the new mini Promis installation, there are 17 others, all using mainframes. Several of these are considering switching to the mini Promis, according to Merrill, and some 73 other judicial jurisdictions are said to be considering or planning Promis installations.

Although the software and documentation is provided free of charge to jurisdictions wishing to use Promis, users must install and operate their own DP equipment. The less-expensive mini Promis system should provide a good inducement to more widespread use of the system.

Although Promis has been available since 1971, courts and district attorney's offices have been slow to adopt the free system for two reasons, according to William A. Hamilton, president of Inslaw.

First, courts are run by lawyers, and lawyers generally do not have a background in DP. Secondly, it often takes two or three years or more to fund local and state jurisdictions.

Responding to a question on how the courts have been able to survive in the past without the use of Promis or any other DP systems, Hamilton said, "the courts are in terrible shape . . .

"FBI statistics end when an arrest takes place, whereas half or more of all felony arrests are dropped in the court system, just outright dismissed, without any plea bargaining . . . If the FBI had been doing more [in the area of statistics] than just counting arrests, we wouldn't be only now finding out that these arrests are of poor quality and will not stand up in court," he said.

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DDP Decision Should Be Financial, One User Says

By Edith Holmes
CW Washington Bureau

GAITHERSBURG, Md. — The decision to adopt a distributed data processing (DDP) system shouldn't pose scientific questions for the user. A decision for or against DDP "ought to be a financial one," James B. Wetterau of New York Telephone Co. said here recently.

Speaking at a conference jointly sponsored by the IEEE/Computer Society and the National Bureau of Standards, Wetterau said New York Telephone's venture with a distributed data base of phone repair records does highlight some of the pluses and minuses of the DDP approach.

Hardware Flexibility

Certainly, a distributed data base offers increased hardware flexibility, he stated. Hardware units can be placed in multiple locations, more redundancy is available at less cost and system growth can also cost less because it is modular. Overall system reliability is improved as well, Wetterau said.

DDP also can offer "tremendous" communications savings. "Telephone companies serving widely dispersed areas can realize maximum savings of their data link costs by wisely selecting the locations of their front-end processors, placing them as close to user clusters as possible," he noted.

Cheaper Approach

Overall, DDP appears to be cheaper than a centralized system, Wetterau added. New York Telephone's system employs one IBM 370/168 and nine Digital Equipment Corp. PDP-11/70s. The DEC machines provide backup for the 168. These CPUs "are an effective spare 168 with redundancy to boot," he said. A second 168 would have doubled the system's cost of $3 million.

However, on the negative side of the question "Is DDP worth it?" is the fact of falling prices for large CPUs. Reduced minicomputer costs initially made DDP systems attractive, Wetterau commented. But "the advent of the IBM 3033 and Amdahl Corp. 470V/7 at costs lower than those of the 370/168 of two years ago must force a reexamination of the hardware advantages of a DDP system," he said.

In addition, minis also encouraged DDP systems because these CPUs promised simple front-end software with its associated reliability and ease of maintenance, Wetterau stated.

In order to do everything users want today, however, minicomputer operating systems are becoming as complex and as demanding of CPU resources "as anything IBM sells," he said. This move from simple to complex operating systems has been obscured by the drop in hardware prices, the New York Telephone Co. executive added.

"As you fragment your system with smaller hardware units, communications flexibility decreases," Wetterau continued. New York Telephone found this situation "intolerable" and finally solved the problem with a third-level of hardware — a dual PDP-11/34 devoted to routing messages among the processors and the CRTs in the distributed system, he said.

"The decision for or against a DDP system is certainly not clear cut," Wetterau stated.

NBS/IEEE on DDP

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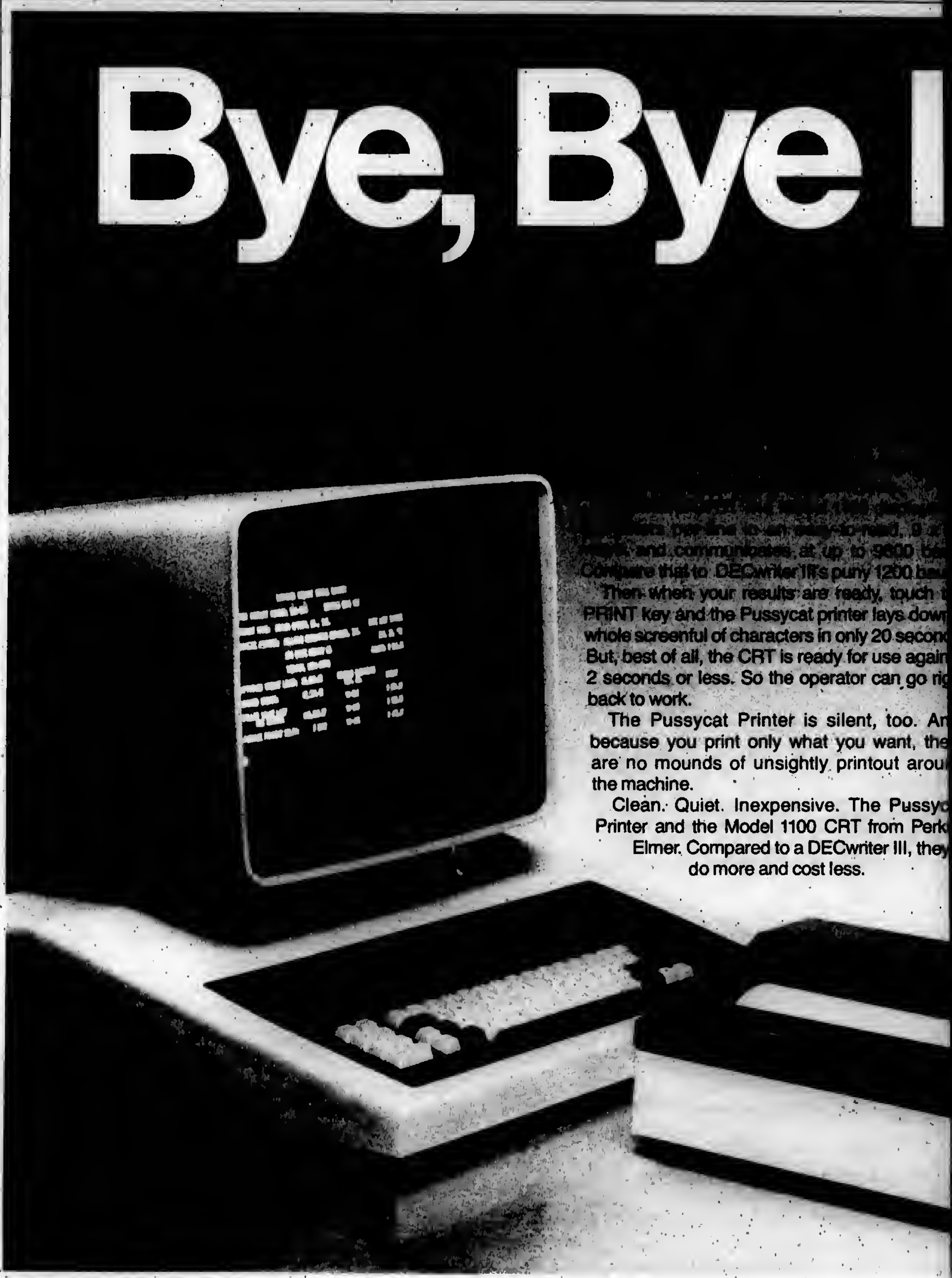

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DDP Helps Ma Bell Handle N.Y. Repair Calls

By Edith Holmes
CW Washington Bureau

GAITHERSBURG, Md. — A man's telephone goes on the blink in New York City. Frustrated, he dials the repair number — "611." What happens?

That phone number connects him to a computerized recordkeeping and trouble-reporting system for Ma Bell's repair service bureaus, James B. Wetterau of the New York Telephone Co. told attendees at the recent "Distributed Processing Trends and Applications" conference sponsored here by the National Bureau of Standards (NBS) and the IEEE/Computer Society.

While a local repair service bureau will still handle the man's troubles, distributed data processing (DDP) has enabled New York's phone company to centralize its service attendants, Wetterau said.

Called the Loop Maintenance Operations System (Lmos), the computerized repair system depends on a data base of phone records distributed among an IBM 370/168 and nine Digital Equipment Corp. PDP-11/70s configured in three groups of three machines. One-third of all the transactions on the system consist of looking up telephone records, Wetterau stated.

NBS/IEEE on DDP

That is one of the first tasks of the repair service attendant who answers the call of the man with the troubled phone line. The attendant's job is to take the customer complaint and enter the man's phone number into Lmos via a CRT. The system comes back with information about the customer's phone line, and the attendant fills in the blanks on the screen requesting a description of the problem and an appointment date, Wetterau explained.

The conversation is concluded, and the attendant completes his trouble report and enters it into the system. A printed message, called the basic output report, is then generated at the terminal in the repair service bureau responsible for the man's phone service, Wetterau explained. That report contains the trouble data plus additional line history and previous trouble history.

As the problem on the man's line is cleared, various status codes are entered into Lmos. When the difficulty is resolved, the trouble report is "closed out" and becomes part of the line's history, he added.

Records Made Available

Lmos has improved the New York phone company's service to its customers by increasing the availability of their records. Records cannot be lost or misfiled, and as a result, communications between customers and repair service attendants have improved greatly, Wetterau said.

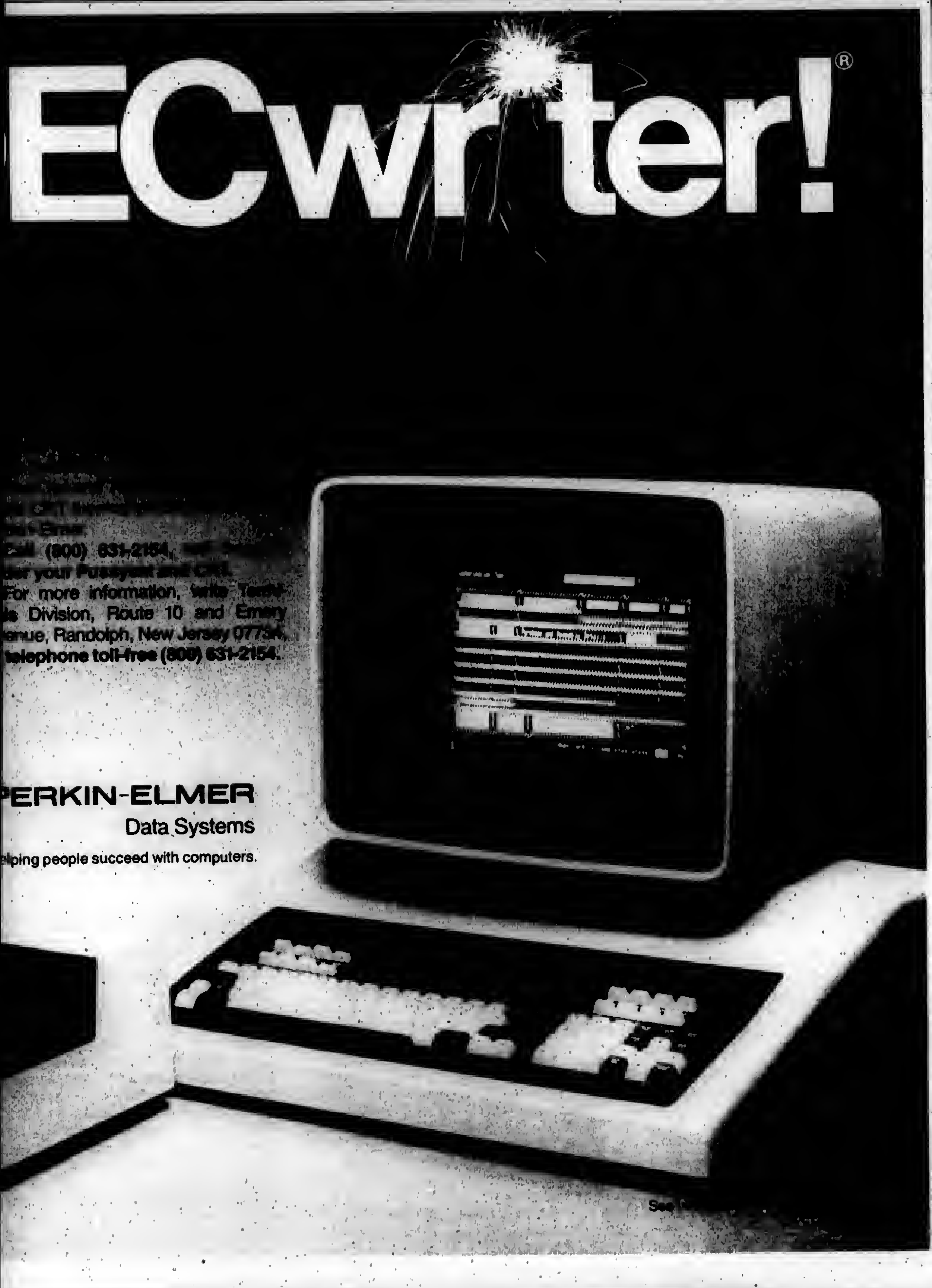
The system also eliminated the need for clerks to search physical line records at the local repair service bureaus. The repair service attendants who access the system today are located in two centralized bureaus, and the phone company has reduced by more than one-third the number of clerks needed at this point in the repair business, Wetterau reported.

Lmos began, "as so many DDP systems do," with a central computer system based on an IBM 370/155 and then a 370/158, he said. The system evolved into a distributed structure as daily traffic increased. Lmos currently handles 70,000 transactions a day and as many as 16,000 transactions during the busy hours of 10 a.m. and 3 p.m., Wetterau added. Eventually, the phone company expects busy hour transactions to number 20,000.

Planning for sufficient host system and front-end processor capacity and dealing with problems encountered in communications among the CPUs characterize much of the history of the New York Telephone Co.'s efforts to distribute Lmos.

While the decision was ultimately made to upgrade the 158 to a 370/168, Wetterau

(Continued on Page 22)



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Security More Than Encryption, Users Told

NBS/IEEE on DDP

By Edith Holmes
CW Washington Bureau

GAITHERSBURG, Md.— Concentration on any one security aspect — such as encryption — in a distributed data processing (DDP) system can lead the system manager to a false sense of security and a potentially higher overall level of risk, according to Captain Paul A. Karger of the U.S. Air Force.

"Although encryption is essential to protect the actual data communications links [in a system], higher level protocols can cause security compromise despite the best encryption schemes, Karger told a recent conference on DDP held here by the National Bureau of Standards (NBS) and the IEEE/Computer Society.

Construction of secure distributed systems will require attention to such areas as naming, interprocess synchronization, downgrading of information, security administration and authentication, Karger said.

The wiretapper can be controlled through cryptography, and there are a variety of military and commercial sources for encryption algorithms, Karger noted. But encryption doesn't easily solve the "real problem in internal computer system security: how to decide which users get access to what data," he said.

Internal Attacks

Internal attacks take two forms: direct penetrations by exploiting existing bugs and "Trojan horse" attacks, Karger said. He explained that the "Trojan horse" is "a clandestine software modification that actively and maliciously attempts to copy" sensitive or classified information to an unauthorized user.

Tiger teams — groups assigned to break system security — have successfully exploited bugs in such systems as IBM's OS/360/370 and VM/370; Bolt, Beranek and Newman's Tenex; Univac's Exec VIII; Honeywell Information Systems, Inc.'s Gcos and HIS' Multics, Karger stated, adding that only a small portion of all system penetrations are reported in published literature.

A Trojan horse is difficult to detect because it can be introduced anywhere from the manufacturer to the end user, and programs work correctly with the software modification in place.

As a test, Karger said the Air Force placed a "benign" Trojan horse into an HIS operating system. The code was distributed to every site using that operating system, and the modification wasn't found until a year later at General Motors during an intensive security overhaul.

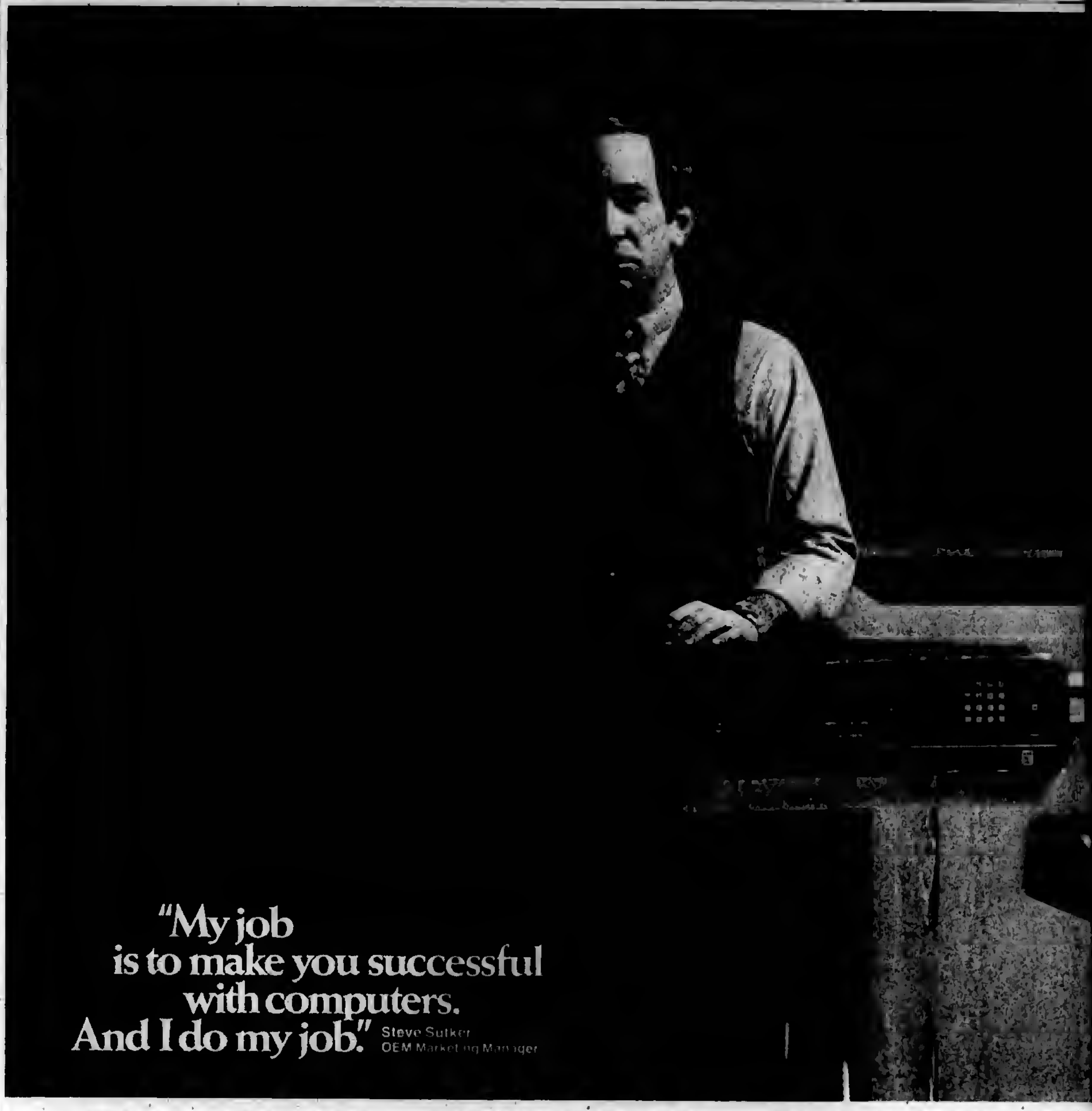
The possibilities for inserting a Trojan horse into a distributed system are "incredible," Karger stated.

To guard against the insidious Trojan horse as well as the normal bug, the Air Force has applied "security kernel" technology, which involves isolating security-sensitive code from the rest of the operating system, he explained.

The security kernel of an operating system mediates all accesses to information and so acts as a policeman, assuring that the desired system security policies are enforced. By sufficiently simplifying the security mechanisms of a system and isolating them from the rest of the operating system into a "secure kernel," it is possible to verify the correctness of the mechanisms mathematically, Karger said.

So far, security kernels are only available for minicomputers; kernels for large mainframe operating systems are still in development. But a distributed system containing large processors can be made secure by the strategic placement of security kernel-based communications processors in the network, Karger said.

Karger's work on host-to-host protocols is available for 75 cents from the publishing services of the Institute for Electrical and Electronics Engineers at 345 E. 47 St., New York, N.Y. 10017. The paper's publication number is CHI365-6/78/0000-0053.



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NBS/IEEE on DDP

Widespread Popularity Predicted

Future Communications DDP Key: Branscomb

By Edith Holmes

CW Washington Bureau

GAITHERSBURG, Md. — Advances in communications are the key to the future health of distributed data processing (DDP), IBM's chief scientist said at a recent conference here cosponsored by the National Bureau of Standards of (NBS) and the IEEE/Computer Society.

Improved digital facilities and switched services and the emergence of more value-added communications offerings will help DDP attain the popularity of which it is capable among business users, Dr. Lewis M. Branscomb suggested, at the meeting entitled "Trends and Applications: 1978 Distributed Data Processing."

"Eventually, communications systems will depend on 11- to 14- GHz satellite networks with earth stations," Branscomb, who is also an IBM vice-president, added. He believes satellite technology may have a life span of 50 years, but cautioned that "satellites may be a transitory technology on the way to fiber optics."

DDP can offer users a wide range of capabilities because of the mix of technologies it provides. It can also help lower personnel costs, in Branscomb's view.

Quoting International Data Corp. (IDC) figures, Branscomb said that of a total of $30 billion spent by users today on computing and communications, 19% goes for communications, 46% for computer systems and 35% for salaries. The scientist added his belief that most organizations actually spend close to 50% on personnel because they don't take advantage of the available technology.

CW Photo by E. Holmes

Dr. Lewis M. Branscomb

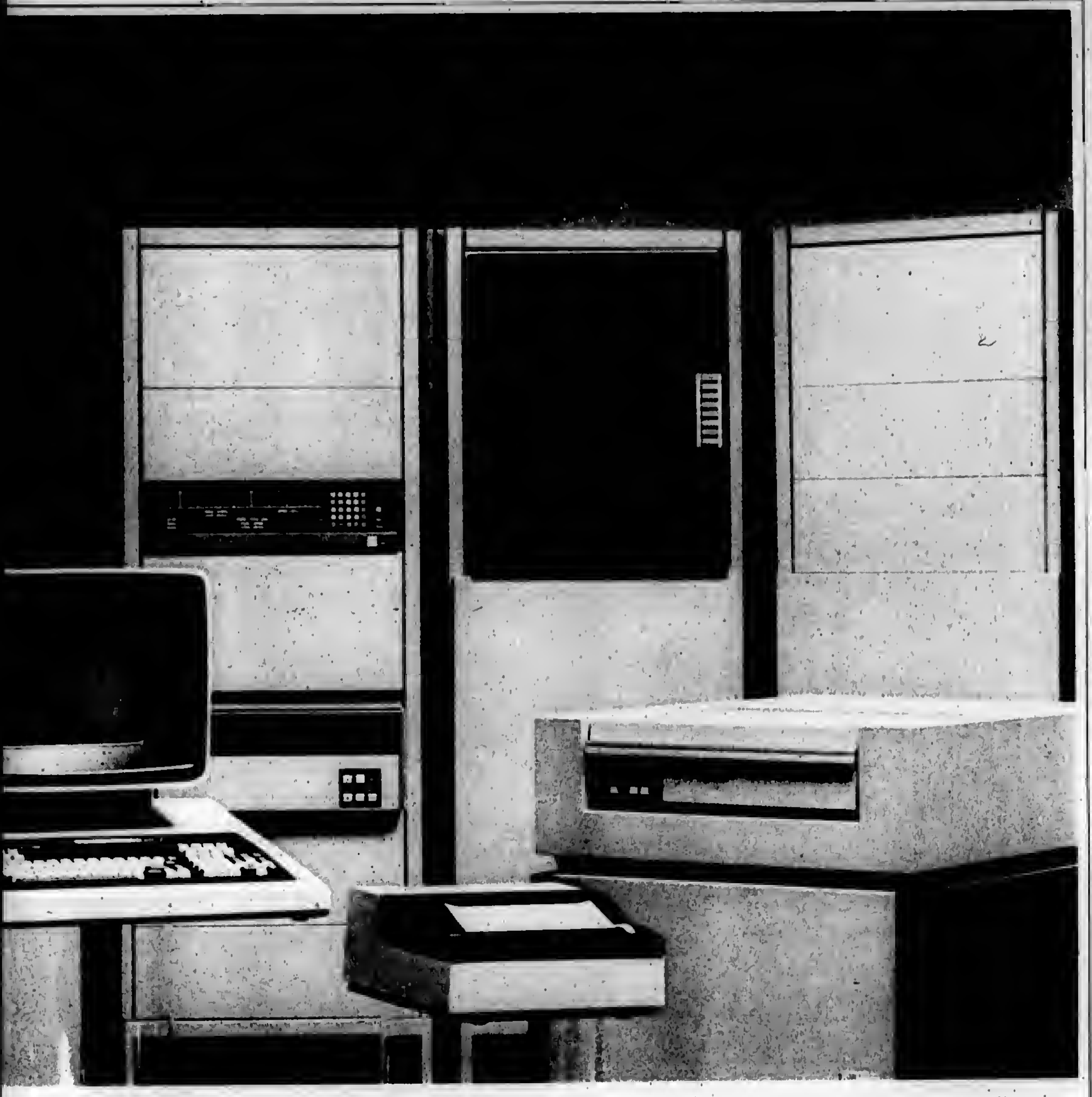
Salaries Major Cost

If salaries continue to increase at a rate of 6% a year while communications' costs decrease 11% annually and the cost of systems declines 15% each year, salaries will eat up 73% of the total amount spent on computers and communications by 1983, according to IDC projections, Branscomb said. He believes, however, that people costs will decline to one-quarter of the total cost to users of computers and communications because of technological improvements and their use by 1983.

In Elementary Stages

Today's DDP is "almost all elementary" Branscomb said. In general, the distributed data is not shared among several locations. Much needs to be done before DDP will be sufficiently sophisticated to provide the many approaches that are required to handle a variety of applications at once, he stated.

In addition to improvements in communications services, better methods of manipulating data bases must be addressed. The partitioned data base is best for updating while the replicated data base does its finest work where "inquiry only" is involved, for example, Branscomb said. "Unfortunately, the real world needs of most businesses fall between these two kinds of data bases and applications," he commented.



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Congress Warned Networks Threaten Privacy

By Marguerita Zientara
CW Staff

WASHINGTON, D.C. — Today's advanced teleprocessing technology can pose a serious threat to personal privacy if not properly controlled, according to a report to Congress issued recently by the Office of the U.S. Comptroller General. The report said, however, that "a high level" of protection is possible in the merging of DP and communications resources into federal computer networks.

Entitled "Challenges of Protecting Personal Information in an Expanding Federal Computer Network Environment," the report was issued in an attempt to summarize the lessons learned during the past several years concerning the ability of computer networks to adequately protect private information. Recent studies include one made in 1975 of the Federal Information Network (Fednet), a proposed joint General Services Administration (GSA) and U.S. Department of Agriculture computer acquisition. Another report was made on the proposed computerized Tax Administration System (TAS), a project that was terminated in 1978 with privacy as a major issue.

Biggest Threat

The major threat to personal privacy, according to the report, stems from the misuse of personal information by untrustworthy or dishonest individuals who have authorized access. The report recommended that risk can be substantially reduced through the use of such managerial controls as segregation of employee duties, personnel screening, activity monitoring and effective auditing.

A secondary threat to security is from malicious penetrators, the report said. These people can penetrate a system by using an operating system function in a way unanticipated by designers or by exploiting some anomalous behavior of the operating system, the report indicated. Further, they are frequently aided by the fact that operating systems designers have assumed that users will not deliberately attempt to force a malfunction of the system.

A major problem in the area of computer security is defining the level of protection required by personal information, the report said. Part of this difficulty arises from the need to choose between two alternatives: that all personal data, regardless of how trivial, will be afforded protection at the same level; or that data will be categorized by degree of sensitivity or confidentiality with a level of protection assigned to each category.

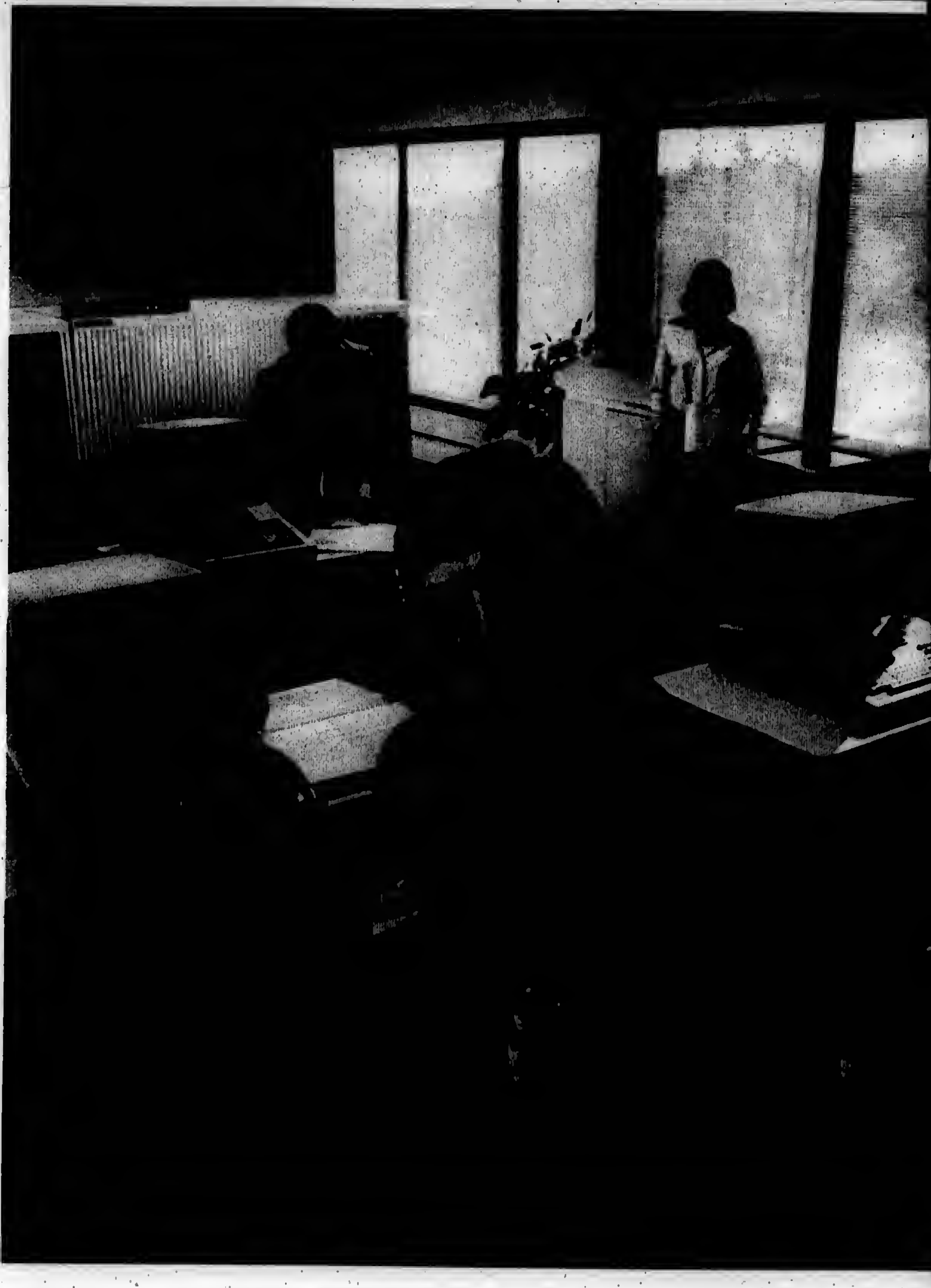
In discussing the relative threats to privacy inherent in various network systems, the report listed, in order of increasing risk, the following types: common carrier; single computer, multiple users — within that category, dedicated hardware, shared hardware and shared data; multiple computer, mulitple users — within that category, fixed allocation of resources and automatic resource balancing.

As for protecting the privacy of information through hardware, the report suggested a number of means that will ensure "a high level" of protection in a multiuser environment. The major suggested method in that vein is to segregate sensitive data and its processing from all other data in a policy of "isolation." To accomplish this, according to the report, isolation mechanisms must be present that cannot be bypassed by users exercising normal user-programming control of the system.

There are two basic architectural approaches that provide this type of isolation — virtual machine systems and descriptor-based systems, the report noted. Virtual machine systems furnish an isolated environment through techniques which create for each user a complete system dedicated solely to the user's purpose. Descriptor architecture isolates users by providing each with a totally independent address space.

Other methods include the "kernel concept," in which all security-sensitive elements of a system are placed in a "security kernel" at the highest level of protection, or innermost section of the system, while other functions are

(Continued on Page 19)



Program to Catch Welfare Cheaters

N.Y. Legislator Calls Project Match a Failure

By Ann Dooley
CW Staff

NEW YORK — Brooklyn Assemblyman Charles E. Schumer has charged that the federal government program aimed at finding and reducing welfare fraud is "an utter failure" because of "tremendous confusion" and errors in computer checks here.

But a spokesman for the city's Human Resources Administration, calling Schumer's charges "a precipitous use of a draft report to grab headlines," maintained Project Match is successful and cost-effective.

Project Match was designed by the Department of Health, Education and Welfare (HEW) to reduce welfare fraud by matching welfare records against various payroll records, other federal pay programs and Social Security numbers (SSN) [CW, Nov. 21]. It is the SSN matching, the most recent program in the project, that has aroused Schumer's wrath.

The computer matches are used only as leads for manual investigations and follow-ups, according to the Human Resources spokesman. But Schumer, chairman of the state Assembly's Subcommittee on City Management, contended the "bungled files" require the interviewing of so many welfare recipients who turn out to have legitimate claims that the system is "cost-inefficient."

Schumer based his complaint on a draft report issued by the Human Resources Office of Loss Analysis and Prevention indicating that the city agency had submitted 802,836 names of welfare recipients and their SSNs to the Social Security Administration in 1976 and that 287,889, or 35.8%, could not be confirmed..

The report also noted, however, that a sample totaling 4,465 of those not listed as eligible for welfare were interviewed and that 75% were found to be victims of errors.

Most of the errors can be traced to either the Human Resources Administration's manual files or to errors made in moving the information from the manual files to computer tapes for Project Match, Schumer said.

But the Human Resources spokesman noted the report, which was leaked to Schumer's office, was still in draft form and claimed, "The statistics were not calculated as scientifically as they should have been and are invalid."

Some problems have occurred with the SSN tape, he admitted, but no more than would be found while setting up any kind of a system.

The SSNs are received on an annual basis; because of the time lag in getting the data, people may have moved, changed their names or made changes in their welfare status, he added.

In any case, he said, the actual number of unverified numbers is only .5%. Those are unverified for many different reasons and are being investigated.

Computer matches in fiscal year 1977 led to 7,322 welfare cases being taken off the books for a savings of $27.9 million here, according to Dr. Blanche Bernstein, the Human Resources administrator. The city agency expects to realize a savings of $31 million by the end of this fiscal year.

Nets Termed Privacy Peril

(Continued from Page 18)

placed at lower levels, the report stated. In opposition to this system is another possible method in which the security-sensitive elements are scattered throughout the system.

A very expensive security method is data encryption, which involves the use of an encryption device at the point of data transmission and a decryption device at the point of data reception.

The report recommended that because of the cost involved, a definite need should be established through a formal threat analysis prior to a decision to employ this technology.

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Career Pathing Called Way to Limit Turnover

By a CW Staff Writer

NEW YORK — A career path can contribute to greater efficiency and motivation of employees, can keep people from leaving a company and can keep DP personnel from looking elsewhere for challenge and opportunity.

This was the message delivered by George Florit, president of the Burton Group, Inc., to a workshop on career pathing for operators and programmers at Computer Expo '78 here recently. Florit's company specializes in trying to improve the efficiency and productivity of corporate DP organizations through better utilization of personnel.

So far, management has not recognized the importance of the human factor in productivity and effectiveness, Florit said, adding that merely defining a career path can't work unless management also addresses other issues affecting it.

While making no specific recommendations about career paths that might be followed by programmers, systems analysts and operators in a company, Florit did make some suggestions to workshop participants on how and why to set up a career path.

Drawing on his experience in consulting with users, Florit commented that in some companies, an individual no longer had to be a manager to get visibility within the corporation. "There are nonmanagerial positions, equivalent to first- or second-level management, which are being filled by high-level individual contributors," he said.

A career path is a defined position structure which indicates the transferability of knowledge from one position to another, according to Florit. In order for this career path to work, the company must have a good understanding of the requirements for each job. The sum total of these jobs must equal the mission of an organization, Florit told the group.

Looked at in this way, there are three essential characteristics of jobs in an organization, Florit said. First, there should be no duplication of jobs; second, no omission of jobs; and third, no conflict between jobs. Further, organizations must examine what relationships must be established and maintained to accomplish the mission, he added.

Building a task-position matrix, Florit said, will tell an organization if it has achieved these three goals and if it has achieved transferability of knowledge. The matrix, which consists of tasks listed along one axis and positions along the other, can be used to validate the job structure.

Florit, whose company constructs these matrices as part of its consulting work, said the matrix should also tell a user how and where an individual acquires skills and knowledge.

Defining a task as a "procedural activity" and a skill as a "body of knowledge needed to perform the task," Florit said his company recommends performing skills definitions to create a career path.

Two of the advantages of a defined career path, according to Florit, are that employees of an organization can be guided in the advancement process and new employees or potential applicants coming into a company can be evaluated for their knowledge and worth. After explaining the concept of "quit and reapply to the company" in order to get a raise, Florit claimed that the institution of a career path and matrix prevents this employee attitude.

Once a career path and skills matrix are set up, Florit said, employees can be "profiled" against the matrix to identify weak skill areas. The sum total of these weaknesses should define an organization's training effort.

Wang System Set As Prize at NCC

ANAHEIM, Calif. — The slogan at the Wang Laboratories, Inc. booth at the National Computer Conference will be "Let's Make a Deal" with a contest prize that will turn even Monty Hall green with envy. Wang is giving away a desktop business computer which some lucky attendee will walk away with on the last day of the show.

Wang PCS-II

The system is a PCS-II with 8K internal memory, 89.5K storage on a single minidiskette drive, a CRT and a full alphanumeric keyboard. It will be on display throughout NCC and will be given to the winner following a drawing at the Wang booth on June 7.

Any NCC attendee who watches a demonstration of Wang's new virtual storage computer is eligible to enter the contest. Drawing cards will be handed out following each demonstration and placed in a drum from which a Wang official will draw the winning card.

The drawing is closed to Wang employees, its vendors or competitors.

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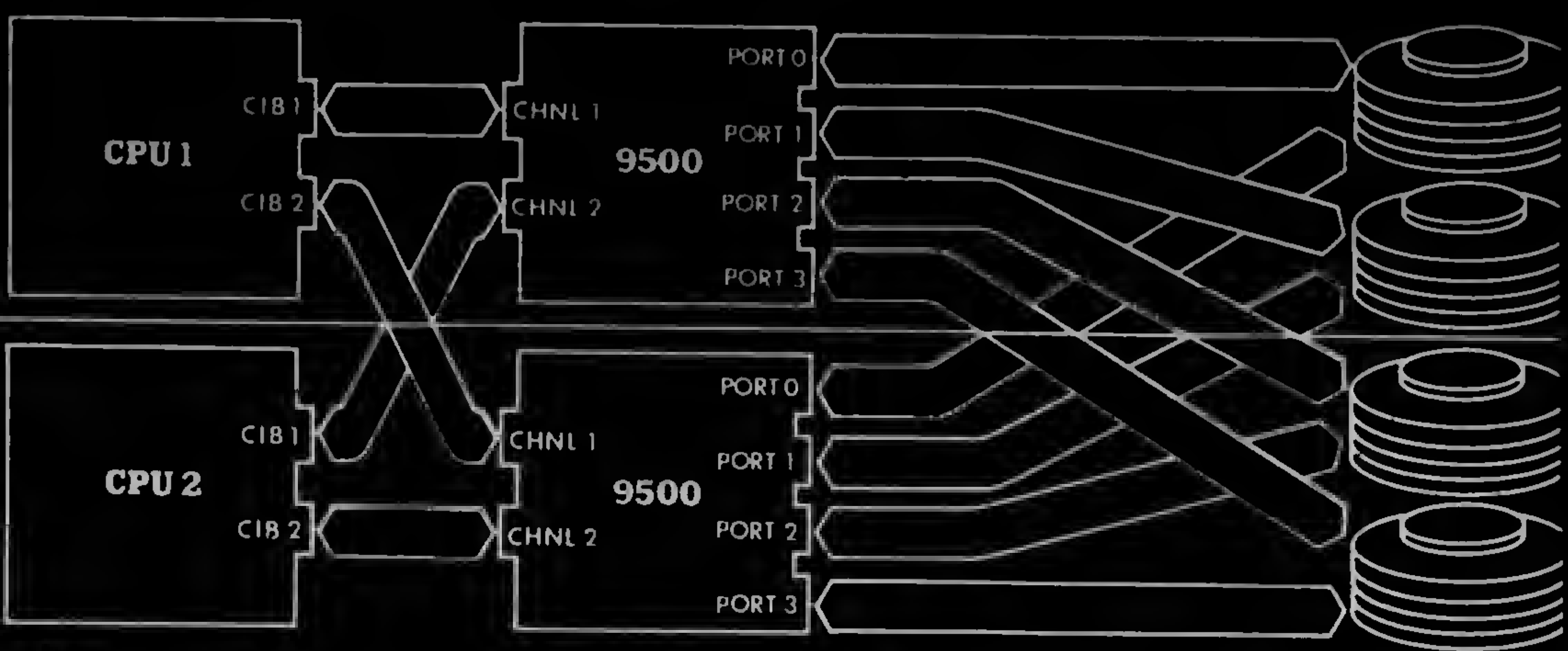

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Managers on the Move

John R. Blake

Dean A. Pfennig

Randall G. Clyma

LaGrange Ratcliffe, Jr.

DR. MELVIN FERENTZ has been appointed to the newly created post of director of computer services at Rockefeller University in New York.

Prior to joining Rockefeller, Ferentz was a professor of physics and director of the School of Science Data Acquisition Facility at Brooklyn College, City University of New York (CUNY), where he also held the posts of director of the Computer-Assisted Instruction Research Center and associate director of the CUNY/State University of New York Institute for Research in Learning and Instruction with responsibility for a statewide 13-campus teleprocessing network.

Ferentz received his undergraduate degree at Brooklyn College and received his Ph.D. in physics from the University of Pennsylvania.

•••

LEE R. HERRINGTON III has been appointed vice-president for data processing at Progressive Casualty Insurance Co. in Mayfield Village, Ohio.

Herrington joined Progressive in 1974 as a financial analyst and in 1977 became DP manager, a position he held until his recent appointment.

The company's youngest vice-president, the 30-year-old Herrington received his B.A. from Yale University and spent four years in the investment business before joining Progressive.

•••

JOHN R. BLAKE has been promoted to the position of manager, information systems technical services, for Drew Chemical Corp. of Boonton, N.J.

Blake joined the chemical firm's DP department in 1977 after several years as a branch technical manager with Honeywell Information Systems, Inc.

In addition to managing Drew's Boonton computer center, Blake will be responsible for providing technical services related to both equipment and software for Drew facilities worldwide.

The new appointee received a B.S. in mathematics from Adelphi University and also holds a certificate in data processing from New York University

•••

LAGRANGE RATCLIFFE Jr. has been named manager of corporate information systems and services and RANDALL G. CLYMA, manager of the corporate data center at LaBarge, Inc., a St. Louis-based manufacturer of specialized process or precision tubular products.

Both are employed at the company's corporate data center in Tulsa, Okla.

Since joining LaBarge in 1972 from Elmer Fox, Westheimer & Co., certified public accountants, Ratcliffe has served as director of the corporate data center.

Clyma has been with LaBarge since 1973 as a computer programmer and assistant to Ratcliffe and previously worked as a computer operator for Seismograph, Inc.

•••

JERRY R. RAMBO has been named manager of management information systems facilities planning, and MILARD F. BANKER has been appointed manger of the data center at Owens-Corning Fiberglas Corp. headquarters in Toledo, Ohio.

Banker, who was previously project leader for building materials group information systems, replaced Rambo as data center manager.

Banker attended Rutgers University.

Rambo started at Owens after finishing high school and was one of the company's first programmers.

•••

COL. JOHN Z. DILLON will become chief of staff of the Electronics Systems Division at Hanscom Air Force Base in Massachusetts. He will replace COL. AVON C. JAMES, who will be transferred to Scott Air Force Base, Ill. to become deputy commander for data automation at the Air Force Communications Services Headquarters.

James has been chief of staff at Hanscom's DP division since 1973.

Dillon has commanded the Rome, N.Y., Air Development Center since mid-1976.

•••

DEAN A. PFENNIG has been appointed manager of computer production control at Philip Morris U.S.A. in Richmond, Va. Pfennig has been a staff systems analyst since joining the company in March 1977.

Prior to joining Philip Morris, Pfennig was a staff systems analyst for Babcock Wilcox in Akron, Ohio.

He holds a B.S. degree in management science from the University of Buffalo.

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Going to DBMS Hard Work, Users Warned

By Howard A. Karten
CW Staff

NEW YORK — Prospective users of a data base management system (DBMS) must be prepared to put in a lot of hard work before deciding to go with a DBMS — and then must be prepared for the problems that will develop after the system is installed, according to Thomas L. Pettibone, manager of management information systems for BMW of North America, Inc.

Pettibone emphasized at a recent conference here that the use of a DBMS can be highly advantageous to a company, but that comany must be prepared to "pay the piper" in all respects.

This means, he said, that a company must first be willing to sit down and ask itself the hard questions of what will be gained from a DBMS, how it will be used and who will be using it.

However, "going to a DBMS is a tough job, and your management must be 150% behind you. Going to a DBMS will mean disruptions and problems and will amplify the already existing problems in your company," he warned.

Pettibone, who stressed he was speaking from experience and not as an expert, said potential users must also be willing to look at the darker side as well as the bright side of DBMS. Users must be willing to pay for reduced operating efficiency, a data base administrator, additional hardware and software and personnel training on top of software costs.

Reduced operating efficiency results because the DBMS must do more than the software it replaces. Although the benefits will show up in other areas, such as quicker responses to management requests for additional information or file or program changes, hardware will typically be working significantly harder than before the software was installed, Pettibone said.

The requirement for a good data base administrator (DBA) cannot be overemphasized, Pettibone contended. "A good DBA is worth his weight in gold to the corporation and it is not worth going to a DBMS if this position is not staffed properly," he said. The DBA's position should be high in the corporation.

The costs of additional hardware and software and additional main memory must also be considered, as well as the need for constant and continuous training of both programmers and management.

Users considering the purchase of a DBMS often start out with an unrealistic set of expectations, according to Pettibone, and therefore must carefully list what they hope to accomplish by buying such systems. Data bases will not meet all their expectations, he pointed out.

A DBMS will not provide the immediate analysis and display of corporate trends and results, he noted, and it will not provide situation analyses or models for alternative corporate strategies. Nor will it provide quick concentration of diversified, decentralized businesses or a "totally integrated system," he said.

However, there are some very definite advantages to be gained by using DBMS, Pettibone said, such as:

- A quick adaptation of systems to new ventures and new ways of doing business.
- Protection from downtime-caused problems, such as failure to complete an update.
- An increase in programmer productivity, since not all functions, (for example, checkpointing) must be performed in all programs.

There are three fundamental reasons for using a DBMS, Pettibone observed. These are the ability to respond more quickly to changing corporate needs, an improvement in data integrity since users make more use of the data and a built-in audit and recovery capability.

Selection of a DBMS should be a 10-step process, Pettibone believes, beginning with defining and ranking the uses for a system. After doing this, the same work should be done on objectives for a DBMS.

Next, a corporate user must establish and staff a data base function, taking particular care to define the functional corporate interfaces with the eventual users. Only after doing all this preparatory work should data relationships be defined and the required data base structure be specified.

Next, the published features of available systems should be tabulated and weighted against the user's objectives and hardware/software plans, Pettibone continued. It is also important to contact and visit users of sytsems which most closely match the user's plans.

After selecting a DBMS based on features and recommendations by users, the corporate user should be trained by the vendor and engage in planning with joint consultation by the vendor. Finally, Pettibone said, frequent consulting with the vendor after implementation is highly desirable.

Summing up for the audience of DP executives, Pettibone recommended two publications as particularly helpful. These are James Martin's *Principles of Data Base Management* and Richard Nolan's article in the *Harvard Business Review* of September 1973 called "Computer Data Bases: The Future is Now."

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DDP Aids Ma Bell With Repairs

(Continued from Page 15)

told the audience that Amdahl Corp.'s 470V/6 was seriously considered. The phone company began looking at these two processors when the 158 approached its maximum capacity — defined in this case as the CPU's ability to respond to 95% of the trouble calls during busy hours in 10 seconds or less.

In its study of the Amdahl machine, New York Telephone visited Bell and non-Bell users and found everyone "very happy" with the 470V/6. All were sophisticated users "glad to get away from big blue," Wetterau said.

The phone company selected DEC's PDP-11/70s in part because of directions from Bell Laboratories, Wetterau stated. Those front-end processors handle 45% of the total Lmos load and the 168 manages the rest.

The lack of communications versatility in this distributed system was solved with the installation of a cross-front-end processor — in this case, a dual PDP-11/34. This processor is connected to all the computers — host and front-end CPUs — via 9,600 bit/sec lines and routes messages from the CRTs to the correct processor.

Lmos uses a host and a front-end data base structure, Wetterau said. IBM's IMS was used for the 168.

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Sets Up Training Program

Bank Finds Handicapped DPers Productive

By Ann Dooley
CW Staff

NEW YORK — A program aimed at opening DP jobs to the physically disabled has shown handicapped people are "equally productive compared with others, if not more," according to Charles LaBelle, vice-president of human resources at the Manufacturers Hanover Trust (MHT).

The handicapped people who work at MHT are reliable and loyal; because they appreciate the opportunity, they also work harder, LaBell noted.

Several years ago, MHT decided it wasn't enough to just say it would hire the handicapped if they applied. It set up a program to actively recruit and train handicapped people for DP jobs.

The program consists of a basic computer programming course and, upon successful completion of the course, placement in programing jobs at a remote site leased from the Human Resources Center on Long Island.

The center is especially equipped for the handicapped with ramps, extra wide doors and other special-need facilities. The remote site also enables the handicapped workers to avoid the difficulties imposed by daily travel into Manhattan. Currently MHT is employing three handicapped people at the center.

One of the objectives of the program is to keep working conditions as similar as possible to conditions found in any office or the working situation might prove defeating for the handicapped person, LaBelle noted. In keeping with this idea, the handicapped students take a basic programming course with only slight modifications.

The changes that do occur include adding larger boxes to coding sheets for those workers with manual handicaps and providing extra wide scanners and magnifying glasses to enlarge letters and numbers on computer printouts for those workers considered legally blind.

Terminal for Sightless

One MHT employee who is totally blind is learning to use a teminal developed for those without sight. Designed by Triformation Systems, Inc. of Stuart, Fla., the terminal allows blind operators to transmit data to and receive data from computers or other sources of coded information, according to the firm.

MHT is planning to purchase the interactive terminal, which converts information into braille at up to 120 char./sec and can print on paper tape or continuous-feed paper. Currently MHT's blind employee is learning how to use the terminal and is taking a special occupational training course at the University of Manitoba, which boasts a placement rate of 70% to 80% for graduates of the program.

Once the blind person has learned how to use the terminal, he can operate any of the four basic configurations made by Triformation without assistance, the company said.

If the machine runs out of paper, that fact will be communicated to the operator by a beeping sound. Errors in operation are communicated by devices on the keyboard which are automatically activated to indicate what the problem is and how to remedy it.

Blind programmers can obtain information in its original form from manuals that have been sound-recorded or from those published in braille. In order to get program specifications, someone must read them to the blind programmer, who copies them down in braille and then processes them.

Book Tells How To Reduce Costs

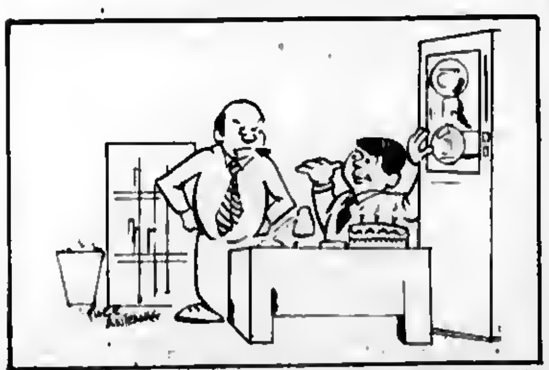
NEW YORK — *Data Procesing Cost Reduction and Control,* a newly published book by Dick H. Brandon, presents 119 techniques designed to reduce costs and improve profitability.

Designed for management, the book's content is keyed to three major audiences: the information systems manager interested in improving his budget, the senior management function to which the DP organization reports and the financial management function concerned with costs, budgets and audit responsibility.

Greater management involvement is stressed and the relationship between the user and the DP organization is examined to show where cost control can be exercised by both parties.

Other areas covered include people problems, the impact of organizational structure on costs and the effect of changes in the economy on DP activities.

The book is priced at $17.95 from Brandon Consulting Group, Inc. at 505 Park Ave., New York, N.Y. 10022.



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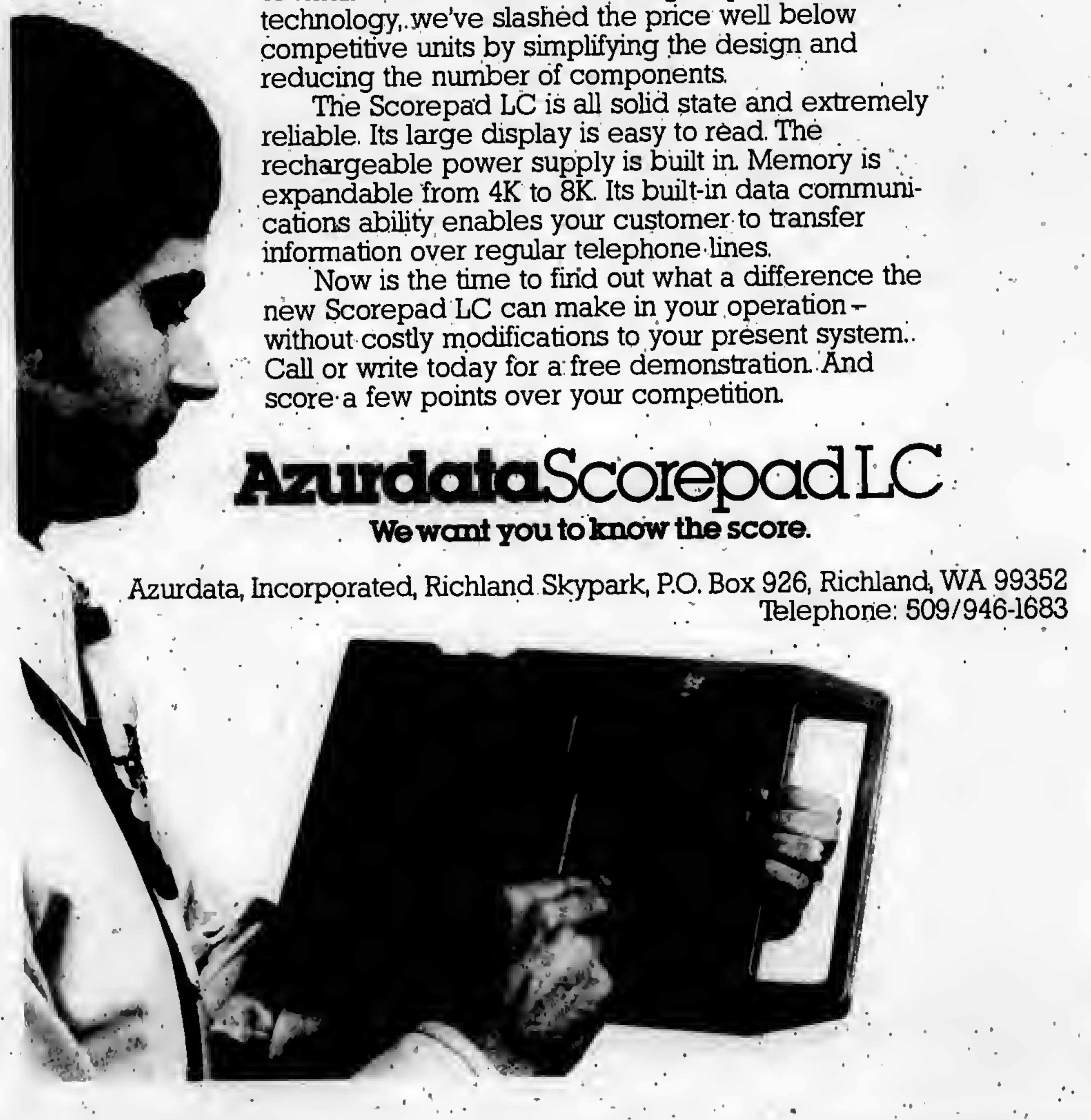

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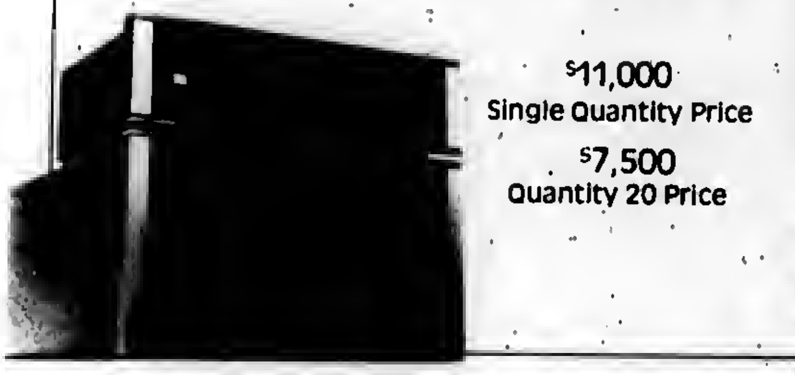

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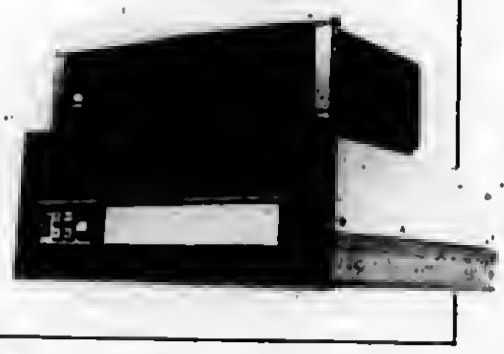

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User With Eight Sites Urges Simplicity in DDP Systems

By E. Drake Lundell Jr.
CW Staff

NEW YORK — In selecting and implementing distributed data processing (DDP) systems, users should try to avoid complexity, according to Michael P. Bouros, DP manager for J.W. Mays, Inc., which has established such a system in its eight department stores.

In addition, users should try to use packaged systems and software wherever possible, Bouros suggested at a recent conference here.

Bouros said one of the major reasons for going to a distributed system is to cut down on the complexity that would be involved in establishing an on-line system for the same application. With on-line systems, the user has to have a highly trained staff — which means a highly paid staff, he noted — and needs expertise in networking and data base management.

Furthermore, such networks usually require higher priced hardware and software, he said, and the hardware tends to be more specialized.

Another disadvantage of on-line systems is that if the computer center goes down, the entire network will fail, he pointed out. With DDP, failures are limited to particular installations and backup can be provided.

A system based on DDP can be more available than a centralized on-line system, he said, allowing users to do the processing at their convenience rather than at the convenience of the data center.

DDP systems can also be tailored more to individual user needs than massive centralized systems, he indicated, which have to be very general in nature.

Going DDP Route

Because of all this, Mays went the distributed route in all of its eight stores, he said, equipping each location with a Singer System Ten minicomputer that handles all the point-of-sale (POS) terminals in the store. These minicomputers are polled at night by the firm's IBM 370/145 at the central DP shop through the use of a Periphonics, Inc. front-end processor.

There are 40 to 100 POS terminals in each store; the system collects statistics on each sale at each terminal for master file updating.

In addition, individual store managers can use the system printer and a report writer package to get special reports on the activities within their operations. For example, the managers usually will get a printout of sales by department and store totals several times each day. Sales at a particular register can be accumulated so the manager can move extra personnel into areas where activity is concentrated.

Through these statistics on individual registers, managers can also identify their best operators and make sure they are assigned to registers where the demand is expected to be heavy.

At the central site, the information is accumulated and sales reports are delivered back to the minis in the store locations the next morning, he said, a process that formerly took several days.

Further, bad checks are identified in the central system and information on them is transmitted back to the individual stores, as is price change information and information on goods the store should expect to receive that day.

Even though Mays had some problems when Singer went out of business, Bouros still recommended buying packaged software from that equipment vendor or others if such packages are available. He said users should avoid doing too much programming themselves, even though a simple-to-use report writer would be a definite plus.

At the same time, however, he warned the attendees they should only consider software that is up and working and not count on software planned by the vendor for later availability.

Employer Warns No Test Can Measure Competency

By Howard Karten
CW Staff

NEW YORK — Competency must be distinguished from knowledge in assessing and hiring DP personnel — but, unfortunately, there is no test presently available to measure competency in programming and systems analysis.

This is one of the crucial facts to bear in mind when surveying the field of DP competence testing, according to Janis Miller, a second vice-president of Standard Security Life Insurance Co.

Speaking at a recent conference session on competency testing, Miller said she seeks three things in a job applicant: the knowledge to do the job, the ability to apply that knowledge to a solution and the ability to fit in psychologically in her shop.

If she feels unable to interview an applicant in a particular area, Miller said, she does not hesitate to call in someone more able to conduct that aspect of the interview. If necessary, Miller said, she will even engage the services of a psychologist for additional testing.

Miller, who holds the Certificate in Data Processing (CDP), stressed that the role of the CDP in entry-level jobs is negligible, although more companies are either requiring it or looking upon it favorably in applicants for mangerial positions.

However, she stressed repeatedly that a test is just a screening device and should not be used alone. Feeling comfortable with an applicant is highly important, she said, adding she sees some similarities between choosing a friend and choosing an employee.

Responding to a question on how to know whether an applicant has the knowledge to do the job, Miller said she never merely tries to fill a job. Instead, she said, she lists the skills she believes are required for successful performance of the job and then tries to match them with an applicant.

Data Compiled on 46 Cities

Study Refutes Fluoride, Cancer Death Link

By Tim Scannell
CW Staff

ATLANTA — A community's cancer mortality rate cannot be related to the existence of cavity-preventing fluoride in that community's water supplies, according to the results of a computer-assisted study that appeared in a recent issue of the *New England Journal of Medicine.*

The results of that study, conducted by Dr. J. David Erickson during a two-year period, dispute the findings of a study published last year in which researchers demonstrated a direct correlation between the incidence of cancer-related deaths and fluoridated water.

The Erickson study, funded by the National Center for Disease Control here, centered on 46 U.S. cities, 24 of which used fluoridated water. The final statistics showed 195 annual cancer deaths for every 100,000 people in the fluoridated communities, but 197 annual cancer deaths per 100,000 people in the communities without fluoridation, Erickson said.

Computer Correlation

During the study, information extracted from computer tapes supplied by the U.S. National Center for Health Statistics was input to a computer that correlated similar characteristics of each selected city. The tapes consisted of data abstracted from death certificates and the characteristics included age, race, sex and place of residence at the time of death, Erickson stated.

Median education, population density, median income and the percentage of the work force employed in manufacturing (as a measure of industrialization) were also considered, he added, because "these four factors were subsequently shown to be correlated with the level of the cities' death rates."

The deaths were categorized by cause according to a modified version of the "34 Selected Causes" classification of the Center for Health Statistics. This classification includes all leading causes of adult deaths in the U.S. such as diabetes mellitus, cardiovascular or heart-related problems, motor vehicle accidents and malignant neoplasms or cancers, Erickson explained.

Mortality, Not Morbidity

Mortality was chosen as the outcome measure, Erickson said, because of the availability of death certificate information. Morbidity — the incidence of disease in a certain area — wasn't focused on in the study because the available data was unsuitable for scientific purposes.

For instance, although the National Cancer Survey provides figures on cancer incidence, these figures are taken from too large a survey area to be useful in determining the fluoride exposure of a certain state, Erickson said.

The computer used in the study was an IBM 370/158 with 6M bytes of main memory. The hardware, located at the Systems Development Branch of the center, includes 10 tape drives, two printers, two card readers and several disk drives with a total capacity of up to four billion characters of on-line storage.

Considering all of the variables, Erickson found the annual death rate from all causes in the cities using fluoridated water supplies was 1,123.9 for every 100,000 people, while the rate for those communities without fluoridated water was 1,137.1. Cities with nonfluoridated water systems actually had a slightly higher death rate than those cities using the chemical additive, Erickson noted.

Opposite Conclusion

In a similar study performed last year, John Yiamouyiannis and Dean Burk arrived at an opposite conclusion after examining the death rates in 20 U.S. cities. Their results found "the increase in cancer death rates in fluoridated cities is significantly higher . . . than in nonfluoridated cities."

However, Erickson contended the two researchers' control of the age, race and sex characteristics was, at best, "rudimentary."

"The cities that had fluoridated water were not really similar . . . to the cities without fluoridated water," Erickson said. "They were somehow picked because they had similar 'crude' cancer rates in 1950" and "those authors followed them through 1960 and then through 1970."

It was because of this previous report that the fact that there had been no large-scale general investigation of mortality statistics in the U.S. in relation to water fluoridation since the 1950s that Erickson decided to conduct his own examination of the available data. Other studies have also shown that children who drink fluoridated water have, on the average, experienced 65% fewer cavities.

The study also showed two cities, San Diego and Kansas City, both adopted fluoridation of their water systems and discontinued its use after a three-year period. Although Erickson couldn't recall exactly why these two cities decided to reverse their decision to fluoridate, he believes that ". . . somebody simply got up a petition and it was voted out.

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State Cited for Using DP to Deliver Services

By Marguerite Zientara
CW Staff

PIERRE, S.D. — The State of South Dakota was singled out in a recent federal report as a leader in the use of DP technology to improve the delivery of federally funded human services.

The state was cited for its work on a single-application-form system developed to determine eligibility of individuals for nine different federal human services programs.

As part of the Single-Purpose Application with Automated Referral System (Spaars) project within North and South Dakota, Montana, Wyoming, Utah and Colorado, the Integrated Eligibility Determination Unit (IEDU) in South Dakota has administered the nine human service programs since October 1977. These include Aid to Families with Dependent Children (AFDC); food stamps; Supplemental Security Income (SSI); Section 8 Housing Assistance; Title 20 programs, which include 24 services such as alcohol treatment and household services; the Comprehensive Employment and Training Act (Ceta) program, employment services, a local/state elderly tax rebate program; and a program unique to South Dakota — technically under Title 20 — which automatically tests for day care services if someone is ineligible for AFCD.

Spaars was called "the only meaningful attempt to develop a common taxonomy and uniform definitions for federally funded human services" by the Human Resources Team of the President's Automatic Data Processing Reorganization Project in a report issued in late April [CW, May 15].

Nevertheless, federal legal constraints prevent the total integration of the state's computerized system by limiting the information agencies can exchange with each other. These constraints limit the IEDU program to ascertaining "probable eligibility" rather than "true eligibility," according to Mary Evans, management analyst in the State Economic Opportunity Office. Evans is coordinating the Spaars program in the state.

"Verification information cannot be transferred between two agencies, so a client must go to two workers if he needs aid from both of those agencies," she said.

Under the IEDU system if someone goes into one of the three pilot locations in the state needing help, his probable eligibility can be immediately determined for all nine of the programs involved, according to Mike Pendo, president of Dakota Data Services of Rapids City, the time-sharing firm that furnishes the equipment for the program.

Eligibility Predicted

To determine probable eligibility, a series of 30 questions concerning the household and seven questions concerning each individual within the household is asked, Pendo explained. The system prompts the caseworker via CRT and, after the questions have been answered, predicts eligibility or noneligibility for the programs and specifies the reasons.

The system then asks if the client wants a referral. If the client does, the system generates the appropriate hard-copy forms, with the information that has been captured, to take to various agencies, Pendo said.

The questions asked each prospective client can be divided into three groups, according to Evans.

DP and Human Services

The first group includes identification information, such as the head of household, address and phone number. The second area is income information such as resources, benefits received, expenses and rent.

Third, the worker asks individual information on each member of the household, such as date of birth, grade level of a child, employment status and health status — whether someone is disabled, incapacitated or blind, for example.

The Social Security Number (SSN) is asked, but not as an identifier, Pendo noted, adding the system creates its own identification numbers. The SSN is used on the hard-copy forms generated; in compliance with privacy laws, after the generation of the hard copy the only information saved in the system is demographic information, Pendo said.

According to Evans, the SSN is asked "because the welfare programs wanted it." Under the Privacy Act of 1974, only federal welfare programs are allowed to require the SSN for eligibility.

The system runs on Dakota Data Services' Data General Corp. Nova 3D minicomputer with three Applied Digital Data Systems, Inc. Regent 100 CRTs and three Digital Equipment Corp. Decwriter printers, Pendo said. Two more CRTs will be added within two months.

Since the program hasn't yet compiled its final statistics on the operation, Evans said, it is "really too early to tell" how efficiently the system is working. "My guess is that it has increased the number of caseloads each worker can process, but we could not prove that at this point," she said.

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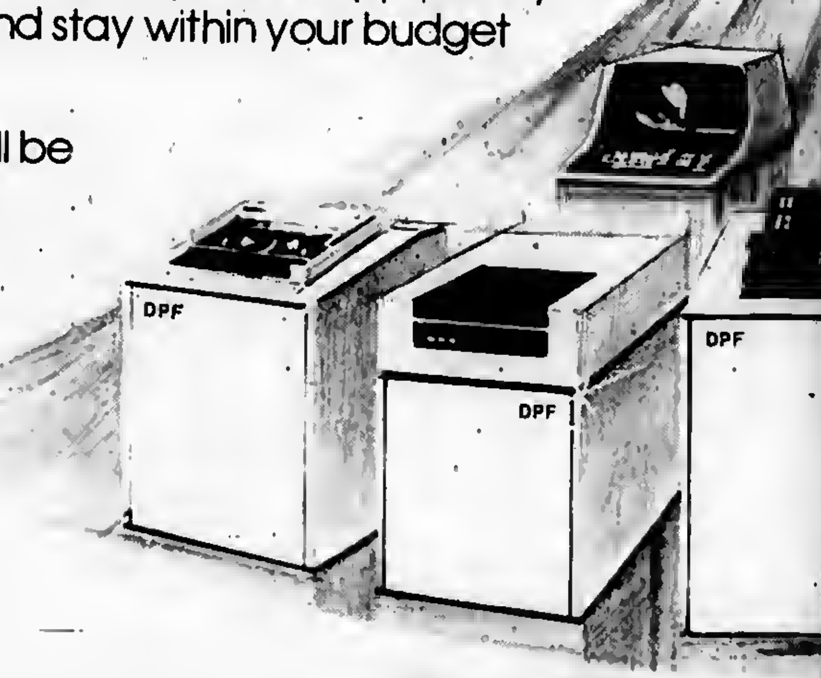

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DP and Human Services

Eligibility Determined in 24 Hours

Single Form, Net Cut Payment Errors in Half

By Marguerite Zientara
CW Staff

MADISON, Wis. — A 50% reduction in overpayment and underpayment error rates has resulted from a computerized single-form eligibility prediction system for federal human services programs in four Wisconsin counties.

The Computer Reporting Network (CRN) collects the information necessary to predict eligibility or noneligibility for Food Stamps, Aid to Families With Dependent Children (AFDC), Medical Assistance and Supplemental Security Income (SSI), processing over 500,000 people per year, according to Bernard Stumbras, division administrator for Wisconsin's Division of Economic Assistance.

When an applicant enters a social service county office seeking aid, he fills out a 14-page application form asking such information as identification — name, address, telephone number, length of residence in Wisconsin; number of household members and information about each household member; health and medical information including insurance information; and employment information.

The application form also asks for a summary of the applicant's assets, benefits being received, household expenses and daily expenses such as lunch costs and child care expenses, according to Paul Pecorin, director of the State Office of Information Systems, which administers CRN.

CRT operators, with the aid of a prompting program, then enter the information into IBM Model 3270 terminals, of which there are seven within the four counties. The information is stored in the system's IBM 370/158 for night batch processing.

Reports are printed so that within 24 hours of an applicant's filling out a form, his eligibility for all four programs has been determined."I've heard that some states are running 30 days," Pecorin remarked.

It is a one-stop process, Stumbras noted, in that an applicant fills out only one application form and deals with only one "case aide," or eligibility processing person, from beginning to end of the application process for the four human service programs. One of the objectives in the planning of the program was to reduce the number of times a client had to apply for certain services.

"Once an applicant went through the hassle of applying for one program, he wasn't ready to take on the hassle of the next program," Stumbras said.

"We looked at our caseloads and found we had high numbers of people eligible for and receiving Medical Assistance, for instance, but not receiving food stamps," he said. "That didn't seem to make much sense because the eligibility criteria for the two programs are almost identical."

Another objective of the program was for as much "horizontal equity" as possible, Stumbras said. "We knew that depending on what side of the bed the case aide got up on that day, how well the aide understood or was trained on the policies and depending on local variation on policy, people were sometimes unjustly found ineligible for benefits or the amount of their benefits varied," he said.

In addition, policies would often change three or four times a year, necessitating the examination of every record in the state to redetermine every participant's eligibility in every program, Stumbras noted.

According to Pecorin, "Our biggest benefit has been in the proper computation of eligibility. The eligibility requirement has been so complex that we were never sure whether in fact it was being calculated the same way by two different case workers."

Greater Productivity

Besides the error rate reduction, the system reduces case aides' work time on each case "by at least 22%," Stumbras said. Workers formerly completing two full cases per day on a manual basis have increased production to eight to 10 cases per day with automation.

"We heard repeatedly from case aides that, after they had started processing forms, they would find they still needed more information because the forms in the previous manual system obtained general information," Stumbras said. "Now, when the form is filled out completely, no matter what the situation, the data is there."

Design of the system began in September 1972. The first pilot county site went on-line in September 1976, and the most recent county site started operations in January 1978, according to Stumbras.

CRN is now in the process of converting to an IBM 3033 CPU using IBM 3790 intelligent terminals, expected to be in operation by the end of the year.

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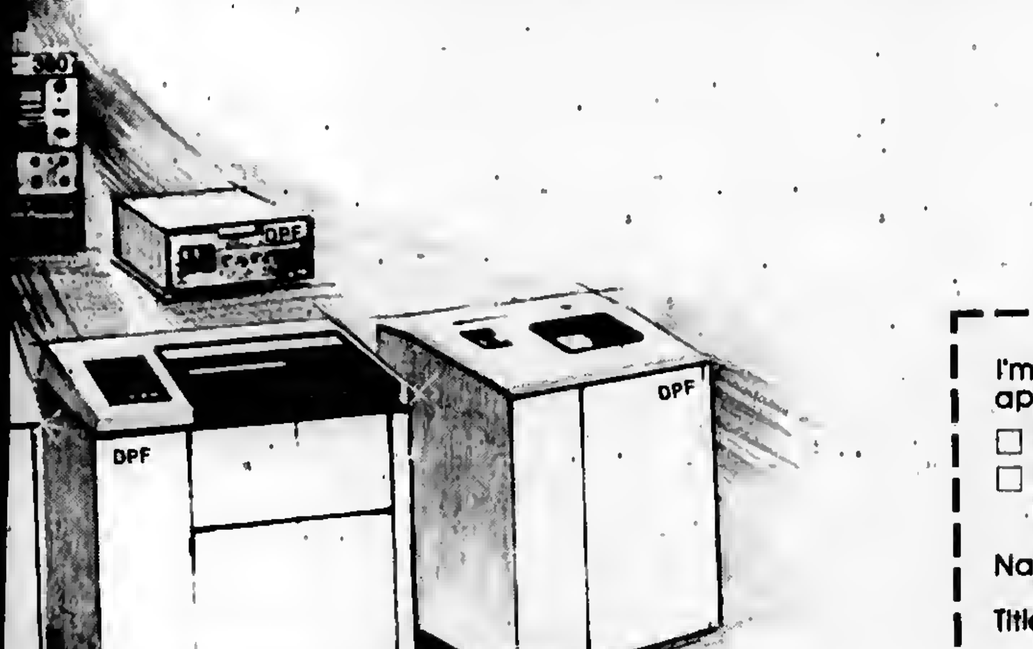

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Data Base Lists Information for Theater Buffs

By Marguerite Zientara
CW Staff

DALLAS — If you are curious about the state of the community theater in America today, the National Theater File (NTF) is the data base to access. NTF is maintained by Theater Sources, Inc., a nonprofit corporation created in 1975 to gather and distribute information about theater activities. It also sponsors a Theater Computer Users Group.

NTF contains three areas of information, according to Mike Firth, secretary of Theater Sources, Inc. The first area is a mailing list of about 2,000 theaters, each of which is coded by type of theater, such as community, children's or equity professional, Firth said.

Another area of information is specific data on about 300 theaters, gathered from returned questionnaires. It includes such information as staff size, the theater's season dates, size of the house and whether the group owns the theater or uses someone else's, Firth explained.

The program on which this information is run was designed so that the file can be expanded to contain up to 10,000 theaters of any type, Firth noted. "Our goal here is to keep the old data coded as to when it was valid so that someone can look at the state of the theater now," he said.

The third area of information in the file is a listing of more than 8,000 cities in the U.S. by Zip Code and population.

The NTF runs on Southern Methodist University's primary computer, a Control Data Corp. Cyber 76, on a time-sharing interactive basis, Firth said.

The data base is valuable for playwrights who want a list of the theaters in a particular area to contact about performing a new script, Firth pointed out, as well as to theater management students who want to determine various characteristics of audiences.

The Theater Computer Users Group provides a vehicle for information exchange via a newsletter "for people exploring uses of large and small computers in theater situations."

Topics of interest dealt with in the newsletter include special software programs for specific theater jobs such as set design and inventory, cutting lists and ticket sales, and special uses of hardware for things like stage lighting and management of production cuing, according to Firth.

Other theatrical uses of the computer include ticket sales, mailing lists and patron records, actor/casting lists, volunteer crew management, financial management records and a number of inventory and management functions, Firth noted.

Firth, who is a playwright as well as a computer programmer, said that if someone uses the information in the NTF for research, payment can be made in the form of more information for the file (as in questionnaire results). Information such as mailing lists can be purchased outright.

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Child Writes About DPers

By Eve R. Wirth
Special to CW

When you work with kids, you have a front-row seat to a stage of some rollicking, zany entertainment.

Consider this essay that a member of the grade-school set wrote for his teacher on the subject of people who work with computers:

A computer person has a top, middle and a bottom. The top starts off with a head which is most often attached to the neck. This is done eggspressly so it won't come flying off, and also it houses his brains to operate the computers. Next comes his roundish squared off shoulders which steadies his head smack in the middle.

Sometimes he shrugs his shoulders when he can't operate the computer real good, so then what does he do? Well, he makes a wrinkled-up nose face and his eyes get black-eyed and wild and they go in and out and this way and that way, and his lips go tight and thin and he yells out loud, "Hey you stupid computer. What's the matter with the input and output?"

A computer person also has a chest which goes in and out — it all depends if he feels proud or lousy.

He has a stomach part that has to be getting food three times a day and also coffee breaks like my pop has. But every once in a while specially when he gets real eggsighted on the job his stomach gets mad at him and starts to bubble-up, gurgle-up and he starts to feel gassy. So what does he do? He grabs a Rolaid from his pants and then burps a couple of times and that's the end of that.

He has legs and feet for traveling to work and all around the office when he has to use the computer. Sometimes these legs get tired, so he sits down, but not for too long or his boss will get wild and fire him, so he quickly gets up and walks around like.

A computer person is the most impotent person there is, because without him who would operate the computer?

Data Compiled in Emergency Rooms

System Monitors Consumer Products for Safety

By Tim Scannell
CW Staff

WASHINGTON, D.C. — All accidents, regardless of the degree of seriousness of the resulting injury, are potentially dangerous, according to the U.S. Consumer Product Safety Commission (CPSC). Unfortunately, maintaining an up-to-date record of such incidents and thus identifying "accident-producing" items is a problem because many people are often embarrassed to reveal the circumstances surrounding the accident.

The CPSC, in an effort to overcome victim hesitation, formed the National Electronic Injury Surveillance System (Neiss), a centralized computer facility that receives information from more than 119 statistically selected hospital emergency rooms across the country.

So far, the commission has used the system to report on injuries resulting from items ranging from bubble bath preparations and cosmetics to ice picks and coffee makers, a spokesman stated.

First Level: Surveillance

Neiss operates in a "bilevel" fashion, the spokesman noted. The first level, surveillance, involves recording such information as the day the patient was treated, the diagnosis of the injury, the bodily part affected, the type of product involved in the accident and the individual's age and sex.

Surveillance provides estimates of the frequency and severity of product-related injuries and establishes priorities for further study, the spokesman explained.

Information is input to two IBM 370/168 mainframes, located at the Parklawn Computer Center in Rockville, Md., via teletypewriters installed in the emergency rooms of participating hospitals. A hospital employee, trained by the commission, reviews all emergency patient records each day, isolating those "involving but not necessarily caused by" consumer products, the spokesman continued.

The who, what, where and when of the accident is typed into the terminal, creating a paper tape. The tape is then rewound and loaded onto a reader that is accessed, via telephone line, by the central computer.

The central computer compiles the information extracted from each of the teletypewriters and prepares reports that are reviewed by the commission's staff. The CPSC uses these reports to note the hazard patterns associated with the product involved and possibly develop remedial action or issue product-related warnings.

Second Level: Investigation

The second level of Neiss consists of in-depth investigations of accidents and interviews with both the victims and eyewitnesses. The investigations, sparked by the computer-produced reports, provide the evidence needed by the commission to initiate change or corrective action.

Products involved in mishaps are grouped into general categories such as "kitchen appliances," "sports and recreational equipment" and "housewares," each assigned a coded "product number." The actual number of reported accidents treated at hospital emergency rooms is inflated to produce an estimated number of product-related accidents that occur in the continental U.S.

The estimates, because they are derived from a sampling rather than a complete emergency room census, are subject to error, the spokesman pointed out.

The system is also subject to inaccuracy because injuries treated at a doctor's office, through direct hospital admission and at home are not reported, he added.

Injuries are broken down into specific categories and assigned a "mean severity value." This measure is used to compare severity of injury among different products, the spokesman said.

Misleading Data

The computerized system, which catalogs more than 400,000 emergency treatments involving nearly 1,000 products each year, can sometimes provide misleading data, the spokesman admitted. For instance, Neiss data was used by commission staffers to prepare a report that showed a phenomenal increase in skateboard-related injuries.

The computer showed occurences of this particular type of injury soared from 3,230 in 1974 to 27,522 in 1975 to 71,483 in 1976. After investigating the data and analyzing the injuries, however, the CPSC discovered skateboards were essentially safe, but found the people using them were doing so in a reckless manner.

While the system does list the products involved, the spokesman stated, the injury does not always have a direct cause-and-effect relationship with the product.

For example, an injury that involved a toybox actually occurred when the victim tied a jump rope to an overhead pipe in the basement to swing over carpeted stair steps. The rope broke and the victim fell, striking his head on the corner of the toy chest, the spokesman recalled.

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STRUCTURED ANALYSIS, by Victor Weinberg, presents a philosophical, yet pragmatic, approach to the systems development life cycle and identifies classic problems faced by analysts. It fully describes techniques and tools to aid in the systems development process. Topics in this 344-page text include Overview; Data Flow & Data Structure Diagrams; Structure Charts; Data Dictionary; Design & Implementation Strategies; Problem Definition; Structured Methodology; Exercises; References; Appendix; Glossary; Index.

STRUCTURED ANALYSIS AND SYSTEM SPECIFICATION, by Tom DeMarco with a Foreword by Dr. P.J. Plauger, provides tools and methods to guide the analyst step-by-step in the development of a "Structured Specification." In 368 pages, the approach is graphic, partitioned, top-down, concise, iterative, maintainable, and a paper model of the system-to-be. Topics include Basic Concepts; Tools: Data Flow Diagrams; Data Dictionary; Process Specification; System Modeling; Structured Analysis for a Future System; Extensive Case Study; Glossary; Bibliography; Index.

STRUCTURED SYSTEMS DEVELOPMENT, by Kenneth T. Orr with a Preface by J.D. Warnier, describes, in 192 pages, techniques for developing solutions to DP problems, and presents logical analysis, design, and development methods. Topics include Systems Analysis & Problem-Solving; Process Flow; Tools; Systems Building; Systems Design; Structured Design Tools; Applications; Appendices; Bibliography; Index.

STRUCTURED DESIGN, by Edward Yourdon & Larry L. Constantine, teaches the highly disciplined science of systems and program design. This 464-page book assumes a basic knowledge of the elements of computer hardware, of the syntax of at least one programming language, and of coding. Topics include Coupling; Cohesion; Design Heuristics; Transform & Transaction Analysis; Alternative Design Strategies; Modular Systems; Packaging; Optimization; Recursive Structures; Homologous & Incremental Structures; Implementation; References; Appendices; Glossary; Index.

LEARNING TO PROGRAM IN STRUCTURED COBOL, PART 1, by Edward Yourdon, Chris Gane & Trish Sarson, serves as a sound introduction to structured programming using COBOL. The 252-page text first presents the basic steps of a simple computer project, with progressively difficult levels of detail later. Topics include Processes, Decisions & Loops; Defining Data; Doing Arithmetic; Developing Programs; Program Logic; Data Entry & Retrieval; Appendices.

LEARNING TO PROGRAM IN STRUCTURED COBOL, PART 2, by Timothy R. Lister & Edward Yourdon, treats the more advanced features of COBOL using structured code. All discussions and numerous, tested programming examples illustrate the proper way to develop reliable, maintainable, readable COBOL code and programs. Topics in this 224-page text include Facilities; Internal Coding & the DATA DIVISION; Tables; Advanced Input-Output Techniques; Sorting & Merging; Testing & Debugging; Efficiency & Optimization; Appendix; Glossary; Index.

STRUCTURED WALKTHROUGHS, by Edward Yourdon, treats in-depth the technique credited with huge reductions in the number of errors in DP systems. Topics in this 152-page book include Types of Walkthroughs; Programming Teams; Roles; Convincing Management; Evaluating Performance; Building Teams; Review Exercises; Bibliography; Index.

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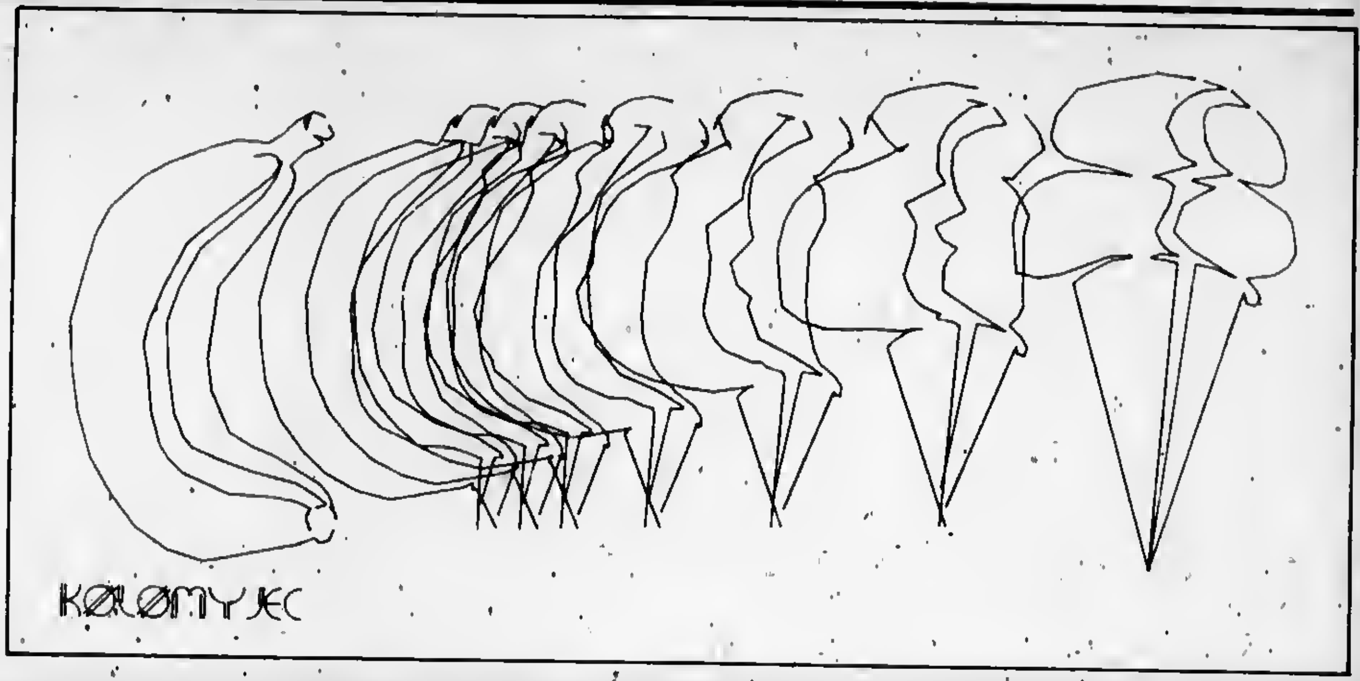
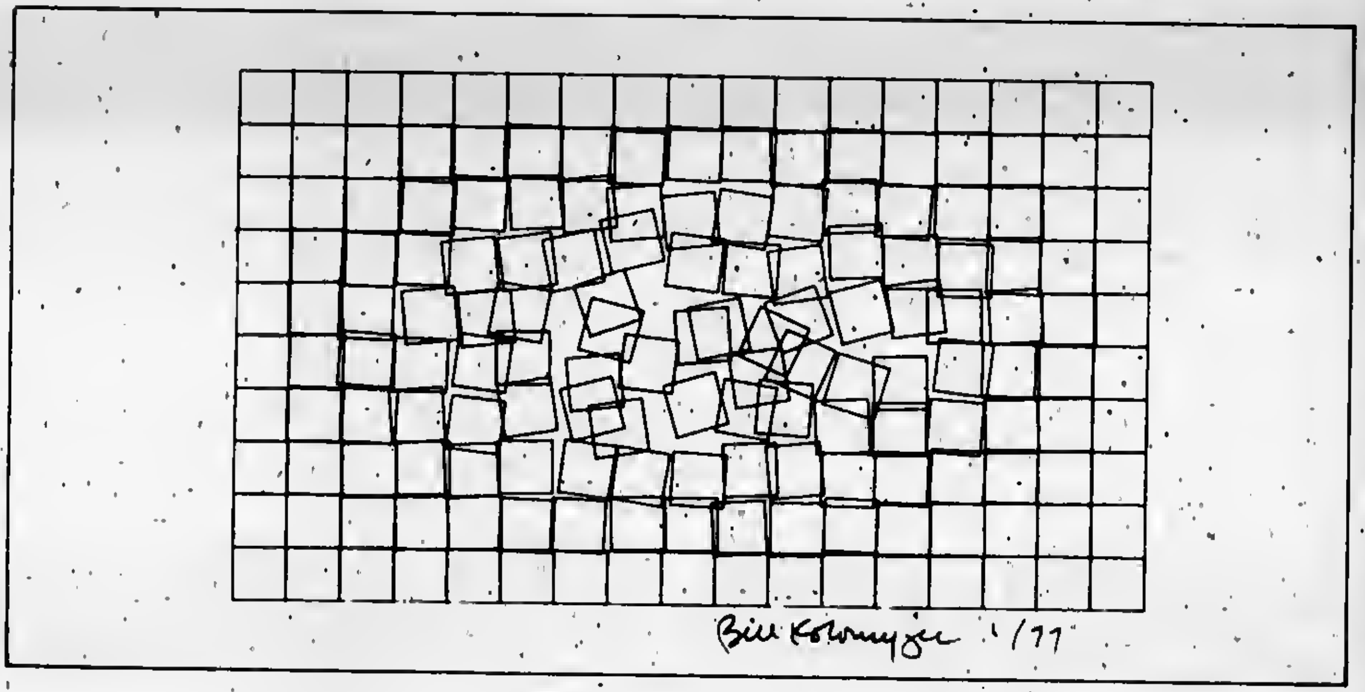
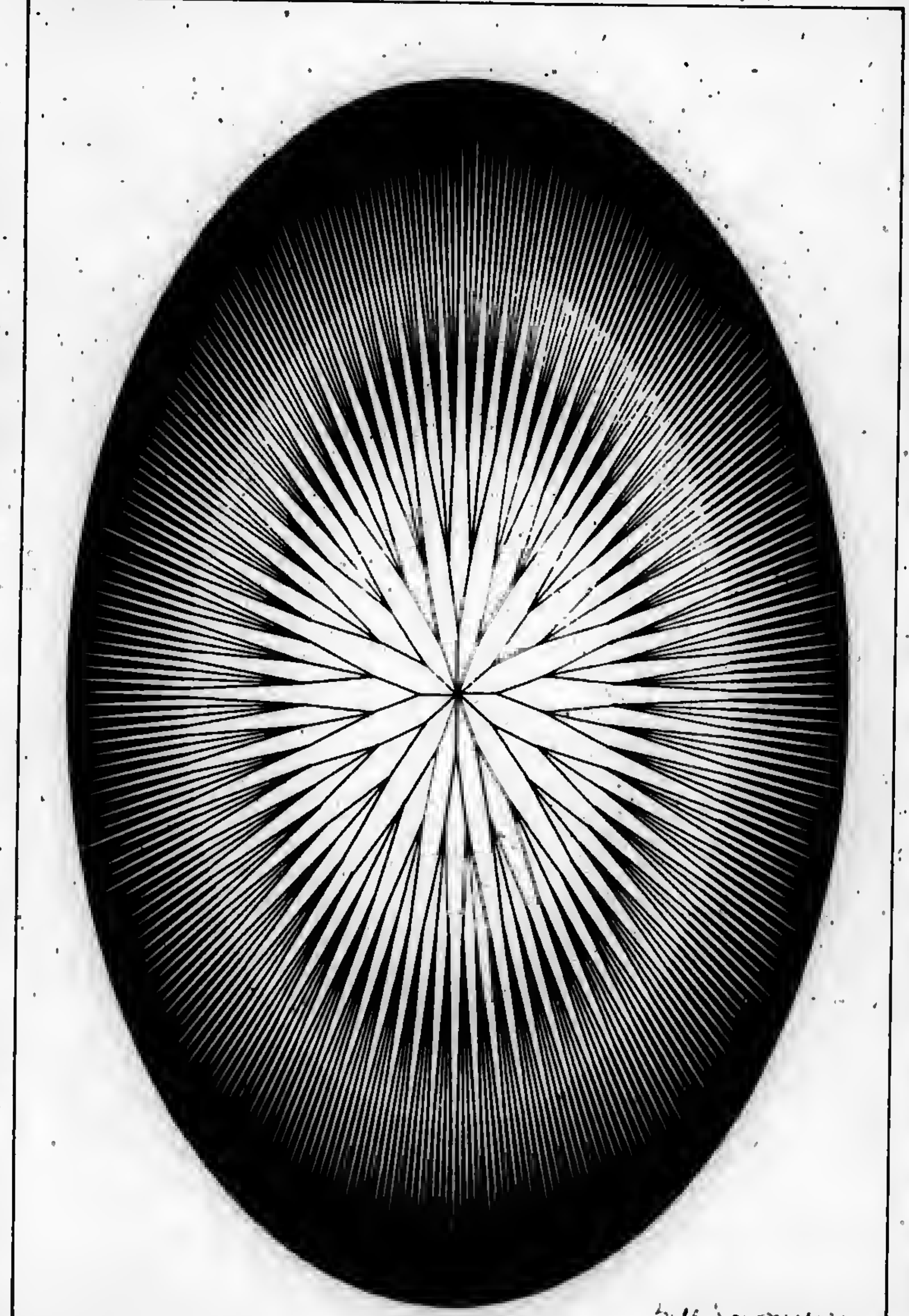
Concept behind 'shotgun' art approaches 1940s abstract expressionism







By Marguerite Zientara
CW Staff

LANSING, Mich. — "I'd rather do computer art than anything else, but I have to make a living so I teach here at the university." These are the words of William J. Kolomyjec, a man who, for about 10 years, has been using computer equipment to produce art such as that shown here.

Kolomyjec's interest in computer graphics began while he was an undergraduate working toward his Bachelor of Fine Arts degree in industrial design at Michigan State University. He now teaches engineering graphics and computer graphics in the university's College of Engineering. He heard that one could use the computer as a design tool and "just started checking it out."

Over a period of a couple of years, he taught himself to program, and further research culminated in a Master of Fine Arts degree in graphic design in 1975. Since the majority of his work was in computer graphics, Kolomyjec became the first "computer graphic artist" to graduate from Michigan State.

Kolomyjec considers himself a pioneer of the medium. "Traditional artists are scared to death by the technology involved and most people are appalled by the idea of using the computer for art work. They think the computer does all the image-making. Go ahead and program a computer to draw a bird — it won't know what to do until you describe the bird to it," he said.

Computer vs. Brush

"I use the computer as a traditional artist would use a brush — as a tool to produce the artwork. I have complete control," Kolomyjec explained, adding, "The nice thing about my medium — and there are two ways to look at it — is that I can turn trivial decisions over to the computer, such as using the random number function."

A single image-generating program utilizing random parameters can produce infinite variations in the sense that duplication might actually occur but only after a few billion trials, he pointed out. Therefore, each work can indeed be unique and yet remarkably similar to a previous work or to the thousandth piece to be produced by output equipment. This capability, according to Kolomyjec, is forcing us to reevaluate the concept of "originality."

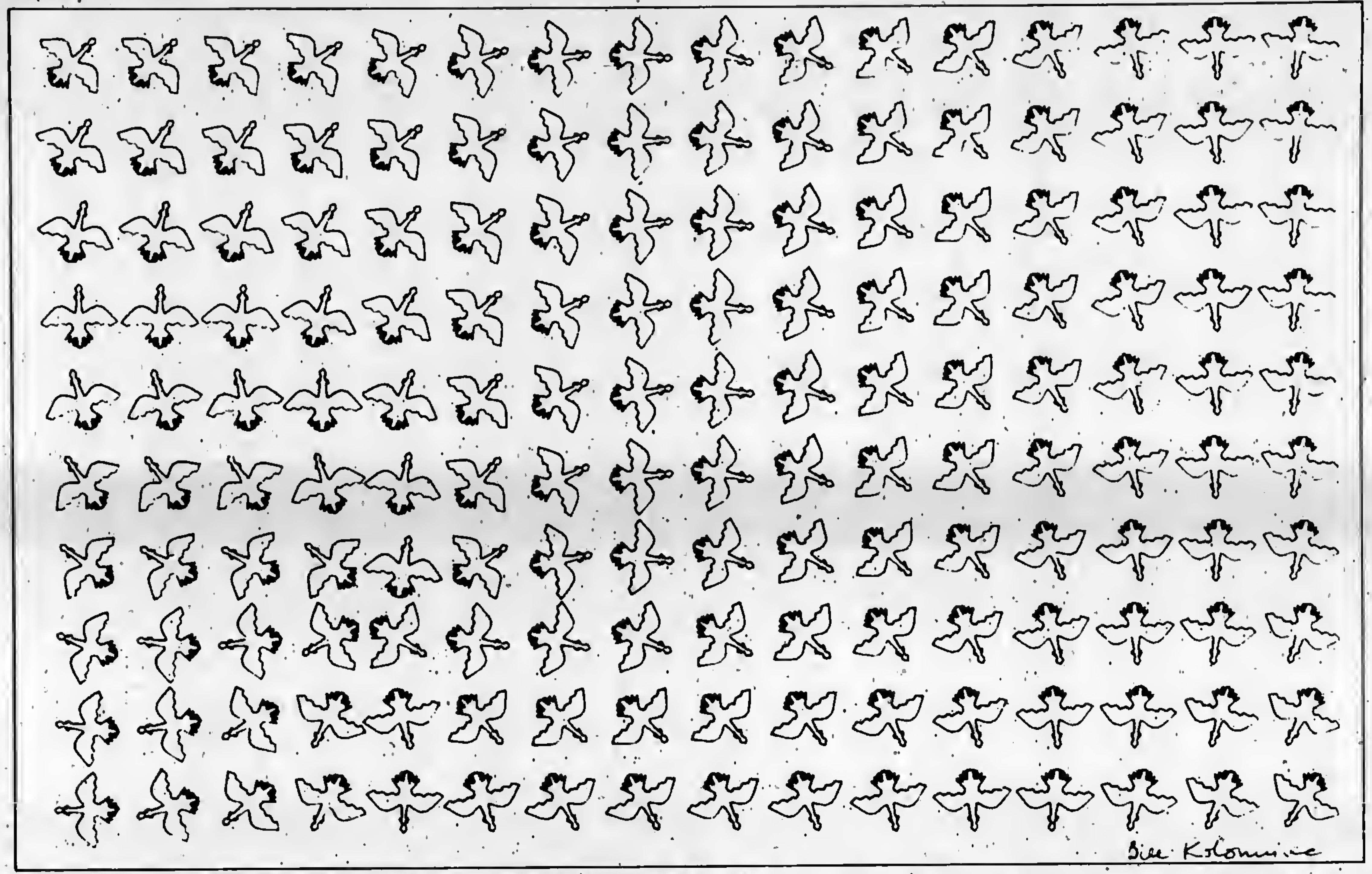
In addition, he said, the random technique enables the artist-programmer to "define a percentage of involvement within a computer-produced image." This allows the artist to become detached, wholly or in part, from the execution of a piece.

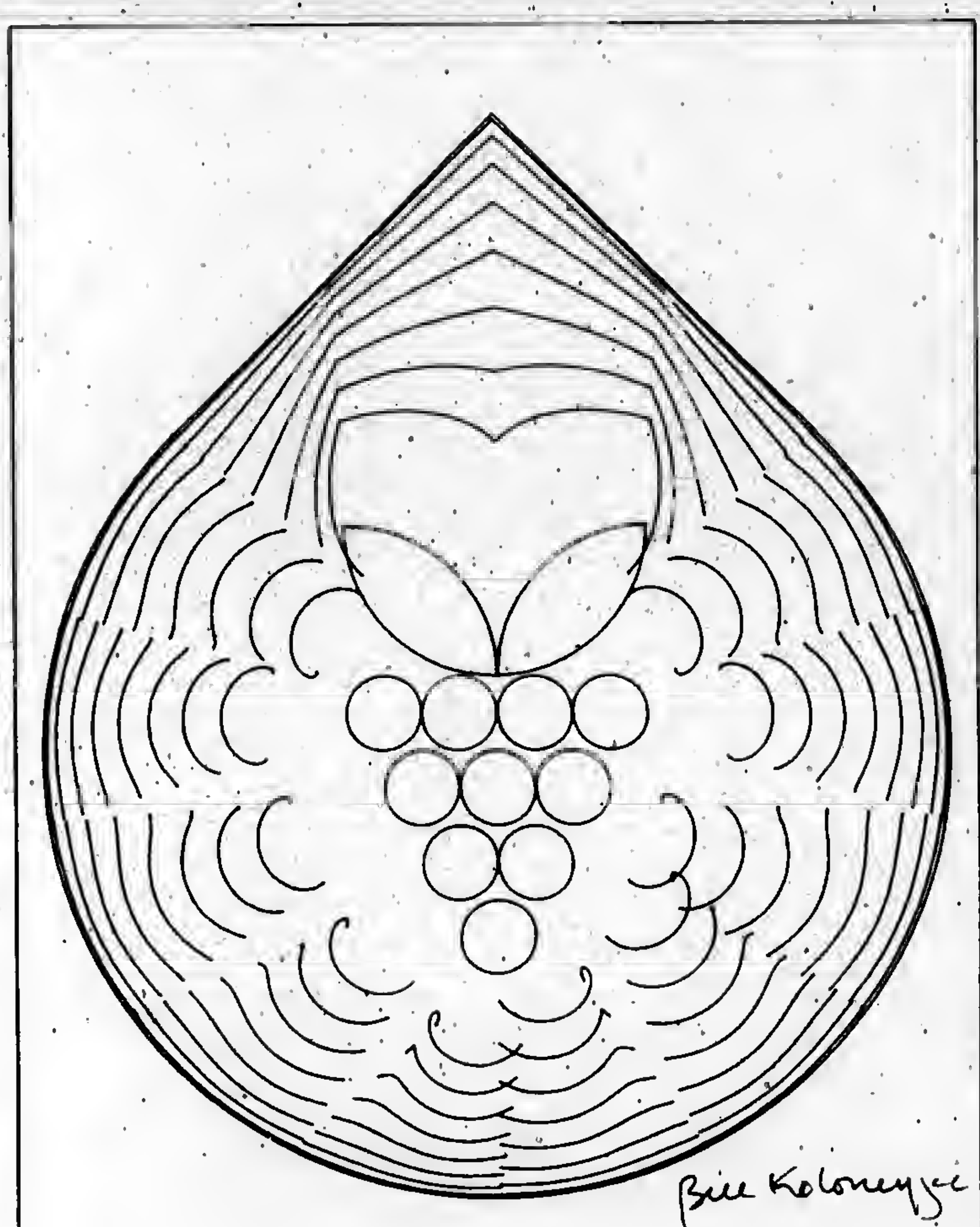
"It can be considered 'shotgun art,' in which you load the gun and fire it, so to speak," he said. That process is very close to the thinking involved in the Abstract Expressionism of the 1940s, in which the underlying concept was to minimize control, "to let the subconscious roam as it would." This allows for accidental occurrences with frequent random and chance effects, Kolomyjec said.

Two Methods Used

To produce his images, Kolomyjec uses either of two systems belonging to Michigan State University. One consists of a Control Data Corp. 6500 computer and a Calcomp 936 plotter; the other is an IBM 1800 running a Calcomp Series 500 plotter. Since Fortran is the language of this equipment, Kolomyjec uses that for his programs.

The artists uses two programming methods. The first is the "digitized image," which is provided to the computer external to a computer program. "I draw the image on a piece of graph paper using a series of dots and the





Shown clockwise from top left: "Banana-Cone" (Fig. 1), "Geese" (Fig. 2), "Water Into Wine" (Fig. 3), "Kolomyjec's Moire" (Fig. 4) and "Boxes I" (Fig. 5).

computer draws the lines between the dots. Since the computer can't draw a curved line, it's really a series of straight lines that make up the image," he explained. "Once the image is drawn and debugged, then I develop a program to manipulate that image by rotation or scaling."

The second method is by means of algorithms, or internally as part of the computer, Kolomyjec noted. The random number generator falls within this category, he said.

In "Banana-Cone" (Fig. 1), the key images of the banana and the ice cream cone had to be digitized, he said. "Each image has 99 digitized coordinate locations and appropriate pen controls for lifting the pen at proper line segments," he added.

"As bananas can be made into ice cream to be consumed as food, it is possible to change the form of a banana using linear interpolation into that of an ice cream cone which may be visually consumed again and again," Kolomyjec said.

In linear interpolation if two figures are placed a certain distance apart, one can map the intervals between them, along a straight line, Kolomyjec explained. Two figures should have the same number of points, he said, so that if one draws a line between the same number of points and takes the midpoint of all those lines, then connect the midpoints the same way the other two figures are connected, the result will be an interpolated figure.

Excels at Repetition

The work "Geese" (Fig. 2) is another example of using a data base of imagery external to a computer program. "This is an excellent example of one of the things the computer does so well — that is, repetition. This program uses the same data over and over again with slight modifications," he said. "I'd go crazy drawing all those birds."

Although "Geese" can be likened to Andy Warhol's repeated soup cans, coke bottles or dollar bills, "I do not attempt to bring myself down to the level of the machine as Warhol does, but rather try to bring the machine up to my level," he said. "I use more than just its ability to do repetitious operations; I also create a dynamic structure."

Another example of linear interpolation is "Water Into Wine" (Fig. 3) Interpolation was used to go from parts of the symbol for wine (grape cluster) to the periphery of the water drop. "I can change anything to anything," Kolomyjec said.

"Kolomyjec's Moire" (Fig. 4) was created using an algorithm. "I just took 12 lines that crossed. At the end of the lines, I split them into two, at the end of the next line into three, then four and then five," he said. Therefore, the periphery is made up of 1,440 points on a circle.

"Boxes I" (Fig. 5) is based on a classic computer work entitled "Gravel Stones," done by George Nees, a German computer graphic artist. "The idea is that the closer the boxes get to the center, the more they're allowed to vary and rotate," Kolomyjec said.

"I have the opposite, too, in which the closer the boxes get to the sides, the more variance is allowed. I think that says something about people in a strange sort of way — those loose on the outside and tight on the inside as opposed to those loose on the inside and tight on the outside," he added.

"I consider this a very high form of art," Kolomyjec said. "I'm using a highly technical objective medium to do something very subjective. You don't see my programs — the rubble that I struggle with. I'd put my images up against anybody's images in terms of art."

On Sale: Overalls to CPUs

DP Mailings Offer Entree to GSA Auctions

By Tim Scannell
CW Staff

BOSTON — Rubberized overalls, oil drums and mock-ups of Saturn booster rockets have little in common — except that, at one time or another, they have been auctioned off to the public by the U.S. General Services Administration (GSA).

Twice a month, each of the GSA's 10 sales branches holds an auction to help eliminate the surplus materials and objects accumulated by various government agencies. When an agency declares an excess, it notifies the GSA which, in turn, alerts other agencies that certain articles are available.

"If an agency wants a product, the GSA turns it over to that agency; if no other agency needs it, then we put it on the market for public sale," according to Joe Lawless, regional director of business affairs for the New England area.

Bidding for most of the items offered for sale is done through the mail by people whose names are maintained on a computerized mailing list. Because of the variety of items, a computer is used to match specific items with the people who are interested in purchasing them, Lawless said.

When office furniture is up for sale, only those interested in this type of furniture are notified, for example.

The mailing list is updated on a weekly basis by the Centralized Mailing Service Branch in Denver, Colo. Data is input from the GSA's regional branches around the country in batch mode and then processed using a General Electric Co. 425 CPU, a spokesman said.

The Mailing Lists Branch also handles the compilation duties for other agencies such as the Environmental Protection Agency and the Civil Service Commission.

The key to taking advantage of the used items offered by the GSA is getting placed on the mailing list. "A firm or a private citizen wanting to get on the mailing list simply completes an application and sends it into the local bureau," Lawless explained. There is a different mailing list for each of the 10 regions across the country.

A prospective bidder, when filling out an application, must indicate what items he is interested in purchasing and from what state, Lawless said. The state is important because a successful bidder has to pay for and pickup his purchase immediately.

There is a 15-day "grace" period for those people who can't pickup their items; after that the object becomes the property of the government again.

A person who reneges on his agreement to accept an item must pay 20% of the item's cost or the GSA will remove his name from the mailing list, Lawless said.

Three Techniques

There are three types of auctions staged by the GSA. The first consists of people submitting "spot bids" — individuals inspect an item offered for sale — usually a piece of heavy equipment or a vehicle, fill out a card and place it in a box in front of the item being sold.

"The auctioneer then opens the box and reads the prices off to determine the highest bidder," Lawless said.

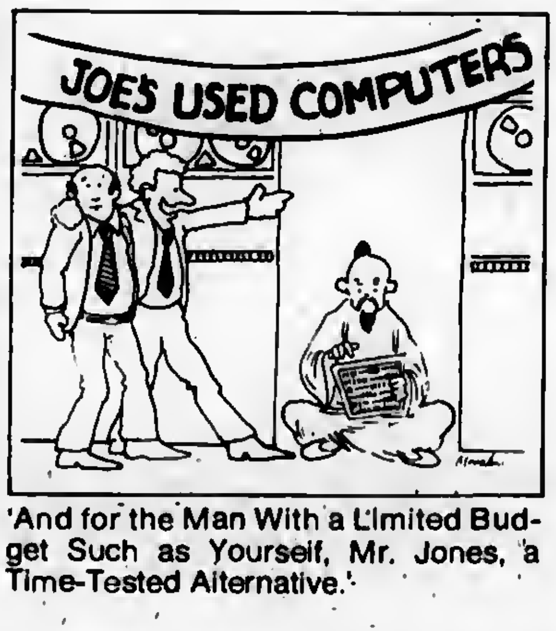
The second type of auction, based on sealed bids, involves people sending in price offers through the mail on items they have learned about via GSA bulletins.

The third type of selling technique is the traditional auction, whereby the items are presented to a group of potential buyers and the floor is opened up for bidding. Usually, this type of auction attracts a gathering of about 800 people, Lawless said.

"There's a lot of worthwhile material that the general public can pick up at a reasonable price," he continued. Occasionally, a few Cadillacs and foreign-made cars have found their way into the bidding platform after having been confiscated "because the person who owned the car was using it to transport drugs or weapons. At one time or another, there have even been a few computers added to the selling list," Lawless said.

"On the bidding document we tell what we know about a product. — whether repairs are required or if the product is junk or scrap," he noted.

So far, the GSA has managed to sell every item that it has offered for sale. This includes 3,500 coat hangers recently sold by the New England region and cattle from the Lyndon B. Johnson ranch auctioned off by the Southwest bureau, Lawless said.



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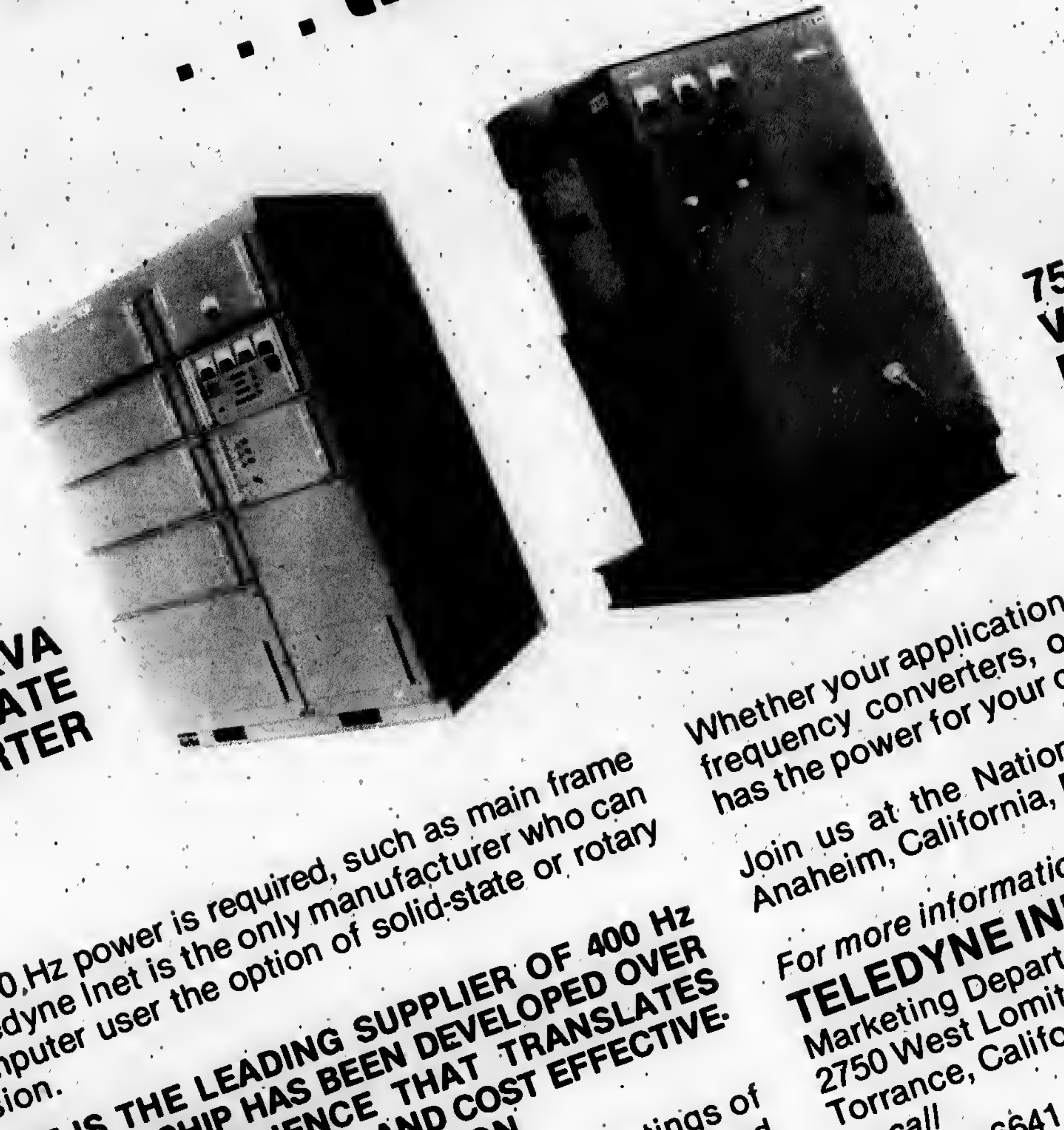

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'The duck walked through the flowers.'

To Teach Deaf Children

Artist Makes Sentences Come Alive

By Marcia Blumenthal
CW Staff

COLUMBUS, Ohio — An Ohio artist and computer scientist has teamed up with a researcher at Gallaudet College in Washington, D.C., to teach deaf children language skills through the use of computer-generated animation.

According to artist Charles Csuri, the system used is basically a digital computer interfaced to a standard color television set. The animated presentation is distributed via TV or video tape.

The teaching method is aimed at helping deaf children between the ages of 10 and 13 understand the grammatical function of prepositions, particulary in reading and writing. This is a problem that does not come up in sign language because that language is basically conceptual, according to Dr. Margaret Withrow, a researcher at Gallaudet College.

The teaching materials are generated in three basic steps. The first is data generation, which is essentially a method of synthesizing three-dimensional objects or "creatures" into the central processor of a minicomputer. Csuri uses a Digital Equipment Corp. PDP-11/45.

Next comes the animation language, which Csuri described as a script directing the machine to make the objects perform in a particular manner.

The third part consists of display and real-time playback. Television images move at the rate of 30 frame/sec, however, and the minicomputer is too slow to produce representations of three-dimensional colored, shaded scenes in the amount of time, Csuri explained.

Since it takes the computer several seconds to produce each frame, the frames are produced and then stored in an encoded format on disk. Once all the pictures are finished, they can be played back in real time through the computer on a standard color TV set. The output also can be recorded on a video tape cassette, he explained, adding that the system enables the animators to edit under computer control.

Animated Sentences

Csuri's system creates animated pictures and sentences, which can be displayed together or individually or with the prepositional phrase standing alone.

For instance, to teach the sentence "The duck walked through the flowers," the computer animates the scene which is displayed on the TV or video tape player. Then

'The frog jumped over the rock.'

Shown from left is an animated sequence used to help teach the function of prepositions to deaf children. Individual words are superimposed on the screen and grow larger and smaller along the y axis as stressed in the sentence.

the sentence appears on the screen. As the student reads the sentence, individual words become animated, growing larger and smaller along the y axis as they are stressed in the course of reading.

The deaf child can see the interaction of pictures and text. A programmed teaching device also can be hooked up to a video player that requires the child to respond to a question designed to test understanding of prepositional phrasing.

The animation project has been financed through a grant from the Department of Health, Education and Welfare's Bureau of the Handicapped, according to Csuri.

The system is limited in some respects, he said, because it is not interactive. However, Csuri noted that a group at the National Institute for the Deaf in Rochester, N.Y., has developed an interactive learning system, now in the experimental stage, that uses a microcomputer.

Although the animated system is limited, Csuri pointed to its advantages. The system is many times less expensive than animated films and only requires one person to generate the entire animation, whereas film requires the combined effort of several specialists.

Art, DP Background

No dabbler in computer art, Csuri began his career as a painter and switched to the computer 12 years ago. One of his early computer animation films is part of the collection of the Museum of Modern Art in New York City.

As an undergraduate at Ohio State University in Columbus, he took several science courses and, during the early 60s, he became fascinated with the computer graphics developments.

In fact, Csuri recalled that his early art work had a scientific flavor, involving systems, random number generators and the development of a drawing machine.

Csuri, who holds a joint appointment in computer science and art education at Ohio State, designed the system called "Anima II" as a general-purpose computer animation system. The work was done over a three-year period with a grant from the National Science Foundation.

Withrow, having heard about the system, contacted Csuri to see if the system could be adapted to teach deaf children language skills.

Presently, in addition to his work with Gallaudet College, Csuri is a member of Ohio State's Computer Graphics Research Group. This group consists of six full-time associates and several graduate students working part-time.

Aside from the computer animation system, the group is developing computer-synthesized images of highly complex scenes. They have created software which generates images with 500,000 to one million edges in a relatively short time.

In addition to the DEC PDP-11/45, the group uses a Vector General Inc. display and a Digitech Data Industries, Inc. color display. A 32K-byte DEC VAX-11/780 is on order.

The animated sequence shown from the left helps teach the function of the preposition "over." The concept of prepositions is difficult for deaf children because prepositions are not used in sign language.

Calendar

June 20, Dover, N.J. — **Role/Meaning/Significance of Auditing Automated Information**, sponsored by the Federal Information Processing Council Region No. 2. Contact: Peter C. Daikos, P.O. Box 902, New York, N.Y. 10008.

June 28-30, Amsterdam, The Netherlands — **European Datamanager User Group (EUDG) Conference**. Contact: Suzie Wilson, EUDG, 71 Gloucester Place, London, W1H 3PF, England.

July 6-7, Washington, D.C. — **Software: How to Buy It**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 6-7, Washington, D.C. — **Data Communications: Advanced Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 6-7, Washington, D.C. — **Minicomputers and Microcomputers: Selection and Usage Guidelines**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 10-12, Washington, D.C. — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 10-12, Los Angeles — **Effective Computer Operations Management**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 10-12, New York — **Microfilm in Records Management**, sponsored by American Management Associations (AMA). Contact: AMA, 125 W. 50th St., New York, N.Y. 10020.

July 10-13, New York — **Forms Design Course**, sponsored by American Management Associations (AMA). Contact: AMA, 135 W. 50th St., New York, N.Y. 10020.

July 10-21, Santa Cruz, Calif. — **Principles of Data Base Management Systems**, sponsored by the University of California Extension. Contact: Joleen Kelsey, University of California Extension, Santa Cruz, Calif. 95064.

July 10-21, Santa Cruz, Calif. — **Programming Methodology**, sponsored by the University of California Extension, Santa Cruz, Calif. 95064.

July 12-14, Chicago — **DP Project Management: A Practical Approach**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 12-14, Washington, D.C. — **Data Communications: Effective Network Design**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 12-14, San Francisco —**Word Processing: Guidelines for Planning, Design and Implementation**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 12-14, San Francisco — **Data Processing: An Introduction to Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 15-18, Boston — **Expo '79**, sponsored by the Optical Character Recognition Users Association (OCRUA). Contact: OCRUA, 10 Banta Place, Hackensack, N.J. 07601.

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July 18-20, Washington, D.C. — **Microcomputers: Principles and Applications**, sponsored by American University. Contact: Barbara Sumney, American University Office of Summer Sessions and Special Sessions, Massachusetts and Nebraska Ave. N.W., Washington, D.C. 20016.

July 19-21, San Francisco — **Data Communications: An Introduction to Concepts and Systems**, sponsored by Datapro Research Corp. Contact: Don Welsher, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 19-21, Washington, D.C. — **Minicomputers and Distributed Processing**, sponsored by the University of Chicago. Contact: University of Chicago, Center for Continuing Education, 1307 E. 60th St., Chicago, Ill. 60637.

July 23-28, Cambridge, Mass. — **Harvard Computer Graphics Week**, sponsored by Harvard University Laboratory for Computer Graphics and Spatial Analysis. Contact: Laboratory for Computer Graphics, Harvard University, 48 Quincy St., Cambridge, Mass. 02138.

July 24-26, Newport Beach, Calif. — **1978 Summer Computer Simulation Conference (SCSC)**, sponsored by the Society for Computer Simulation. Contact: Dr. Ralph C. Huntsinger, 1978 SCSC Program Chairman, Computer Science Department, California State University, Chico, Calif. 95929.

July 24-28, Santa Cruz — **Design and Analysis of Algorithms**, sponsored by the University of California Extension. Contact: Joleen Kelsey, University of California Extension, Santa Cruz, Calif. 95064.

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Bankers Probing Costs of Privacy Proposals

WASHINGTON, D.C. — The American Bankers Association (ABA) has undertaken a research project to determine how much the recommendations put forth recently by the Privacy Protection Study Commision will cost the banking industry.

The commission was an independent government-appointed group set up by Congress and the White House to recommend privacy measures in the private sector.

Under contract, Touche Ross & Co., an independent accounting firm, began the study in late April and expects to finish in September.

The purpose of the privacy commission's recommendations is to ensure that financial institutions maintain limited and accurate personal information files and that only customers be allowed easy access to their files, with the exception of legitimate credit agencies and law enforcement agencies.

The privacy commission recommended, for example, that federal law be enacted to provide a depository institution or credit grantor "must notify an individual with whom it has or proposes to have a depository relationship of the uses and disclosures which are expected to be made of the types of information it collects or maintains about him; and that with respect to routine disclosures to third parties which are necessary for servicing the [depository or credit] relationship, the notification must include the specific types of information to be disclosed and the types of recipients."

The commission also recommended that data concerning such an individual "must be treated as confidential" by the depository institution or credi grantor and that disclosures t parties other than those necessary to service the financial relationship "must be specifically directed or authorized b the individual."

Although such information as income, indebtedness and personal financial activity "have not been given out for 200 years," according to ABA spokesman William Moroney, the fear exists that with the information more easily retrievable on computer systems, banks might start selling this information.

House Bill 8281, amending the Fair Credit Reporting Act and containing the commission's recommendations, was introduced last year. The ABA spokesman said action on the bill is not expected until fall, by which time the Touche Ross study is expected to be completed.

"If the study shows that implementing the bill's recommendations will cost the banking industry, for example, 10% more to operate, that could influence a number of congressmen in amending a number of recommendations," according to Frank Curran, ABA director of retail banking services. "If it is costly to the industry, eventually it will be costly to the consumer."

In the course of the study, Touche Ross will visit approximately two dozen banks, spending "a considerable amount of time" in each one. The banks will be representative of the entire industry in terms of the way they operate and the kinds of credit business they are in, Curran said.

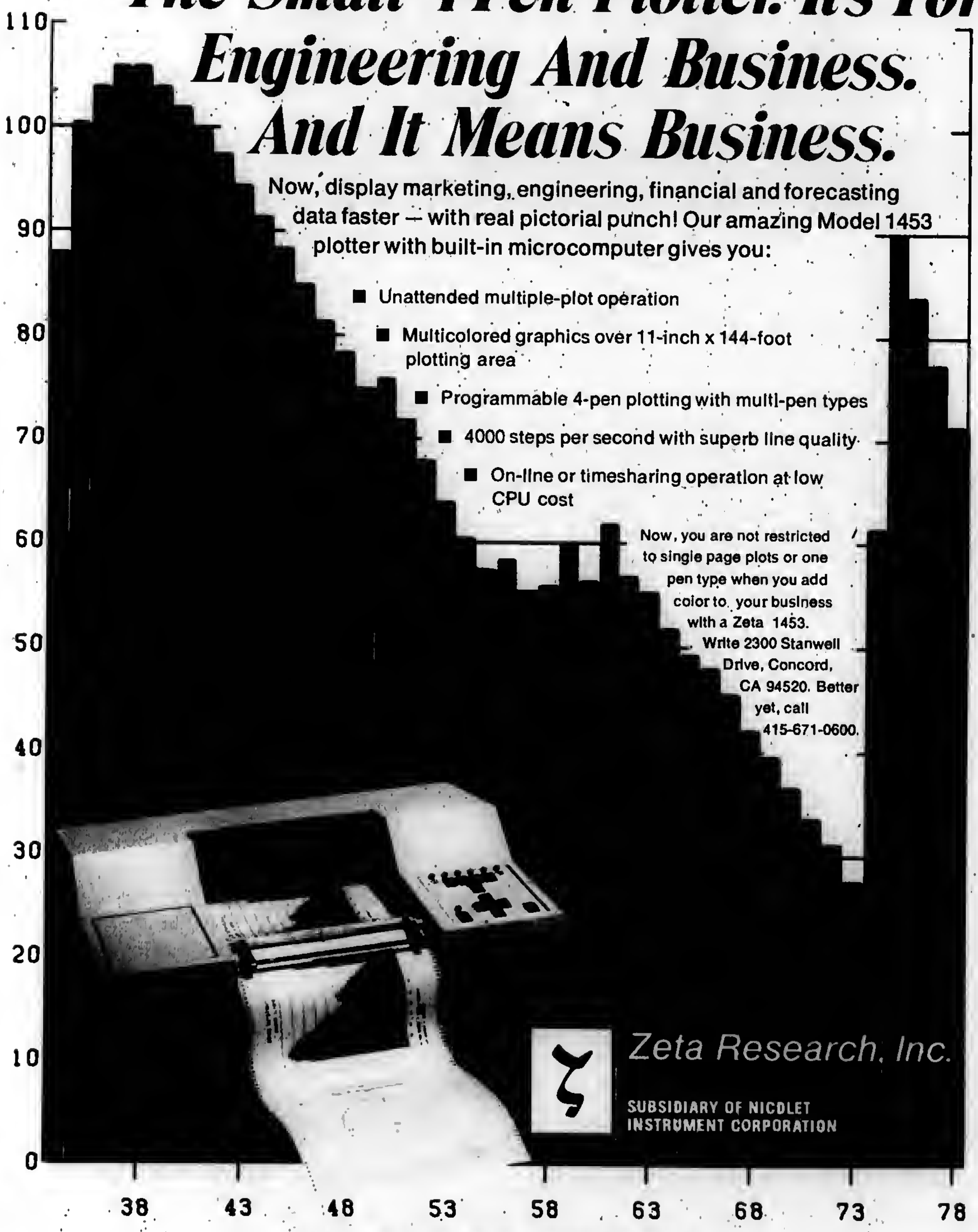
Potential Joiners Invited to Meet With EFT Group

SAN FRANCISCO — The Electronic Funds Transfer (EFT) Association will hold a special meeting here June 12 for prospective members.

The program will include briefings by Harold Mortimer, general counsel of First National State Bancorp. of New Jersey, on "Legislative and Regulatory Proposals Affecting EFT"; by Roland Brandel of Morrison and Foerster, San Francisco, on "EFT and the Uniform Commercial Code" and by Edward H. Coughran, director of the Universtiy of California at San Diego Computer Center, on "EFT and Computer Abuse."

Reservations for the meeting can be made by contacting the EFT Association at Suite 505, 1620 Eye St. N.W., Washington, D.C. 20007.

The EFT Association was formed in 1977 to support continued development and implementation of EFT systems and services.



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To Minimize Service Loss

Canadian Carrier Group Sets Up Disaster Plan

By Ann Dooley
CW Staff

OTTAWA — The Canadian Telecommunications Carriers Association (CTCA) has established a disaster plan aimed at continuing service in case of an emergency, restoring service to essential users and protecting vital points in the network.

The plan will put a high priority on restoring and servicing those DP installations that are essential to the health or protection of citizens. Commercial DP installations will be given a lower priority, but will benefit from the faster, more coordinated response to a disaster situation, CTCA officials said.

Previously, industry members had individual disaster plans which varied in their effectiveness and thoroughness, according to Herb Whittick, chairman of the CTCA Emergency Operations Planning Committee. Realizing the importance of a single, efficient plan, the industry planned the program in conjunction with the Canadian government to ensure a comprehensive approach.

Line Load Control

One practice being implemented under the new program is line load control, which is intended to guarantee easy access to essential users. Previously, no consistent system existed to identify telephone numbers which need uninterrupted service during an emergency.

Line overloads may occur whenever unusual service demands prevail, such as during a disaster or during severe weather conditions. In these situations, CTCA has determined it essential that sufficient service should be provided to hospitals, police, fire departments and other important services, according to Whittick.

The line load control system was developed to safeguard phone service to those essential users when the total volume of calls exceeds the design limits of the switching equipment. The system allows only a certain number of calls to originate from nonessential lines to assure continued operation of the essential lines left in service. The ability to receive calls is still available to all subscribers under the system, Whittick noted.

Each carrier will determine as a consequence of economics and technological considerations which switching offices should be equipped with line load capabilities. Capital requirements implementation and ongoing maintenance costs of the line load control system will vary according to local needs, but each company can obtain funds from the appropriate government agency, in order to pay these costs, Whittick said.

Vital Points Guidelines

Previously, all the CTCA members had various guidelines identifying vital points in the telecommunications networks, but now all the members are cooperating to set up a common list.

A "vital point" is a location which, if removed, would affect the ability of a telecommunications network to meet nationwide service requirements, Whittick explained.

The vital points program is intended to uniformly identify vital points, some of which may be DP sites, define the level of protection the carriers are willing to pay and serve as a guiding document for the industry and government agencies. Members of CTCA annually examine and categorize vital point locations as well as protect vital points against vandalism and trespass.

Security protection in case of war, civil insurrection or riot will be provided according to preplanned strategies devised by individual CTCA members and the appropriate government body, according to Whittick.

CTCA members will also plan their networks with regard to the communication facilities' ability to survive. This will be a fundamental consideration in planning, operating and controlling the networks, Whittick said.

Although CTCA members have always responded quickly in past emergency situations, the group decided to create specialized telecommunications equipment exclusively for such emergencies, Whittick noted. The CTCA, in cooperation with the Canadian government, plans to determine possible emergency needs, develop packages and plan the deployment, including transport and methods of sharing equipment use, he said.

In addition, plans are being drawn up to handle emergency requests for telecommunications services. Charges for the program will be paid by the government while the ownership and control will remain with the member company.

Since speed is essential in such a situation, member companies will provide a universal telephone number answerable 24 hours a day at one location within each province and territory.

The CTCA has already devised a portable telecommunications package that can be taken into an area in case of oil spills, radiation accidents or other emergency situations. It is essential to get a few voice circuits or possibly data links into the area to help control and coordinate emergency rescue, Whittick noted.

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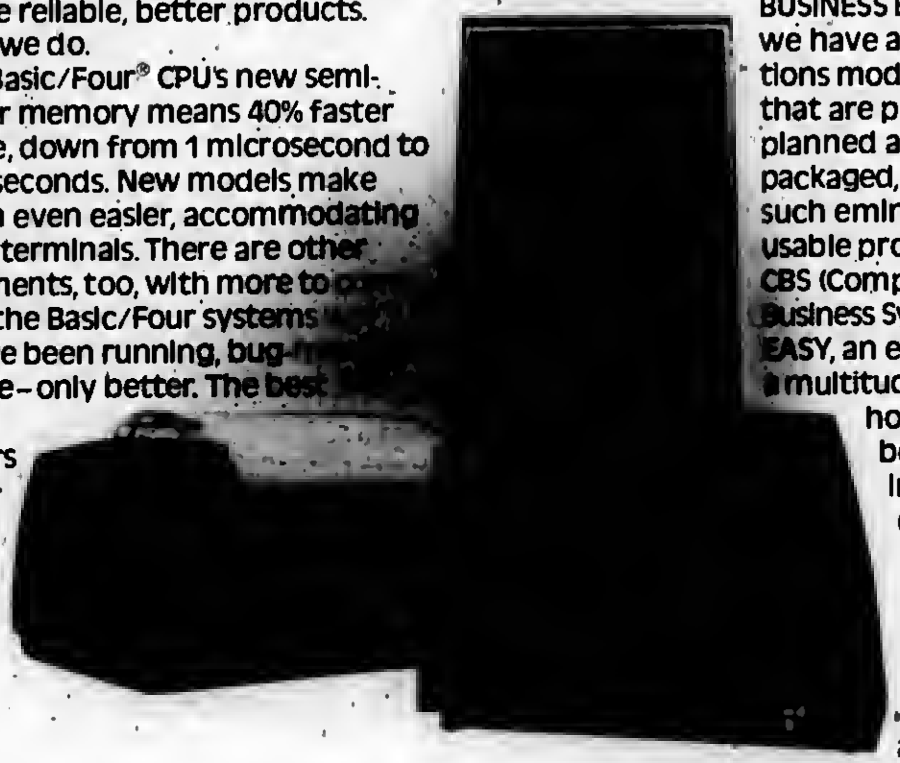

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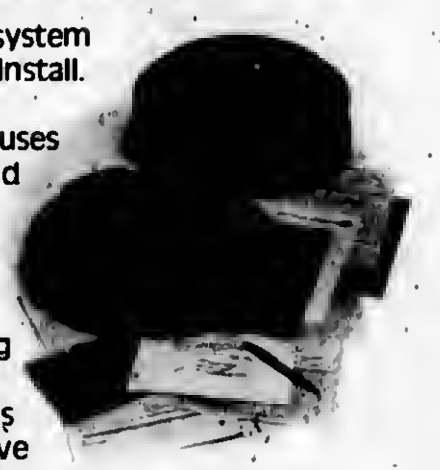

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Air Force Centralizes DP at Cape Canaveral

Special to CW

CAPE CANAVERAL, Fla. — By early summer, a single integrated computer complex will take over all scientific and business processing as well as the range safety computing functions at the Space and Missile Test Center's Eastern Test Range (Samtec/ETR).

Range safety computations and scientific data processing formerly were performed by eight computers, grouped in three separate configurations, each with its own noncompatible operating system.

The complex — designed around two Control Data Corp. Cyber 74s and one 6500 — will replace three IBM machines and five 3000 series CDC computers, according to Col. R.A. Gardner, director of technical operations for Samtec/ETR. A single operating system — a modification of CDC's standard NOS software — will replace the three separate systems used for preflight monitoring, real-time range safety data acquisition and postflight data reduction, Gardner indicated.

Richard F. Douglas, chief of data processing, and Maj. Frank DelPrete, the project officer responsible for implementing the complex, said the two Cyber 74s, along with a CDC 65125 mass storage subsystem — the Cyber-compatible version of CDC's 38500 IBM-compatible mass storage — will be acquired in September. The mass storage system will be located at the cape and connected via a 1.5M-bit data link to the CDC 6500 housed in the technical laboratory at Patrick Air Force Base, 30 miles away.

The CDC 6500 will be used mainly for program generation, debugging and data reduction and will serve as a remote job entry system to the 74s.

When the system is complete, according to DelPrete, the present 18 remote data entry terminals will have been increased to 30, located throughout the cape and the technical laboratory at Patrick.

"One requisite in designing the complex," DelPrete said, "was to use off-the-shelf-hardware, modifying the software if necessary, rather than the hardware. This will keep us flexible so that we can add or subtract equipment as our mission changes."

Supports Varied Missions

Samtec/ETR provices support the National Aeronautics and Space Administration (Nasa), the Air Force and the Navy, as well as an occasional launch for a friendly foreign government. Now that the manned space program is at an ebb, unmanned satellite launches using Delta, Atlas-Centaur and Agena boosters comprise most of the workload at Samtec.

Activity is increasing on the Trident program as the fleet ballistic missile system approaches the operational stage. Continuing test launches of the earlier Poseidon and Polaris submarine-launched missiles also occupy the center. Later, the space shuttle will be launched from the cape.

After launch, the tracking station at Patrick passes off control to downrange tracking ships and shore stations in the Grand Bahamas, Turk, Antigua or Ascension islands. This radar and telemetry data is fed in real time from the computers to the range safety officers, who must make go/no-go decisions based on the data displayed on four CRTs.

Updating the computer complex is the latest in a series of range modernization steps taken over the past several years. Completed in mid-1976, the range added on-axis tracking capabilities to most radars. This capability ties the radars directly to on-site computers so that they can predict 10 times each second the location of the object being tracked.

These four large CRTs show computed track and position in longitude, latitude and azimuth, with actual vehicle path superimposed. Variance is displayed numerically and graphically.

An outline of the terrain over which the vehicle will fly is also projected on the CRTs so the range officer can make an informed decision to destroy the vehicle if deviation from normal flight might bring it over populated areas or the craft's velocity is too low to inject it into orbit.

During ballistic missile tests, data fed into the computers from the downrange tracking radars is used to predict and display the impact point.

Meteorological information, such as wind speed and direction and lightning path prediction, along with other vital weather data, is processed in real-time by the Cyber 74s through a special interface. This real-time data is later transferred to the CDC 6500 at Patrick in batch mode for reformatting and archiving.

Orderly Transfer

Although production work is confined to five days a week, the central computer complex operates around the clock, with the weekends devoted to

(Continued on Page 43)

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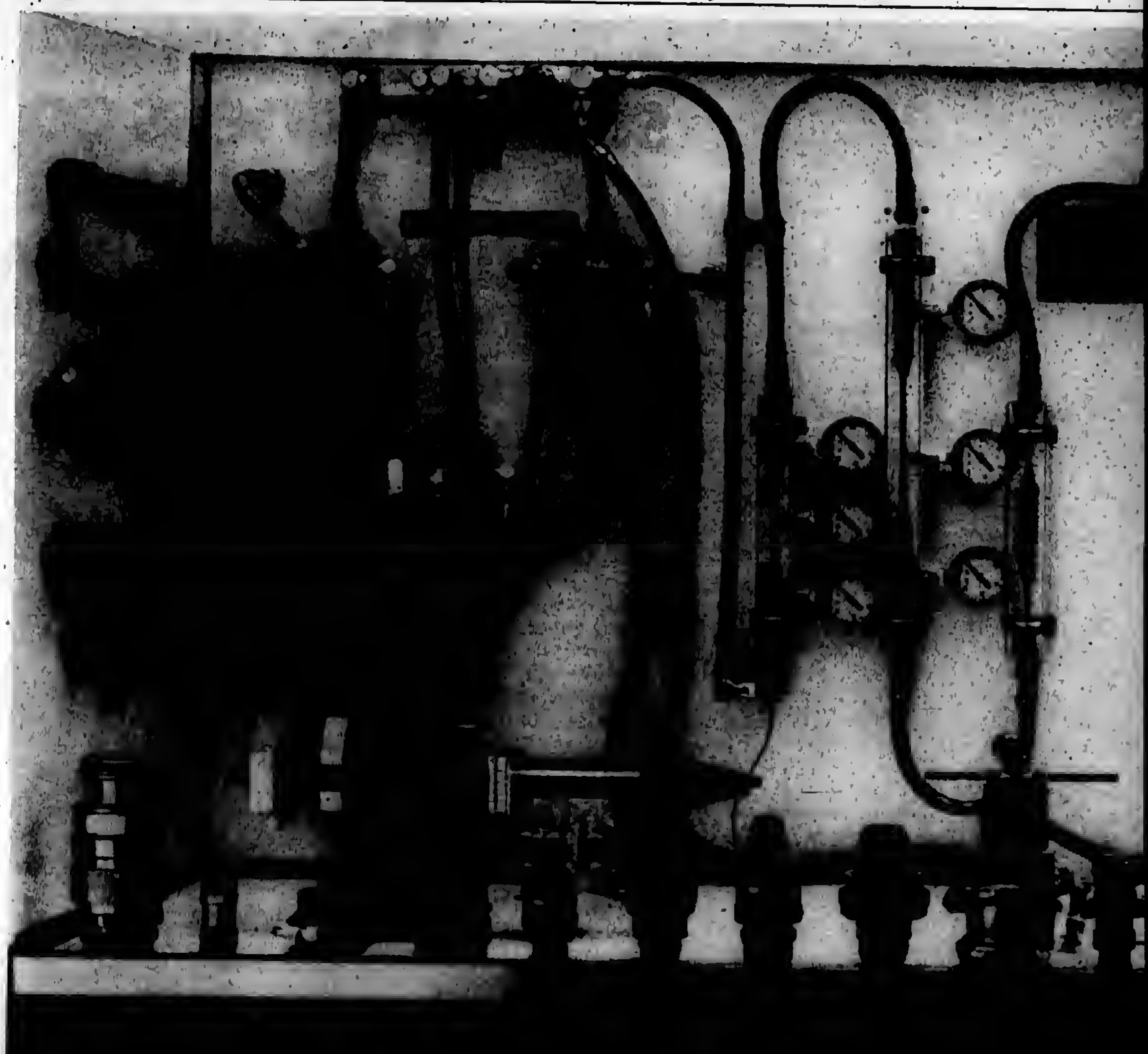

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High Schoolers to Represent U.S.

California Students to Compete in Jerusalem

LOS ANGELES — Three students from Santa Monica High School, Eric Enderton, Chris Pettus and Alex Melnick, have been named the U.S. winners in the International Youth Competition in Computer Science held May 5 at the University of Southern California here.

The students are now eligible to compete in the Aug. 9 International Finals in Jerusalem against teams from Israel and Great Britain for the world championship. The contest is part of the Third Jerusalem Conference on Information Technology being held Aug. 6-9.

Three U.S. data processing industry companies have contributed funds to make possible the participation of a U.S. high school team in the finals to match their knowledge of computer systems with those from other nations. U.S. sponsors of the competition are Automatic Data Processing, Inc., Dataproducts Corp., and Brandon Applied Systems, Inc.

Prizes for the winning teams in the International runoffs will be: first prize, $1,000; second prize, $600; and third prize, $200.

Invited Speakers

The theme of the Jerusalem conference will be "Computers, Communications and Technology Transfer." Invited speakers and their topics include Jean Sammet (the state of programming languages); George Glaser (electronic funds transfer system); Iann Barron (the future of computer technology); Uzia Galia (building computers in a developing country); and David Golden (technology transfer).

In the area of computer and communications technology, sessions will focus on "Fault-Tolerant Computing"; "Applications of Machine Descriptions"; "Hardware and Software Technologies for Developing Countries"; "Emerging Domestic and Regional Communications Satellite Systems"; "Advances in Data Communications"; and "The Future of Peripheral Devices and Network."

Besides the student competition, there will be a computer chess tournament, social events and professional tours to various Israeli university and industrial computer installations.

Those wishing to attend the conference as delegates can obtain program information by writing to JCIT3 Secretariat, Department of Computer Science, 4226 Ridge Lea Road, Amherst, N.Y. 14226.

Air Force Groups Test Range DP

(Continued from Page 42)

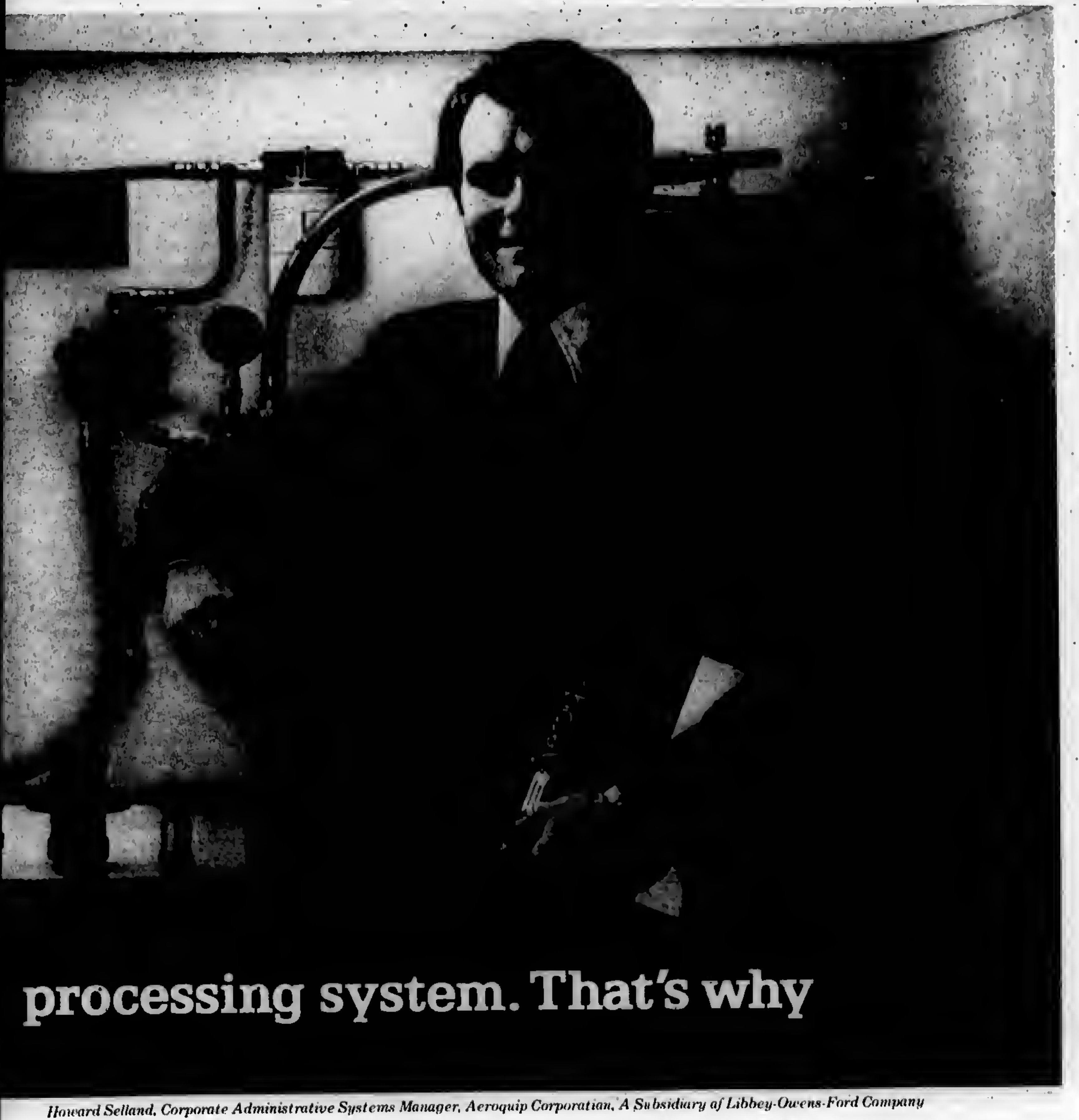
data reduction and data archiving. This requirement has made it mandatory that changeover to the latest computer system be accomplished with a minimum of downtime and that reliable operation from the moment of takeover be assured.

To assure no downtime in range operations, both the old and the new computer systems will operate in parallel for at least three successful launches, DelPrete said.

Range safety requires that telemetry data from the launch vehicle must be acted upon in real time and that no data be lost.

The two Cyber 74s are linked to a common 2M-byte extended core storage and a CDC 6683 satellite coupler that provides for automatic takeover should one processor go down. Both Cyber 74s will be processing the real-time data simultaneously so that if one machine fails, the backup will be able to continue the range safety displays.

By mid-December, the Air Force is scheduled to have a CDC 65125 mass storage system integrated into the computer complex. The CDC 65125 will provide on-line storage equivalent to 15,000 reels of magnetic tape, with most data accessible in less than 10 seconds.



Howard Selland, Corporate Administrative Systems Manager, Aeroquip Corporation, A Subsidiary of Libbey-Owens-Ford Company

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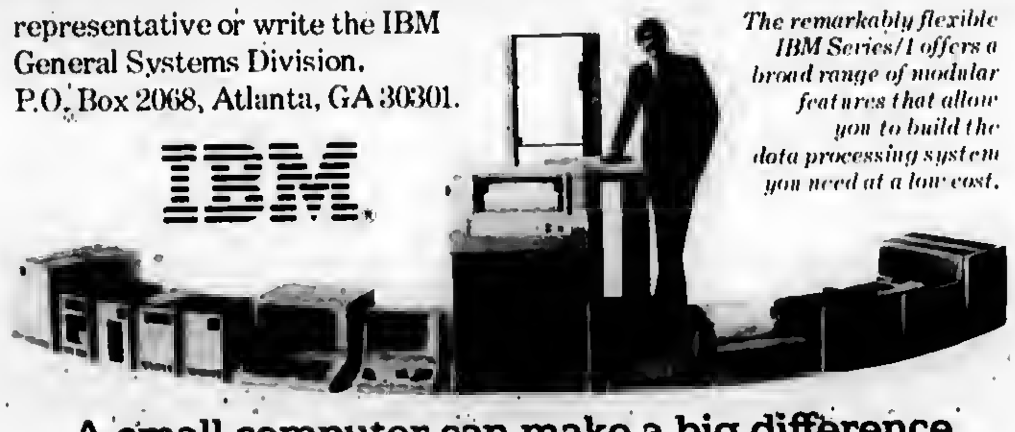

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System Gives Record Company Ear for Hits

NEW YORK — Within three days of the release of Stevie Wonder's recent album, "Songs in the Key of Life," Olympia Record Industries, Inc. knew it would be a hit and immediately geared up for a sales trend that was still going strong four months later.

There was no intuition or guesswork involved. A computer-based system that keeps close track of new release sales on a day-by-day basis provided the key information that told Olympia executives the industry had a hit on its hands.

The same system provides tight control over items in stock and supports efficient fulfillment of complex and lengthy customer orders, an Olympia spokesman said.

The system was tailored to Olympia's needs by the Business Systems Division of Automatic Data Processing, Inc. (ADP). In equipment, it involves one small, on-line terminal in Olympia's offices linked by a dedicated line to a 64K Microdata Corp. Reality minicomputer in ADP's regional data center in Clifton, N.J.

The problems which led Olympia to use this system resulted from the very nature of its operations. The distributor of hi-fi phonograph records, tapes and accessories was formed in 1954. With 1,000 customers, yearly volume is in the $5 million range.

The company employs 47 people, including eight salesmen. The warehouse is part of the headquarters facility, and an administrative staff of seven people works closely with warehousing personnel.

"We have to move swiftly to take advantage of the public's demand for hot items, but at the same time we must be sure we do not tie up capital in stock that will only have to be returned [to the manufacturer] if it doesn't sell," according to Ervin Litkei, president. "This puts a premium on the quick availability of current and accurate information."

Since Olympia's customers also return unsold items, returns from each of the company's 1,000 customers must be closely tracked.

"It costs us about $15 to process $100 worth of returns," Controller Betty Rodgers said. "A customer with a high rate of returns cuts into our profit. We also have to guard against any possibility that a customer might return merchandise purchased from another distributor."

A high percentage of Olympia's customer orders are termed "general" orders, where a department or chain store buyer is ordering centrally for 500 or more stores. The customer selects the items and quantities to be sent to each store. It's then up to Olympia to look up ship-to information and process shipments to each of the stores involved.

The typing and related paperwork for one general order had reached the point where several members of the office staff were tied up for a full week.

Determining whether a new release was likely to become a hit was almost entirely a matter of intuition. And if a key person in the office or warehouse was out for any reason, operations were impacted.

Move to On-Line

Olympia had been using ADP's batch services since 1970 to handle accounts receivable. In 1976 Rodgers, working closely with ADP systems analysts, developed a system calling for on-line data processing to support accounts receivable with quick accumulation of data on returns. The system also helped marketing and inventory control.

Stored in the data base at the ADP service center are complete details on each of Olympia's customers: names and addresses with ship-to information, current balance outstanding, returns and other pertinent business facts.

Also in storage is inventory data — a unique number for each item, the title of the song or album, artist or group name, manufacturer, shelf location indicating where the item is stored in the warehouse and a list price code. Close to 1,000 items are stored in the data base, which can be accessed only by authorized Olympia personnel using their distinct identification codes.

As new releases are issued, identifying information is entered on-line through the terminal keyboard. New release lists are printed on the same terminal and distributed to customers. As orders come in they are also entered through the terminal, with day-by-day information available to track sales.

Catalog Generated

Every other week a catalog is printed on the terminal that lists every item with its related information. Items no longer selling are dropped simply by entering the item number and the letter "D": This automatically deletes the item from the data base and generates a list so the items can be pulled physically from inventory and returned to the manufacturer.

The updated catalogs are distributed to customers, who write their orders on order sheets coordinated with the catalog data.

When a general order is received, the basic details are entered through the terminal. The system automatically "looks up" ship-to and related data. It also prints packing slips complete with each item's warehouse location.

As customer payments and returns come in, they, too, are entered through the terminal to instantly update the accounts receivable file. All related selling and payments information is in the central data base, accessible through the terminal.

Paperwork for general orders is now completed within two days, without impacting staff time, and data is swiftly retrieved on the terminal for any given customer to find current returns, dollar amount, current balance due and year-to-date invoicing with returns, Olympia said. Similar data is available for each individual stock item.

Since the system went into operation in August 1976, returns have dropped by about 12%, the company reported. And, with all the required ordering and order processing data in one catalog, order fulfillment efficiency has improved about 50%.

Warehouse picking efficiency has also been significantly improved, since the time location is clearly printed on all packing slips. New people become proficient much more quickly, according to the company.

As to overall office efficiency, Rodgers estimated the seven-person staff is now at least 25% more productive.

The cost of this service is $1,000 per month, including the terminal.

'This Thing Is Getting out of Hand — It's Contradicting Me.'

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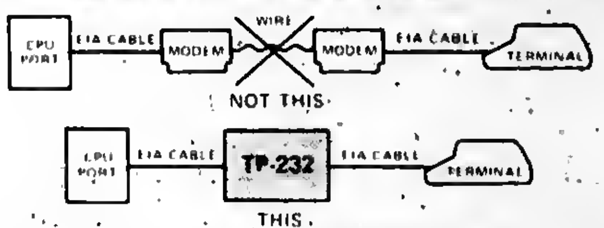

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With Vendor's Cooperation

Explorer Scouts Getting Taste of DP Careers

By Denise Petski
CW Staff

FRAMINGHAM, Mass. — Explorer Scouts here not only tie sturdy square knots, they are also writing code and getting a taste of life in various computer careers.

About 15 boys and girls between the ages of 14 and 20 meet once a week at Prime Computer Co.'s Industrial Park facility to listen to lectures on marketing, engineering and employee relations presented by Prime employees. The talks include information about the kind of educational background needed for each type of job.

After each session, the scouts use terminals linked to the firm's 500 engineering production system — a network of three systems and 60 terminals — to write programs and play games. The scouts use three languages: Fortran, Assembly and Basic, with Basic used most frequently, a spokesman indicated.

There are about 35 games available to the scouts via Prime's terminals including golf, "Adventure" and "Hangman."

Computer golf consists of an imaginary course of 18 holes complete with obstacles. The compter is programmed from hole to hole and the operator is given a hole distance and terrain specifications. The operator picks a club; the computer then swings it and tells the operator where the imaginary ball lands.

"Adventure" is a game that gives the operator few directions. The operator is taken on a jaunt through a cave with 141 rooms.

The computer gives the operator commands in English and tells the operator the route he is to take via compass directions. The computer then tells the operator what it sees, according to a Prime spokesman.

The object of the game is to find the buried treasures in the cave and return them to a specified place outside the cave. The average completion time of any game is eight to 10 hours.

Favorable Reaction

The reaction of the scouts to the project has been very favorable. Glen Campbell, 16, of Natick, said he had taken computer courses at school and was delighted with the idea of learning more about Basic and programming.

Bob Collins of Westboro High School was enjoying writing his own Fortran program, and a student from Hudson Catholic School, Ed Beuchemin, was so excited about the Explorer program he was considering a career in computers even though he has no prior computer experience.

The project was developed by Jim Ward, 21, a programmer at Prime and himself a former Explorer Post member at Honeywell Information Systems, Inc. Ward said his career decision was influenced by the program.

Law Enforcers Discuss DP Unit

GAITHERSBURG, Md. — The International Association of Chiefs of Police (IACP) is establishing a special interest Unit on Law Enforcement Data Processing.

At present, there is no unit within the IACP where views and concerns of the law enforcement DP community can be expressed. The unit will try to establish professional standards for the administration, management and operation of law enforcement DP.

The unit will also serve as a combined source of administrative, managerial and technical know-how to which law enforcement executives may direct questions of DP.

Its primary functions will be to provide an adequate organization and opportunity for members to conduct meetings, discussions, research and evaluations and transact any necessary business.

Membership in the unit will be open to all active, life and associate members of the association in good standing who are now or have been involved in the administration, management or operation of law enforcement DP.

Those interested in the unit should send their name, title, agency and address to Larry Goldman, IACP Headquarters, 11 Firstfield Road, Gaithersburg, Md. 20760.

ICCP Changes CCP, CDP Dates

CHICAGO — The Institute for Certification of Computer Professionals (ICCP) has announced changes in its examination schedule for the coming year to bring it more in line with traditional academic year.

The Certificate in Computer Programming (CCP) exam will be offered Dec. 9, 1978, and the Certificate in Data Processing (CDP) examination will be offered on May 5, 1979.

The institute also announced a scholarship award will replace the previous monetary award.

For information on the institute and its programs, a report is available from the group at 35 E. Wackr Drive, Chicago, Ill. 60601.

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the gypsy fortune teller,
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and JoJo the dog-faced boy,
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See the magic of the biggest systems advance since the 370—a brand new breakthrough computer by a computer company you've never heard of. To discover more about who's putting on this magic show, turn to page 159.

Editorial

IBM Playing Catch-Up

IBM's E series of computers is expected soon (see story on Page 1) and with it a whole new price/-performance ratio for the small and middle-size classification of computer users.

In the past, such announcements have sent the competitors scurrying for catch-up solutions to the new IBM products, but this time it appears the tables have turned and it is IBM that is playing a catch-up game.

This probably reflects a maturing of the industry to some degree and helps illustrate the overall vitality of the computer field today.

IBM has been slow to announce radical new price/performance machines for two reasons. First, it appears to be having internal problems between its General Systems Division and Data Processing Division deciding which will actually market machines in the small to medium-size market.

Second, and probably more important, the firm is leery of dramatic price/performance units because it is worried about the effect such systems wold have on its huge rental base of equipment.

In the past, this rental base has been a boon to IBM, generating revenues year after year, but now it may be more of a millstone.

While IBM has been worried about the effect of superior price/-performance computers on rental equipment installed at user sites, others in the industry have leapfrogged it in technology.

The competition has come from two directions: first, the direct plug-compatible CPU manufacturers and second, the minicomputer makers.

Both of these groups have been able to take advantage of the tremendous advances in semiconductor technology over the past few years to bring out computer systems that offer IBM users superior price and performance — all while IBM has been waiting for its installed rental base to age enough so that the firm could profitably displace it.

But now, faced with the new competition, IBM will have to react, and that reaction will probably begin a new wave of price cutting and technological improvements in the computer industry that will give users more and more "bang for the buck" over the next few years.

Ever since IBM reacted to the Amdahl Corp., Itel Corp. and Control Data Corp. plug-compatible replacements, users on the upper end of the computing spectrum have been able to get superior price/-performance machines from IBM as well as the independents.

It appears now that users of the smaller machine types finally will also be able to get the benefits of the recent technology advances from IBM as well as its competitors.

Data Past

Five Years Ago
June 6, 1973

LOS ANGELES — In 1972, Jerry Neal Schneider "clawed" his way into the Pacific Telephone and Telegraph Co. computer system to steal more than $1 million worth of electronic equipment and wound up serving 40 days of a 60-day sentence for grand theft. One year later, he became a systems consultant for EDP Security, Inc., a company he helped organize. Schneider explained that the best way to develop confidence in a system is to try and break it, and "we feel we can break into any system."

— — —

NEW YORK — The first National Computer Conference and Exposition opened here this week with attendance anticipated to exceed 30,000. Two hundred sixteen firms were expected to exhibit in 620 booths in the New York Coliseum.

Eight Years Ago
June 10, 1970

NEW YORK — Control Data Corp. extended the flexibility of the 6000 and 7000 "supercomputer" series with new versions of the 7600, a new 6200 system and the compatible software to facilitate user upgrading through both of the series.

— — —

LOS ANGELES — A computerized vote count stirred up a controversy in California that threatened the use of punch-card voting in state elections. Dr. Leonard Larks, head of the Democratic Party's Los Angeles Election Certification Board, expressed concern over five core dumps that occurred during the evening vote count for no apparent reason. Other complaints concerned the nondelivery of 40,000 sample ballots; a failure to mail, as promised, some notices advising citizens where to vote; a failure to enclose some candidates' literature; wrong addresses for polling places; wrong configurations in the sample ballots; and the mailing of one party's ballot to another party's member. All voting lists and mailings were handled by computer.

THE LOST LOVE FINDER TERMINAL
Q. AFTER ALL... THESE... YEARS I CAN'T BELIEVE IT. IS IT REALLY ♥YOU♥, PRISCILLA? MY LOVE, MY HEART OF HEARTS, MY TREASURE...
A. YES, MILES, BUT THE ONE I ADORE WON'T SPEAK FOR HIMSELF... CAN YOU TELL ME HOW TO GET IN TOUCH WITH ♥JOHN♥ !?
Computerworld

Letters to the Editor

Fear of the Unknown

Remember the future, Joseph Schengili ["Checklist Shows if APL Is Suitable Language," CW, May 8]. As the CPU vs. programming cost ratio progressively declines, APL becomes more attractive for implementing a system in any of your suitability categories.

Less code is needed in APL to do the same job than in another language, therefore expediting development and especially maintenance, which is required in ony system of long-range value. Also, intermediate results can be checked and errors corrected on the fly, and since there are less than 10 basic errors, a code book need never be consulted and then interpreted, all greatly reducing testing time.

The advantages to the programmer are obvious, and as his standpoint becomes more respected, the benefits accrue to the user. An admittedly simplistic questionnaire such as the "APL Checklist" can only serve to bolster fear of the unknown.

Michael Blum
Stamford, Conn.

Lecht's Ideas Off-Base

Charles P. Lecht must be an amazing man. He is oft quoted, heavily excerpted, readily transcripted; in short, an "authority." And, although I've never heard him, his speaking style must be very appealing.

At least, I hope so, because much of what he is quoted as saying at the Mid-Atlantic Computer Expo '78 [CW, May 22] is preposterous at best.

For example, "computers in the sky," far from being maintainable and enduring, would be cost-prohibitive because of the necessity for redundant circuits, expensive communications gear and the classical "power, weight, volume" limitations of satellites. Making repairs would be a neat trick.

The idea of a "natural, easy-to-use man-machine interface" has always seemed attainable. But unless the very real problems of artificial intelligence are solved first, the computer will continue to be picky and exacting — in short, hard to live with. Conversely, if artifical intelligence is solved, the need Lecht mentions for language skills will go right out the window along with the programmer.

His statements on management don't even rate consideration.

I guess if you say something crazy enough, people will believe you every time.

Alan P. Schlutsmeyer
Pasadena, Calif.

Different Type of Abacus

In answer to W.B. Adams' letter in the May 22 edition of *Computerworld* in which he references his "abacus," the device he described, four counters below and one counter above the bar, is a soroban. It is Japanese in origin and its beads (or counters) are slightly beveled or "pointed."

The Chinese abacus has five rounded beads below and two above the bar.

I have seem "impure" variants of both these calculating devices, but as to performing hexadecimal arithmetic, I prefer an electronic calculator. But then I use a power mower on my lawn, so it may just be laziness.

T. Eugene Gretsch
Minneapolis, Minn.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Reader Commentary

Red Tape Can Be Bonus If You Have Imagination

By Joseph T. Rigo
Special to CW

My friend, Bubbles McGuire, was in town recently to pick up a shipment of money. He invited me to go along on the ride to the cargo terminal at Kennedy Airport.

"The software business is great," he said, "especially if you're user-oriented."

Bubbles used to run a research laboratory in New Jersey. He had 150 computer scientists studying bubble memory. It was all financed by government grants, but the field became too crowded.

"There was just too much competition for the grant money," he explained, "so I decided to dump Bubbles and get into discrimination."

"Huh?" I asked cooperatively.

"Discrimination is the great new growth industry," he said. "The government is involved in a big way. That means a lot of paperwork, and nothing can be better for anyone trying to sell computer software. Discrimination is opening up a whole new world of computer applications."

"Is that why we're going to the airport, to pick up money from Washington?"

"No," he said. "This shipment is from our Fair seminars in Texas. We've been selling systems like they were free drinks at a Guide meeting."

Fair is Bubbles' personnel records system. Companies use it to prove they comply with the Equal Employment Opportunity act and other laws. It keeps track of each employee's race, religion, sex, country of origin and anything else that may be needed.

"The seminars are terrific," Bubbles said. "First, we have a guy come down from the equal rights agency in Washington. He tells our prospects about all of the records they're required to keep to provide they don't discriminate. The guy just tries to be friendly and helpful, and he scares the pants off them every time.

"Then we have a congressman talk about new legislation that's in the works. He tells them about the records they're going to have to keep in the future.

"We've actually had guys collapse after hearing that talk. Our salesmen complain that some of the people are shaking so much they can barely sign our contract."

We pulled up at the cargo terminal. Bubbles identified himself, and two men began loading a half dozen

(Continued on Page 48)

Reader Commentary

Computers, Bureaucracies Have a Lot in Common

By Dennis L. Miller
Special to CW

Legislators and top government officials are learning computers can cause nearly as many problems as they cure. Chief among those problems, is the self-perpetuating bureaucracy each DP installation creates.

Why have computers gained popularity in bureaucracies? The obvious explanation must be natural compatibility, symbiosis — a fulfilling of mutual needs.

Computers have characteristics which serve to compliment those commonly attributed to bureaucracies. Many facets of computing emulate bureaucratic methods. For example, the following are presented as the most obvious similarities and symbiotic relationships between bureaucracies and computers:

- The central processor of a computer system is a manager. Some persons attribute the real management process to software programming within the central processor. Others are naive enough to suggest that the real manager is the computer operations supervisor.

Anyone who has worked in a computer center knows that when the CPU hiccups, everybody jumps. Even the computer supervisor jumps.

If the slightest thing goes awry in the central processor's domain, all other activities stop until that problem is fixed. The CPU runs the computer center in every sense of the word.

- The central processor is too busy to get involved in details. It delegates major tasks to peripheral devices (called "controllers").

It never reads a punched card; that task is too demeaning. Frequently the central processor remains idle while the task of reading a card is delegated to a subordinate controller device which in turn delegates the task to a card reader device.

- The input and output of a bureaucracy is analogous to that of a computer: frequently unrelated.
- The processes a computer undertakes are closely controlled by a set of procedures called a "program." The computer does nothing unless it is in the procedures. It is very much like a bureaucracy which is run by a procedures manual.

When presented with a problem, the typical bureaucrat's response is, "I can't help you, that is not my responsibility."

- The computer center has a stock

(Continued on Page 56)

The Taylor Report

Sears Rip-Off Deflates Post-Christmas Savings

By Alan Taylor
Special to CW

Annual sales in January help smooth over the peak effect of Christmas shopping. It is traditional for department stores like Sears to have these big sales. However, from the billing programs that are used in February and March, it looks as though some of the supposed savings to consumers are fictitious.

The output of the billing program sent to reader Dolan appears on Page 56. Statements for three consecutive months are shown. In the Feb. 6 statement, a minimum payment of $10 was demanded within 30 days of Feb. 6th, and the full amount due was shown as $26.42.

The March 6 statement said "The amount due shown above includes a past due amount. You should send entire amount now . . ."

Technically, this is wrong. There is no "amount due shown *above*" at all! What Sears seems to be referring to is an amount shown below as being the "previous balance."

"Entire installment payment now" appears to refer to the $10 of the minimum payment on the Feb. 6 billing. However, to find the explanation even in the February statement, you have to read the fine print — "If you prefer to pay in installments . . ."

Nowhere on the March bill is there any statement as to what this "entire installment" is, so the consumer is left totally up in the air.

Real Problem Crops Up

While these are technically and professionally poor practices from a DP point of view, the real problem was not made obvious until the April invoice came out on April 11, dated April 6. This showed that a payment of $26.42 was credited on March 8.

Now, $26.42 was the exact amount that was the "new balance" on the Feb. 6 payment. And the February statement said "To avoid a finance charge next month, pay this amount within 30 days of billing date."

I don't believe that Sears can't count to 30 and I certainly know Dolan can. Thirty days after the billing date, on March 8, he paid in full.

So there is absolutely no question that the statement about the "past due amount" put in on a billing date on March 6, publication date March 11, was false. There is also no question that the "finance charge" computed on an average daily balance of $26.42 was also false. It is important to consider how this happened.

The Sears program should include a method of counting to 30 days

(Continued on Page 56)

Reader Commentary

In Defense of Carrie: Early Trauma to Blame

By J. Rex Theobald
Special to CW

In a recent article, one of my colleagues attacked End-Around Carrie, an old friend of mine, with all the venom of an adder [CW, May 1]. All that he said was true but, like most platters, the story has two sides. I think it's only fair to give equal time to Carrie's side.

I first met Carrie on a 24-bit bus. She was trying to get to her first class at programming school. Being new in town, she had purchased a memory map at the news stand and tried to locate the school. What she didn't realize was that the school had been rolled out to the drum and was not to be found readily.

The bus driver had straightened her out on that and she now had the correct address, but she still couldn't find the school. It was in this state that I found her deadlocked on the bus.

I was finally able to get her to school by providing her with the correct base register, but by that time her seek had timed out — the class was over.

At that time I came to know Carrie as an honest young lady. She had not yet strayed from the critical path. It was while she was in school that the change came.

Carrie got tired of the long bus ride (she had to go the long way around, past all the I/O ports). She couldn't afford a car, so she went to the bicyle shop and bought a superlightweight Turing machine.

Even before it was unpacked, poor Carrie knew she was in trouble. The instructions were written in Backus-Naur Form. Further investigation revealed that the reason the bicycle was so light was that it had virtual wheels.

Unfortunately, Carrie couldn't return the machine because she only had a handshake interface with the vendor and she had no receipt.

It was in a moment of wrath that night that Carrie began her criminal career and incurred the cycle-stealing charge pressed by my colleague. To defend her against the charge, she hired a lawyer held in high esteem by the local bar association. Unfortunately, in his defense he violated the bar code and the charge stuck. Carrie's morals went downhill from there.

Check a Bit Short

Carrie got a job with the Customer Support Division of Burroughs Corp., where she felt right at home. It turned out, though, that her Boss was more unscrupulous than she was. When she presented her pay-

(Continued on Page 48)

Early Trauma Proved Carrie's Undoing

(Continued from Poge 47)

check at the memory bank, there wasn't enough cache to cover it.

She was so upset about it that when she got to work the next morning, she was too-late-to-pocket-select her time card. It was then that she reached her breakpoint and told her Boss that his whole batch was out of balance.

She later repented and tried to get her job back (it had abnormally terminated as a result of her outburst). She decided to break into the data center and alter the personnel records, but when she tried to cut through the Hasp on the computer room door, she found that her file had been corrupted. She never did recover her job.

I would not try to pass this as an argument that Carrie is not to blame for her actions, and only a Maniac would believe that people like Carrie should not alarm the DP community. But we must consider that her transgressions are a result of Carrie's backplane.

The incident with the dishonest bicycle dealer made a benchmark upon Carrie's character which was refreshed by her dealings with the computer vendor and by enough other disappointments to overflow your stack.

What else can we expect from someone with Carrie's backplane? Garbage in, garbage out.

The current state of the industry does very little to help people like Carrie. First, they are difficult to detect. Their fraudulent code is so cleverly written that it must often be inspected with a Micrscope to determine that anything is amiss.

Second, even if captured, the business involved is often so concerned about publicity that it merely hashes the offending code and sends the culprit off.

Finally, even if the offender is imprisoned, the binding time is so short that the misdirected programmer has soon looped back into his old routine.

It was to solve these problems that Restart (Rehabilitative Education for Second-Time-Around Rabblerousers and Troublemakers) was founded.

This group has been compiled with the specific purpose of fetching even the worst-case offenders and interrupting the awful loop of error, rollback, retry, error, rollback, retry, etc. It is Restart's goal to assemhle all of the nation's toughest DP criminals.

Any contributions you make will be used to supply them with enough income to keep them off the terminals and out of the computer rooms of our land.

Contributions may be sent to: Restart, Port 7 Channel 2, Key Word, Fla. Please send only cash.

Remember, when vigilance won't help, bribery will.

Red Tape Can Bring Windfall

(Continued from Poge 47)

crates of money into the back of our pickup truck.

"Couldn't you just have the Dallas office send you a check?" I asked.

"Oh, this is great for staff morale," Bubbles answered. "We let them watch us unloading these crates. It does wonders for productivity. So far, we've been able to drop the company bowling league, the annual picnic and three paid holidays. After our people see these crates come in, they just work like little beavers for weeks and weeks."

Buhbles tipped the two men $100 each, and we headed back into Manhattan.

"The big thing now," Bubbles resumed, "is to come out with a line of minicomputers to run the new software we're developing."

"New software? What can you do that isn't already being done?" I asked.

"That's the nice thing about discrimination," he said. "The law doesn't say what it is. The law just says you can't do it.

"There is a commission to investigate complaints. And the nice thing about a commission is that it moves with the times. A few years ago, companies had to prove that they didn't discriminate hecause of race. These days it's sex. You have to be able to prove that you hire and promote women."

"What's next?" I asked.

"My guess is gay rights," he said. "It seems to be the strongest new movement, and it looks like it's building. I bet that it's only three or four years before every company has to prove that it doesn't discriminate because of sexual preference."

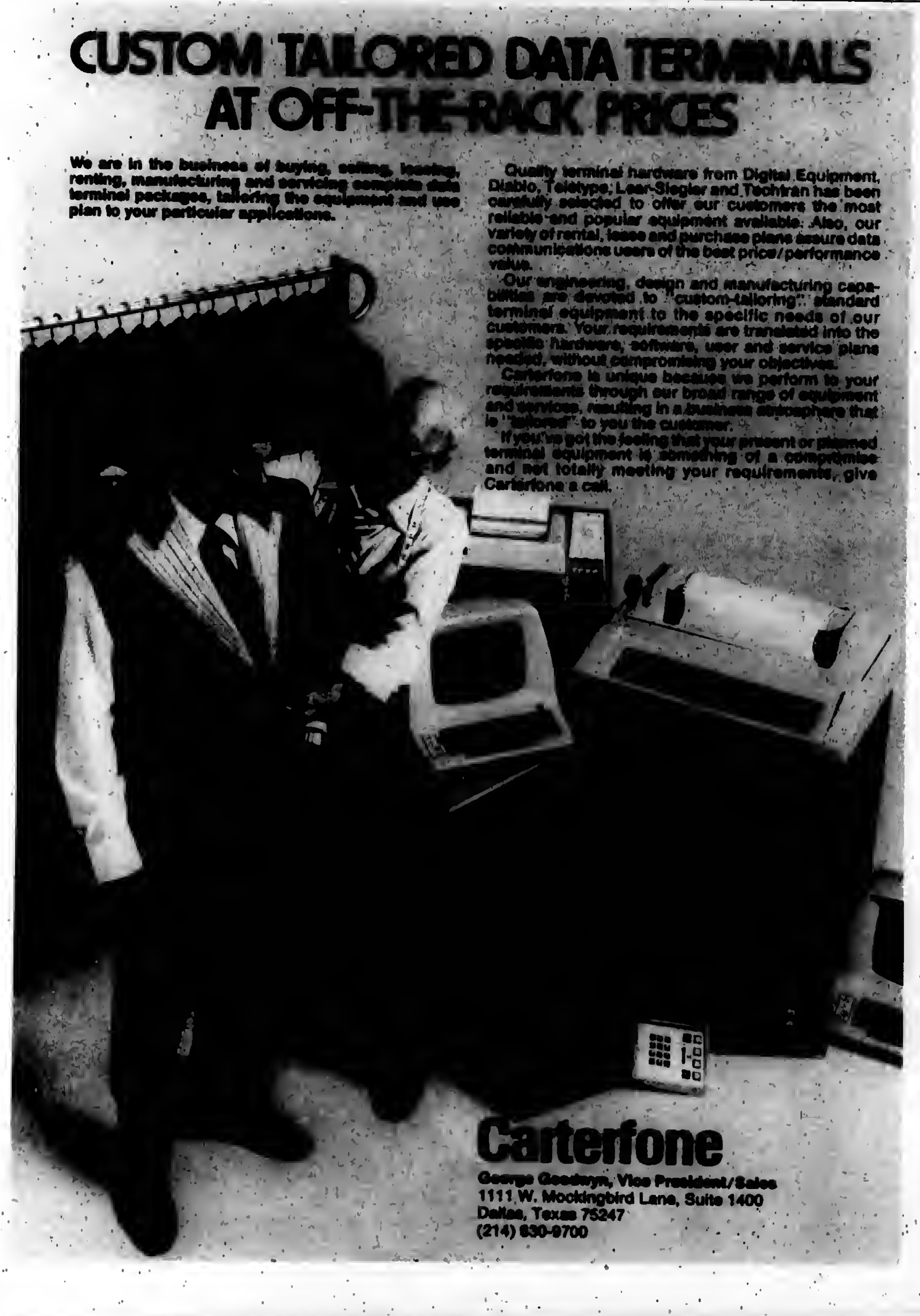
"Well, maybe," I said. "But so what? That's just one more hyte in the employee record."

"No way!" Bubbles thundered. "Not with our government! Our new system will allow for 9,999 variations in preference, and we're thinking of making it even bigger."

"It's crazy," I thought, but I didn't say so. It's hard to be skeptical when you're riding in a pickup carrying six crates of money.

"Bubbles," I asked, "Can you tell me a little bit more about why 9,999 may not big enough?"

Rigo is president of Sysdoc, Inc. in New York City.



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Reader Commentary

Towner on Wrong Track

One DBMS Standard Not Enough for Users

By Dr. Ronald G. Parsons
Special to CW

Larry Towner has once again missed the point on the need for data base management system (DBMS) standards. In his article entitled "Multiple DBMS Standards a Ludicrous Idea" [CW, May 15], he claimed Eugene Lowenthal [CW, March 20] advocated a different standard for each DBMS vendor.

Instead, Lowenthal argued for multiple standards appropriate for different classes of users.

The DBMS facilities of an organization must satisfy the information-processing needs across a broad spectrum of users. These users range from the individual completely unfamiliar with DP to the sophisticated computer programmer.

Today, the programmer, because there are too few of them, is often a bottleneck in getting timely information to the end user. Allowing the end user direct access to his information can free the programmer to perform tasks which need his special attention.

Therefore, there is a clearly defined need for a family of DBMS standards, not a single standard.

Advantages of Standards

The fact that there are clear benefits to having standards is well understood. Standards aid the procurement process by improving the ability to evaluate competitive products and by providing a larger vendor choice and increasing competition among the vendors.

The ability to share programs and data among different agencies is improved. The number of people trained in the use of a product is greatly increased. Data and program conversion feasibility and cost is eased.

Standards arise is several ways. The recognized standards-making bodies, by necessity, evolve standards in a painstaking, slow and deliberate manner. One result of this is that standards often lag behind the state of the art.

It is possible for the presence of a standard to retard the pace of the development or acceptance of new products. Many new programming languages have been developed with obvious advantages over Cobol, yet Cobol remains the premiere language in terms of use.

Standards also get created as a result of popularity and widespread use of the products or by policy decisions on the part of user agencies.

Single Standard Problems

A single standard in the DBMS area could very well prove to be too restrictive to satisfy the large variety of needs of the using groups. It is altogether possible some group might be required to forego benefiting from a DBMS if its peculiar needs were not satisfied by a single standard.

The various components of a DBMS will require separate standards to satisfy diverse needs. A data element description language could probably be defined by a single standard to describe the characteristics of individual data items.

Different data structures, however, have unique characteristics that require separate languages to define them. A language suitable for networks is totally unsuitable for describing relations. Many different languages, and therefore standards, are necessary to describe the data manipulation requirements of pro-

(Continued on Page 54)

TWO FOR THE ROAD

TI's Portable 745 and 765 Terminals.

Our *Silent 700** Portable Data Terminals make excellent traveling companions. They don't take up much room — they'll fit under your airline seat. They're light on their feet — the 745 weighs 13 pounds; the 765, 17 pounds. They know how to keep quiet — they're virtually silent when you're entering, printing and transmitting data on their typewriter-like ASCII keyboards. And while you're out of the office, they can put your office and all your data at your fingertips by printing hard copies of crucial information at 30 characters-per-second, using a built-in acoustic coupler.

The 745 is the lower cost, lighter version, without bubble memory for applications that do not require off-line data entry. It's also available with optional full ASCII/APL keyboard. Like the 765, its microprocessor-based control assures reliability and high-performance capabilities.

The 765 Portable Memory Terminal incorporates nonvolatile bubble memory which retains data, even with the power source off. The 765 can spend all day taking sales orders, real estate listings, insurance information, newspaper stories, or performing any data entry function. Or, following through on time-sharing applications.

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DP and the Invincibility of Incumbents

Reader Commentary

By Arthur A. Bushkin
Special to CW

The year is 1982 and the upcoming elections are becoming a topic of discussion. The last snows of March are melting, but you are not yet well enough to greet the spring.

Late last month, while returning home from the grocery, you slipped and fell on the ice. The results: a broken leg and a letter four days later from your congressman expressing his concern. He promises to do all he can to assist you.

Now, a month later, you receive a second letter from your congressman telling you he has just learned you qualify for additional medical coverage under the Uniform Health Care Act of 1979. His research has shown you broke the same leg while serving in Vietnam in 1967, and there is a special provision in the health care law that makes you eligible for extended benefits.

You, of course, are delighted by this news, and you silently vow to vote for this man in the coming elections. Curiously enough, only three incumbents are defeated that fall.

Not Far-Fetched

The point of this little story is that it is not at all far-fetched. Unless we begin to address some very serious questions in the near future, it is entirely conceivable that the power of the incumbency in our representative democracy will grow to the point of invincibility.

This will occur regardless of the nature of the campaign financing legislation which the Congress will enact. It will happen even if we are blessed with 535 supremely honest people who attempt to campaign in the most fair and open way possible.

The next decade will witness such advances in information and communications technology, and this technology will become so inexpensive that we will be in danger of having the concept of a fair election rendered meaningless.

This prediction, unlike most political prophecies, actually grows out of the integrity and not the evil of the incumbent. The use of advanced technologies will enable an officeholder to do such a significantly better job of representing and servicing the needs of his constituents that the electorate will be presented with less and less of a rational choice in an election.

Challengers will be forced to use imagery or demagoguery, or to exploit factors not directly related to their particular campaigns, just to attract the voters' attention.

The concept of a fair election as first envisioned by our Founding Fathers is extremely fragile; it can be seriously eroded by the advance of technology, no matter how well intentioned the use of that technology may be. There will always be a large block of voters who will see the personal treatment represented by a letter from their congressman as reason enough to vote for him in a future election.

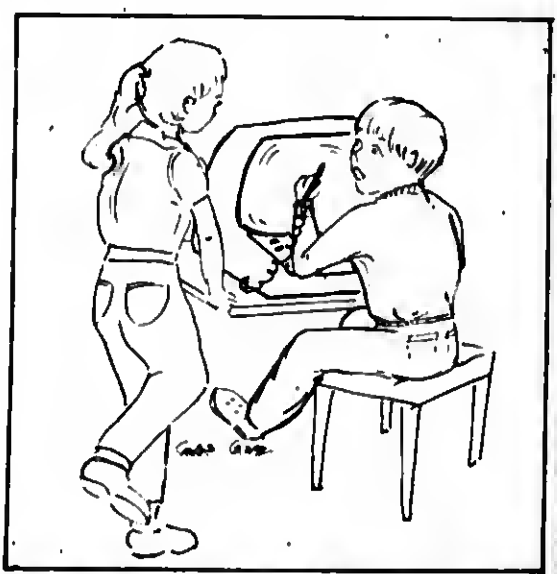
The danger is that the voter who wishes to make an intelligent choice will have less and less of a basis for doing so; future elections may be decided upon the basis of constituent services rather than legislative substance.

Reasonable Technology

In the vignette presented above, the letters would have been prepared by a desktop computer in the congressman's office. Such a computer will soon cost no more than an electric typewriter does now.

It is also quite likely that a future congressman's staff will automatically develop a data base on each of his constituents. This is essentially feasible right now; much of the pertinent information is readily available in the public record. The shrinking cost of technology will only make this practice more practical.

Also, unless the appropriate safeguards are undertaken — and this is surely not a foregone conclusion — the computer in a congressman's office will be able to call other computers, via a standard telephone connection, for the purpose of querying their data bases so as to augment its own files on each constituent. This, too, is technologically feasible today.



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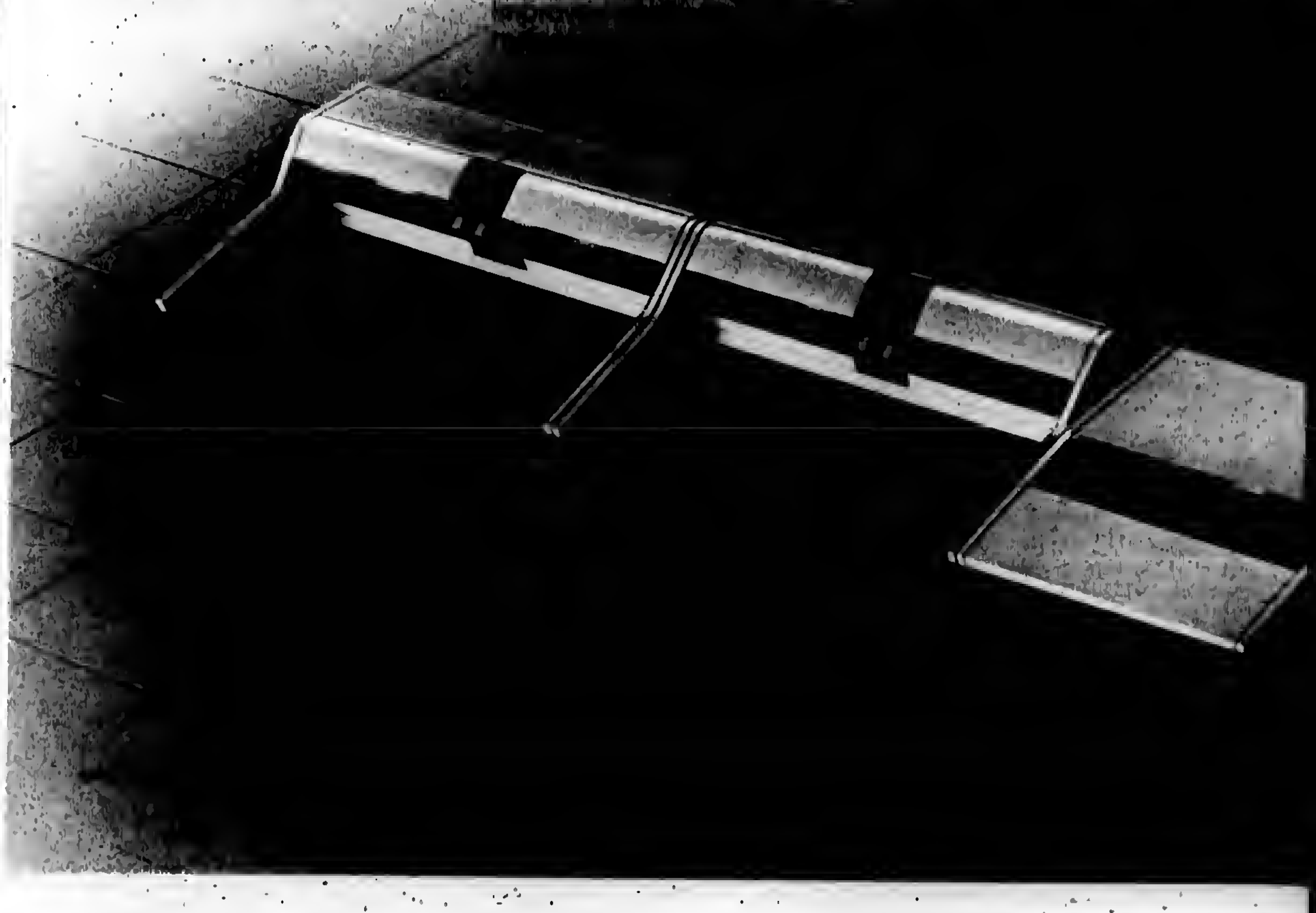

A Prediction That Has Become Truth?

The natural reaction to this type of prediction is to view it as an invasion of personal privacy and to demand that the appropriate precautions be taken. But the issue of personal privacy notwithstanding, it is important to recognize that at least part of this trend is not the embodiment of some technological evil, but rather is actually quite reasonable.

Only its portents for the future of representative democracy need concern us, provided of course that the appropriate privacy safeguards are employed.

Example for Today

Using an example which is applicable today, a congressman can already send machine-produced letters to members of his constituency who are interested in any particular issue, perhaps telling them of his latest action in the area. The congressman already has the franking privilege, and it is certainly easy to accummulate lists of members of a constituency interesting in any way to him because they sign petitions and advertisements, they join local issue groups and so on.

Even today, it is a poorly organized incumbent who does not seek to identify preference groups of voters as he seeks reelection. Furthermore, all of this information can be correlated with the past election history and the census data for each precinct within a district.

The emergence of the computer in the last decade did not make all this possible; the computer just made it more practical. In the next decade, technology will simply become more advanced and less expensive, and its impact on the electoral process will be far greater than we might imagine.

Buskin, director of information program ot the newly formed National Telecommunications and Information Administration, wrote this article in 1974; it was printed in the Congressional Record *in May of that year. According to the author, it was penned originally as a technology forecast that hos turned out to be valid.*

It is easy, though, as one lays blame on the computer, to miss the larger implications of advancing technology. The use of an in-office computer to accumulate publicly available data on a congressman's constituency, done properly and with a respect for personal privacy, is a legitimate function of representation. The more an officeholder knows about his constituents, the better the job he will do.

The campaign reform issue is that the better the job he does, the more difficult he is to defeat, particularly if he has access to advanced technological aids.

Equality for Challengers

Performance in office cannot be limited, however, the way campaign contribution or campaign spending can. Therefore, unless a challenger is provided with compensatory, if not comaprable, access to information and communications technology, he will not possibly be able to make a credible challenge.

In the example above, the issue is whether data bases which have legitimately accrued as a function of representation should not also be made available in some fashion to bona fide challengers prior to an election. After all, is this not public data collected with public funds?

The basic spirit of most campaign reform legislation is a fundamental equalizing of the opportunity to seek public office. This is to be accomplished through a proposed equalizing of services, paid for by public funds or as a result of a limit placed on campaign contributions or spending, or both.

The Real Dilemma

The issue that we have yet to address is an equalizing of capabilities. The dilemma is that some of an incumbent's increased capabilities derive not from sources which can be regulated, but from the impact of advanced technology on the incumbent's performance of his constitutionally mandated responsibility of representation.

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'I Can't Remember What Computer Memory Is Called 'Cause my Core Just Ran Out . . . '

Reader Commentary

Needs 'Constructive Criticism'

APL Suitability Checklist Could Be Better

By George F. Weiss
Special to CW

Since I use the APL programming language extensively and exclusively, I take special notice of any mention of APL in the news. Often I am disappointed with the quality of the articles discussing APL. Such was the case when I read about the APL suitabilty checklist in the May 8 issue of *Computerworld*: I believe Joseph Schengili is on the right track and has a good idea. His idea, however, was not thoroughly thought out and needed much work before it was ready to publish.

One particular gripe about his suitability questionnaire is that although he weights the answers to each question, he does not weight the questions. Certainly the answers to some of the questions would carry greater impact than others.

A second gripe is the lack of interaction between questions. For instance, the CPU load (question 8) may not be important, if the run frequency (question 3) is low.

In addition, Schengili has entirely left out some questions that ought to be asked. For instance, is the application to be run in-house or on an outside time-sharing service? What is the application?

Some applications are inherently well-suited to APL. One such application is financial planning, which requires the manipulation of time series and the consolidation and printing of spread sheets. APL's 60 or so operators "operate" on vectors and matrices as well as single numbers, making program loops virtually unnecessary. A time series is nothing more than a vector and a spread sheet is nothing more than a matrix.

Schengili has succeeded in compiling a list of some questions that should be asked when considering APL for an application. However, the list is not exhaustive and his means of quantifying the answers is poor.

I like Schengili's idea but feel it needs improvement.

Weiss is with Weiss Associates, systems planning consultants, in Danbury, Conn.

Letters to the Editor

Missing Letter Changed Meaning

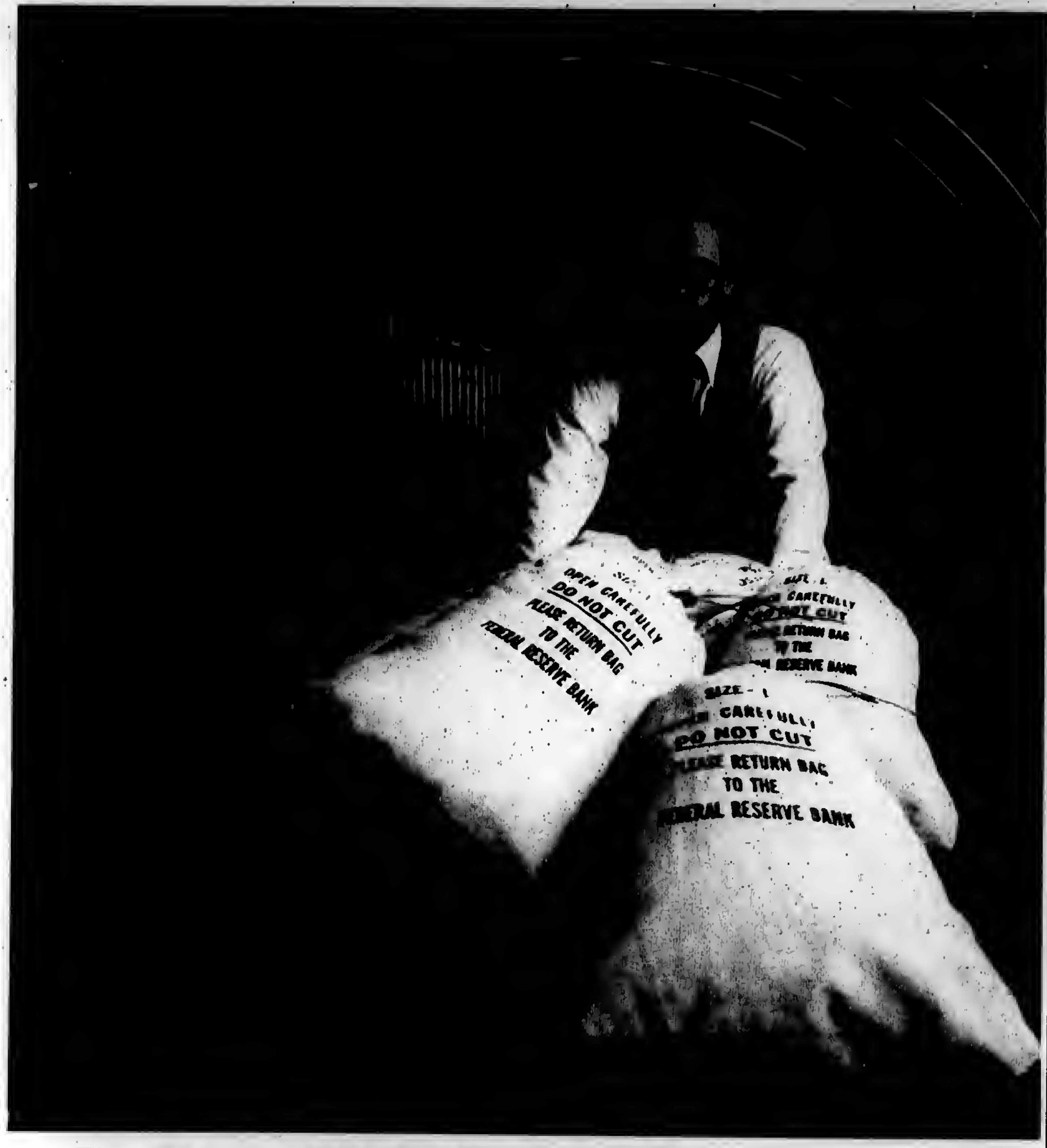
Having been away from the office for the past month, I have just seen the April 10 issue of *Computerworld* containing my article on the potential impact of the IBM 5110 on distributed data processing ["IBM 5110 to Enhance Distributed Data Bases?"].

Let me correct one typographical error which, unfortunately, makes sense as printed but is the opposite of what I wrote in my manuscript. Following my citing effortless transfer of an IBM APL program to a Digital Equipment Corp. system, the next-to-last paragraph in the printed article started off: "This is not typical of APL . . . "

I wrote: "This is not otypical of APL . . . "

One of the virtues of APL is that it is inherently a compatible and transportable language. It is not uncommon for a function written for one system to be executable on another with no or minimal changes.

Brooke Tompkins
Think, Inc.
New York, N.Y.



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Letters to the Editor

Inaccuracies Noted In Article on Iran

One of the difficulties of working in a foreign country such as Iran is keeping informed as to the latest hardware devices and software techniques available in the U.S. Fortunately, publications such as yours are available to help fill the information gap. Most of your articles are well written, informative and accurate. However, we'd like to call your attention to one that isn't.

In the April 24 edition, *Computerworld* ran an article by Thomas Jaycox entitled "Right-Left Language Scanned 'by Number.' " At best, Jaycox is grossly uninformed.

We are currently employed as consultants to the Plan and Budget Organization of Iran. In this capacity, we and our Iranian coworkers are directly involved in reviewing and studying many computer system development projects funded by the government, such as Jaycox's. Therefore we are in a position to spot the many fallacies in his article.

However, since there are too many errors and inaccuracies for us to mention them all, we will confine ourselves to the most glaring.

First, we have no problem at all with preparing computerized systems in the national language, Farsi, even though it does read right to left, as Jaycox stated. The vast majority of computer hardware vendors in Iran have Farsi printers and CRTs available. We're surprised by Jaycox's statement that the latter "right now are still in the text and checking stages." We have been using several hundred Farsi CRTs with our on-line systems for more than four years. This includes the IBM 3270 line.

As for data entry in Farsi, there are numerous vendors and devices available. We use not only the standard IBM Farsi keypunch, but also a Control Data Corp. 970-2 with Farsi data entry terminals.

Finally, Jaycox was dead wrong when he said such things as there are "less than 100 computer installations" or that "most systems developed in Iran . . . process English data only . . ." In both cases, the opposite is true.

Perhaps Jaycox is limited by the type of hardware and software available to him, but to publish these limitations as generalizations for the whole country of Iran is not only misleading to those who may wish to do business here, but an injustice to the host country as well.

Jack A. Beyer
Mark H. Wallace
Teheran, Iran

About Bill-Paying System

"Pay-by-Phone Service To Cover Two-State Area" [CW, May 8] credited the southern Ohio and northern Kentucky "Pay-by-Phone system" which will be implemented in July with being the "first multiple savings and loan system in the country."

I would like to point out that a shared bill-paying system, developed by TMS Corp. of Lincoln, Neb., was launched in November 1977 under the Money Service name. The service is currently shared by First Federal Lincoln, Nebraska State Savings, Equitable Savings, Falls City Federal Savings, The Martell State Bank, Citizens State Bank and Offutt Federal Credit Union. The Money Service bill-paying system is the first of its kind to employ a statewide merchant and branch network in addition to telephone bill paying.

The telephone portion of the Nebraska bill-paying system is built around voice-activated recording equipment which records and stores all telephone bill payments. Such equipment allows 24-hour bill-paying services to be offered.

The article further stated that "the system [Pay-by-Phone] differs from other telephone banking services in that a Pay-by-Phone customer is not restricted to using a Touch-Tone phone." Although many telephone bill-paying systems offer the option of directly transmitting information into the computer via Touch-Tone phones, very few systems are "restricted" to using a Touch-Tone phone. The Nebraska system for example, uses the voice-activated recorder to compensate for the relatively low percentage of Touch-Tone phones in the market area.

TMS Corp. has packaged this bill-paying system and is currently marketing it nationwide.

Kelly Coffey
Advertising/-
Marketing Department
TMS Corp.
Lincoln, Neb.

Tired Stowaway Text

Reference "GM Program Rates Level of Text Difficulty" [CW, May 1]. How much text does it take to describe the benefits of stowing a deflated tire? The first example had 36 words and the second example had 22 words. I would like to offer the following statement. "Stowaway spares are stored deflated. This allows more storage space."

Note the flat statement, "Stowaway spares are stored deflated". This assumes one has a car or vehicle in which to stow the spare tire. Then, for those who don't realize that the deflated tire is going to be smaller, I have added the second statement, "This allows more storage space."

Roger Anderson
St. Paul, Minn.

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One DBMS Standard Insufficient for Users

(Continued from Poge 49)

grammers and end users on the various data structures.

If a particular data model is implied by a DBMS standard, the required or preferred use of a different data model may be precluded. For these reasons, if not for many others, multiple standards will be required.

Even within a single data model, unique end-user and application requirements call for multiple-language facilities for the same DBMS..

Codasyl Specifications

The specifications for DBMS languages for data definition and data manipulation developed by the Codasyl task force and its successors have heen considered by standards bodies for a number of years. The specifications were defined in the 1969-1970 time period and have received only minor revisions since then.

The entire thrust of the creators of the specifications was to produce a data structure and access language for programmers. No language specifications for users of the data were provided.

This was a conscious decision of the task group. It has become clear since that time that direct end-user access to the data is extremely important.

Major objections to the adoption of the Dodasyl specifications as standards have been voiced. An American National Standards Institute (Ansi) study group looking at the data manipulation language (DML) agreed changes to the specifications wero essential, but the group was so divided on what and how much change was required that it went so far as to recommend that a major turnover in the membership of the study group take place.

Indeed, the entire history of the Codasyl data base task force specifications has been one in which emotional and proprietary interests have often overshadowed the technical and economic aspects of the case.

Pride of authorship has, unfortunately, closed minds and formed factions. What may have started out as an earnest attempt to seek the best way to deal with data bases has evolved into a struggle between vested interests.

There are people today who prefer not to confront the serious shortcomings of the Codasyl approach as an accomplished fact with no further need for justification.

Acceptance of an idea is often a snowball-turned-avalanche since, as more people embrace an idea, it becomes easier to justify further acceptance on the basis of widespread popularity. At some point, the snowball begins to roll fast enough to no longer require the impetus of technical justification. The often-misspoken phrase, "Codasyl standard" rather than "specification," illustrates this situation.

There will always be the argument for standardization, just as there will always be the desire to wait for the next generation. Data base management is now emerging as a proper discipline of computer science rather than an ad hoc craft.

Systems are being proposed which are based on cohesive theoretical foundations. The relational systems now being explored have as a basis the mathematical theory of the relational calculus.

Having such a foundation gives strong and useful guidance to the designer and implementors of systems so that their end product is logically sound. Similarly, MRI System Corp.'s System 2000's selection mechanism (the "where" clause) rests on sound mathematical theory. The Codasyl specifications have no such basis.

Low-Level DML

It has been argued that the Cobol DML of Codasyl was intentionally designed as a very low-level language and, because it is functionally complete, any generalized higher level function could be built up by writing subroutines or macros which use the low-level elements. There is a problem with this mode of thinking.

These combinations of low-level commands are dependent on having the proper supporting data structures included in the schema and the subschemata. For example, SETs may be defined which carry no information but only govern retrieval order, or LOCATION modes may not bo defined, prohibiting the use of certain FIND command formats.

In other words, the DML syntax and semantics of a given program are dependent on structures defined at schema generation time. In doing so, a large measure of data independence has been lost.

It is entirely too probable that the data base administrator will discover that certain structures defined by the data definition language (DDL) are needed that were not included in the schema. By that time, he may already be locked into a data base and application design.

The purpose of a DML (even a DML embedded in a programming language) is to provide a high-level application interface and to retrieve the programmer from the necessity of reinventing the wheel each time a commonly used high-level function is needed. Certain functions are best incorporated into the basic DML because they are more efficiently handled by the data management software rather than the application software. The DBMS has access to resources, such as storage structure elements, which are not directly available to the application programmer.

The Codasyl DML constrains the system from being able to take full advantage of this information. Being a navigationally oriented system, the application program is confined to move record by record through the data structure.

To find a subset of a collection of records, each record has to be retrieved and transferred from the DBMS to the application program. This greatly increases interprogram or perhaps interregion or even interprocessor traffic, adding an unnecessary burden to the system.

No DML function other than ORDER uses sets of records as its operands or output. No Boolean operators are provided and no conditional operators other than equality are provided.

Thus, a navigational system of the Codasyl type relies on the application program to perform operations which could be more efficiently performed internal to the DBMS.

The DML is sensitive to factors defined in the schema, e.g., LOCATION MODE....Adding to or changing the schema so that additional addressability is available does not automatically enhance the efficiency of running application programs.

To gain these efficiencies, the program must be rewritten. The program is very sensitive to the schema definition.

Without a high-level DML available, the productivity of the personnel associated with the application will suffer, as I have stressed before [CW, Jan. 9]. Productivity aids such as prototyping capability, program independence and program readability (to ease disruption because of staff turnover) can be lost or decreased when a high-level language is not used.

Thus, it is quite clear that the Codasyl specifications are far from the ideal choice for a standard.

Parsons is assistant to the executive vice-president of MRI Systems Corp.

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DP, Bureaucracies Have Much in Common

(Continued from Page 47)

response when asked what is the cause of problems or delays. It is usually one of the following: "The programmer misplaced a decimal point." "The automatic whiz-bang dingus is down." "The operator mistyped a command." "The power source is fluctuating."

Regardless of the response given, they all lend credence to Parkinson's Law as fundamental to the operation of a computer. Whenever such detached considerations can have major consequences, a disproportionate amount of effort is expended to prevent the malfunctions which occur anyway.

Consequently, the placement of decimal points and the coddling of hardware components take on greater importance than the performance of the task at hand — the solution of a problem using a computer.

- Computers are justified and installed for specific purposes. Very few are actually "window dressing," despite editorials to the contrary. They, like bureaucracies, are established to meet pressing needs.

Needs often change over time, however, leaving "dangling" computers struggling to maintain an identity and purpose when they are no longer needed. They generate a workload for themselves. There are time and cost reports to show how efficiently the computer is being used, scheduling reports to promote efficient use of the computer, personnel reports to report the workload of computing pesonnel.

- Full productivity is a goal of both bureaucracies and computers. No idle hands are permitted; everyone must at least look busy.

The computer is constantly being put to work doing inconsequential tasks in order to reflect full utilization on time and cost reports. Idle computers are a sign of ineffective planning.

- The Peter Principle persists in the computer system. It seems in line with the full-utilization emphasis: bigger and bigger systems are required to handle more and varied tasks.

In its initial form, a computer may have been designed to do its primary task well. As it is expanded (promoted) to greater and varied tasks, it does more things with less quality until eventually it does everything in a mediocre fashion.

I am sure perceptive Individuals could extend this list considerably. However, further examples are unnecessary to underline the observation that computer centers are bureaucracies — from the people who run the centers to the machines that run the people.

Miller is a consultant to the California State Senate Committee on Rules.

Sears Deflates Customers' Savings

(Continued from Page 47)

from a billing date. Thirty days from Feb. 6 being March 8, there should be no conclusion of any past-due amount having occurred on March 6; the amount simply wasn't due. So we know the program used by Sears covering the end of February did not include the 30-day check. That means it did not include the contractual requirement, instead using some other one. What was that other test it used?

It is quite clear, from the way the billing dates are shown, the program uses the day of the month (in this case the sixth day of the month). This is not indicated, and I don't think in the case of February it is even legal, although I leave that to the Federal Trade Commission to look at. It is certainly wrong professionally, which is as far as I care to go.

Moreover, the April statement shows that this mistake (sorry, not mistake, but rip-off) was not being cleared up. When the March 8 payment was hooked within the 30 days, it might have been possible for the 50-cent charge to be lifted from the account. It would have even been possible for Sears to have sent an apology for the accusation of past due amounts, or even to have intervened to stop the incorrect February statement.

However, Sears took none of these needed actions. The April statement shows this. By now, the system has the finance charge hidden in a "previous balance" copied from the previous false one.

The consistency with which such computerized rip-offs are coming up is important from the professional point of view. Through these, most people receive their main information about computers.

At the moment, the message they receive is that where possible, ordinary people will be tricked. Further, where possible, the tricks will be smoothly hidden in a nice, subtle, computer-oriented manner. Not a very good public relations operation for our profession, is it?

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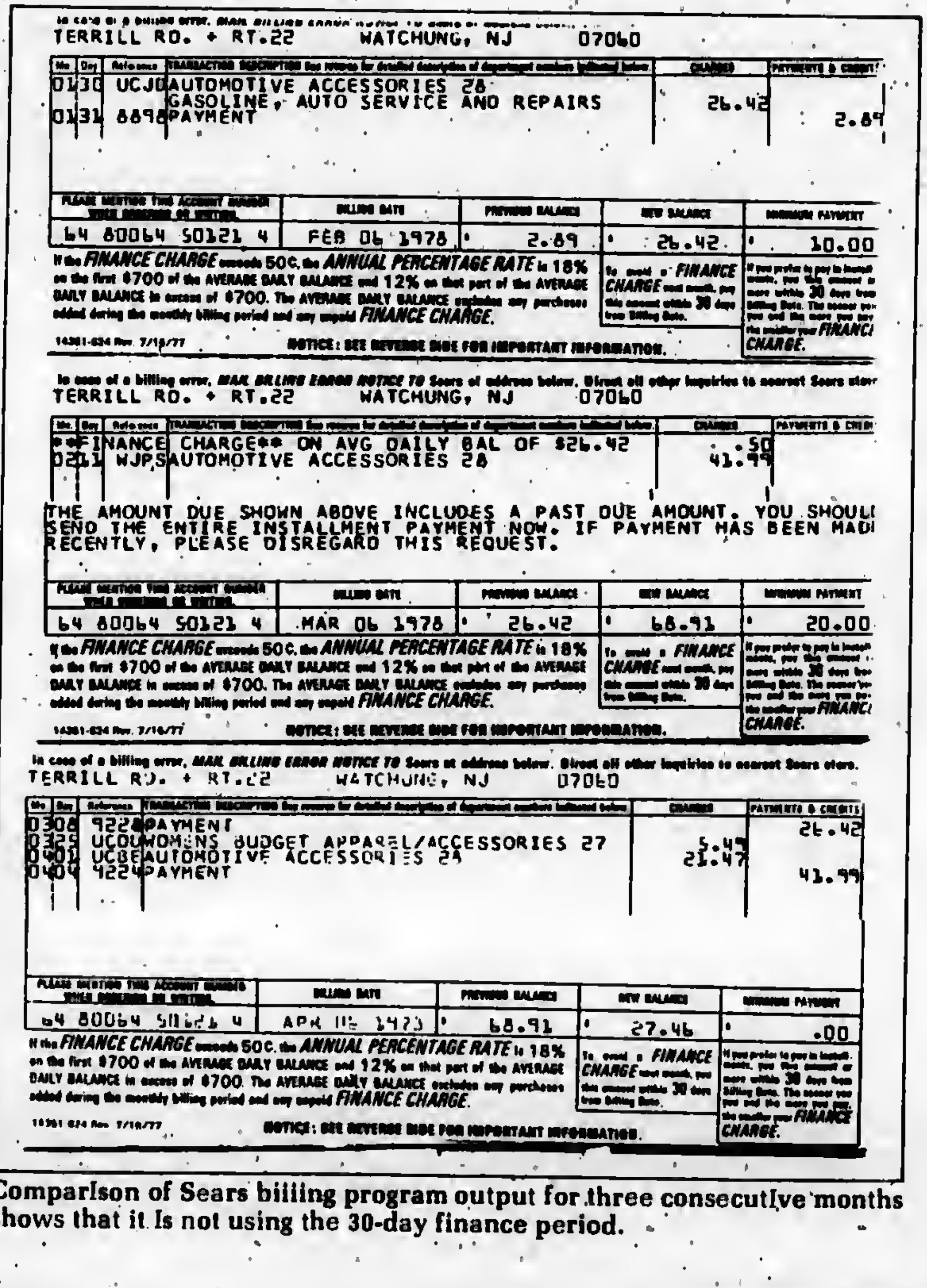

TERRILL RD. + RT.22 WATCHUNG, NJ 07060

Mo.	Day	Reference	TRANSACTION DESCRIPTION	CHARGES	PAYMENTS & CREDITS
01	30	UCJD	AUTOMOTIVE ACCESSORIES 28 GASOLINE, AUTO SERVICE AND REPAIRS	26.42	
01	31	8898	PAYMENT		2.89

ACCOUNT NUMBER	BILLING DATE	PREVIOUS BALANCE	NEW BALANCE	MINIMUM PAYMENT
64 80064 50121 4	FEB 06 1978	2.89	26.42	10.00

If the FINANCE CHARGE exceeds 50¢, the ANNUAL PERCENTAGE RATE is 18% on the first $700 of the AVERAGE DAILY BALANCE and 12% on that part of the AVERAGE DAILY BALANCE in excess of $700. The AVERAGE DAILY BALANCE excludes any purchases added during the monthly billing period and any unpaid FINANCE CHARGE.

NOTICE: SEE REVERSE SIDE FOR IMPORTANT INFORMATION.

In case of a billing error, MAIL BILLING ERROR NOTICE TO Sears at address below. Direct all other inquiries to nearest Sears store.

TERRILL RD. + RT.22 WATCHUNG, NJ 07060

Mo.	Day	Reference	TRANSACTION DESCRIPTION	CHARGES	PAYMENTS & CREDITS
FINANCE CHARGE ON AVG DAILY BAL OF $26.42				.50	
02	11	WJPS	AUTOMOTIVE ACCESSORIES 28	41.99	

THE AMOUNT DUE SHOWN ABOVE INCLUDES A PAST DUE AMOUNT. YOU SHOULD SEND THE ENTIRE INSTALLMENT PAYMENT NOW. IF PAYMENT HAS BEEN MADE RECENTLY, PLEASE DISREGARD THIS REQUEST.

ACCOUNT NUMBER	BILLING DATE	PREVIOUS BALANCE	NEW BALANCE	MINIMUM PAYMENT
64 80064 50121 4	MAR 06 1978	26.42	68.91	20.00

If the FINANCE CHARGE exceeds 50¢, the ANNUAL PERCENTAGE RATE is 18% on the first $700 of the AVERAGE DAILY BALANCE and 12% on that part of the AVERAGE DAILY BALANCE in excess of $700. The AVERAGE DAILY BALANCE excludes any purchases added during the monthly billing period and any unpaid FINANCE CHARGE.

NOTICE: SEE REVERSE SIDE FOR IMPORTANT INFORMATION.

In case of a billing error, MAIL BILLING ERROR NOTICE TO Sears at address below. Direct all other inquiries to nearest Sears store.

TERRILL RD. + RT.22 WATCHUNG, NJ 07060

Mo.	Day	Reference	TRANSACTION DESCRIPTION	CHARGES	PAYMENTS & CREDITS
03	08	9228	PAYMENT		26.42
03	29	UCOU	WOMENS BUDGET APPAREL/ACCESSORIES 27	5.49	
04	01	UCBE	AUTOMOTIVE ACCESSORIES 28	21.47	
04	04	4224	PAYMENT		41.99

ACCOUNT NUMBER	BILLING DATE	PREVIOUS BALANCE	NEW BALANCE	MINIMUM PAYMENT
64 80064 50121 4	APR 06 1978	68.91	27.46	.00

If the FINANCE CHARGE exceeds 50¢, the ANNUAL PERCENTAGE RATE is 18% on the first $700 of the AVERAGE DAILY BALANCE and 12% on that part of the AVERAGE DAILY BALANCE in excess of $700. The AVERAGE DAILY BALANCE excludes any purchases added during the monthly billing period and any unpaid FINANCE CHARGE.

NOTICE: SEE REVERSE SIDE FOR IMPORTANT INFORMATION.

Comparison of Sears billing program output for three consecutive months shows that it is not using the 30-day finance period.

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Trusco 'Compress' Replaces 'IEBCopy'

ATLANTA – The TDS Quick Compress package from Trusco Data Systems was designed and written as a high-performance replacement program for the Compress-in-Place function of the IBM-supported utility IEBCopy, according to a spokesman.

The Trusco package was developed to run in an IBM MVS environment, but can be run in OS/360, VS1 and SVS environments if there is sufficient region storage and the CPU utilizes the IBM 370 instruction set, the spokesman said.

TDS Quick Compress generally runs in about one-fifth the wall clock time and one-fourth the CPU time needed by IEBCopy, and it usually requires one-tenth the EXCP count of the IBM utility, he claimed. Comparative timings between the two software routines will vary, he acknowledged, and this is generally a function of block size.

In any case, operational efficiency isn't necessarily the most important benefit to be gained from the independent's package, the spokesman noted. There is no reset function in IEBCopy, he said, and the availability of this feature in TDS Quick Compress can save an installation "considerable" time in scratching members and compressing.

In operation, the package requires no special SVCs, no special I/O appendages, no "authorization required" and no V=R considerations, he continued.

The utility runs as a standard batch job.

It doesn't generate any ambiguous messages or trigger termination of the compress on minor errors, he said. The program "makes every effort to describe any error encountered and continue the compress."

An internal trace routine and "Snap" dump routines are provided to furnish additional information in the event of problems with the partitioned data sets (PDS) or the user program.

The program was designed to avoid unnecessary paging, he claimed; any unsatisfied request for storage will result in a message to the user advising how much additional space is needed.

The amount of storage required by the product depends on device type, number of directory blocks in use and number of PDS members and aliases. For MVS users, a rule of thumb is to use a 1M-byte region for IBM 3330-type devices and 1.5M bytes for 3350s, he said.

TDS Quick Compress is delivered in object form on a 9-track, 1,600 bit/in. magnetic tape; the one-time license fee is $4,000. The package is available from Trusco, P.O. Drawer 4418, Atlanta, Ga. 30302.

'Doris' Handles Text In DG's RDOS Setting

VANCOUVER, B.C. – Doris is a document formatter designed for the production of printed output such as letters, manuals and reports. It is, according to Finning Computer Services Ltd., a convenient solution to the documentation problem faced by every DP organization.

Utilizing any Data General Corp. Eclipse or Nova family processor running under RDOS, Doris uses a source text file that consists of raw text interspersed with one-word format instructions and that may be created using "any suitable method such as the DG text-editing programs," a spokesman said.

Output from Doris may be in upper and lower case type and may be directed to a line printer or a disk file for subsequent printing, he added.

Features supported by Doris are said to include line justification, page numbering, title centering, margin adjustment and page headings and footings. A slew test for sufficient lines on a page, support for leaving blank pages, showing revision numbers and defining line spacing are also part of the system, the spokesman said.

The package requires any DG or compatible system running under RDOS. Doris is available under license for $1,500 and is distributed on 800 bit/in. magnetic tape.

Program maintenance, including new revisions of the software, is included during the first year and is available for a fee after that, the company noted from 555 Great Northern Way, Vancouver, B.C. V5T 1E2, Canada.

System, Program Plans Maintained by Package

TOPEKA, Kan. — The systems development and documentation package called Structure(s) from Langston Kitch and Associates, Inc. is intended primarily to help designers, analysts and programmers document and maintain existing IBM 360/370 programs and systems easily, according to a spokesman.

It also supports development right from the beginning, he added, noting that high-level designs can be entered into the system from the first day of development work. As new pieces of the system take shape, they are consistently integrated into the system and a new set of formatted, cross-referenced documents is generated.

This degree of support frees the designer from the chore of daily maintenance of a working design and allows him to pay more attention to his basic goal: the design of a logically correct and functional system, the spokesman claimed.

Heart of the Structure(s) package is what the developer calls a document handler. It assembles and draws Warnier-Orr diagrams on a line printer. These diagrams can represent designs of systems or programs or of data base structures, he explained.

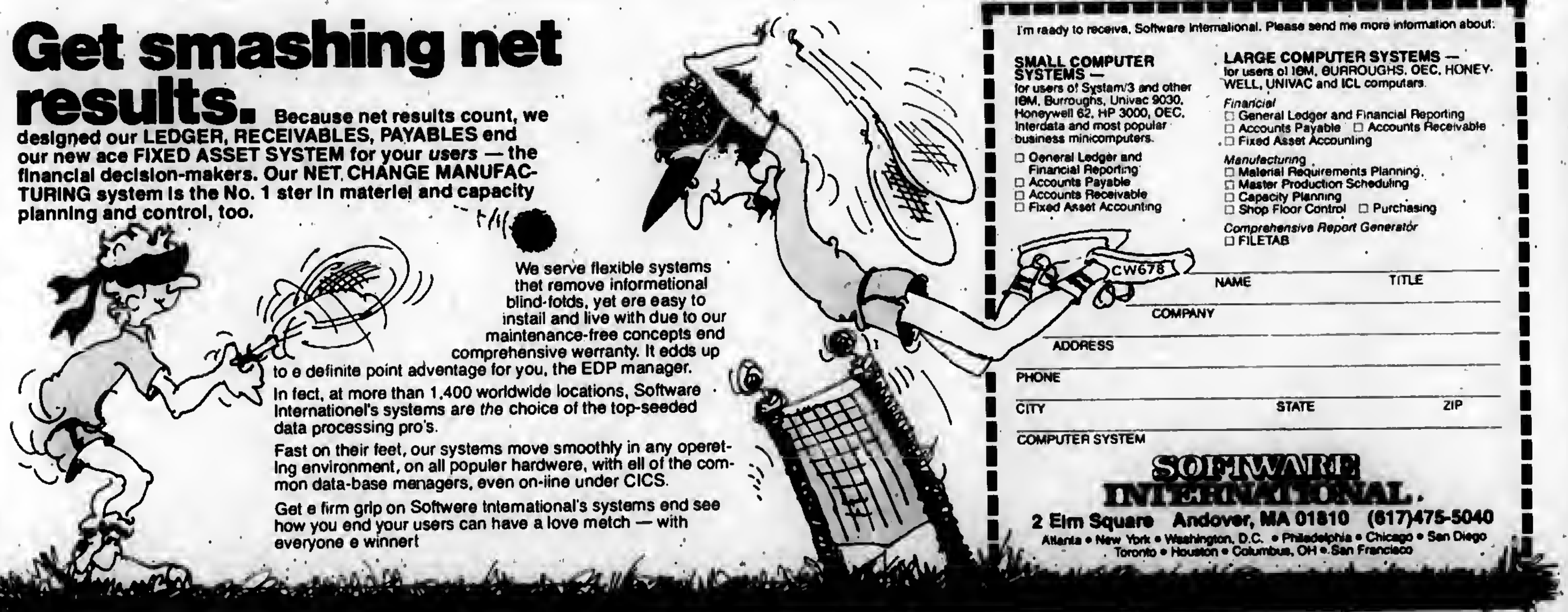
The hierarchical nature of the Warnier-Orr diagrams make them easy to read and understand, he said, and their "unique clarity" improves communications "radically" at all levels, from the programmer to the end user.

Because the Warnier-Orr diagrams have been utilized during development, users feel comfortable with them and with the standardization they bring to the installation's methodology. This makes it much easier to maintain existing systems than when the maintenance programmer has to first try to determine what, if any, documentation exists.

Structure(s) is a batch-oriented system written in Cobol and currently available for IBM 360 and 370 installations. The package may be interfaced with any of the popular source library systems in use on these systems, he added.

Maximum partition size varies with user requirements but is generally around 180K bytes, he estimated. The package is available now for $4,900.

Lease and monthly rental plans are also available, the company noted from 715 E. 8th St., Topeka, Kan. 66607.



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HIS Modules Tie Level 6 to IBM-Like Systems

WALTHAM, Mass. — The multifunctional capabilities of the Level 6 minicomputers from Honeywell Information Systems, Inc. have been extended with the introduction by the vendor of additional software.

Two modules include programs that enable a Level 6 to function concurrently with a variety of IBM-compatible host CPUs as a Hasp workstation or 2780/3780 remote batch terminal, a spokesman said.

In addition, Level 6 users can acquire Henco, Inc.'s Info 6 file inquiry and update system directly from HIS under terms of an agreement signed recently by the two vendors.

Both Info 6 and the other two modules are compatible with the Gcos 6 operating software announced last October, the spokesman noted.

The Level 6 Hasp workstation facility and the 2780/3780 remote batch terminal facility allow users to transfer data between a Level 6 and a number of host processors without any changes in the host system's software, he claimed.

The capabilities can be used at the same time as other facilities previously available for the Level 6, he said.

Info 6 is a conversational data inquiry/update system. Using English-language commands, users can perform normal DP functions without resorting to conventional programming techniques, according to HIS.

The system can provide a sophisticated report with a limited series of steps and supports access to any Level 6 file through a file manager, the spokesman said. Info 6 runs as an application under the Level 6 Gcos 6 Model 400 operating system and may be executed concurrently with other applications.

License fees for these software modules are $2,200 for Hasp, $1,640 for the 2780/3780 remote batch terminal module and $3,800 for Info 6. The two communications modules will be available in the third quarter. Info 6 is available now.

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'FTL' Manages Transients Put in DOS/VS Memory

COLUMBUS, Ohio — The Fast Transient Loader (FTL) utility from Goal Systems Corp. is said to allow DOS/-VS-oriented installations to place B transients and CRT transients in main memory.

By supporting that placement, the package reduces contention of the system residence disk volume and the transient areas are freed more quickly, a spokesman explained. Overall throughput can be increased "significantly," he claimed.

For example, he said, when the CRT transients are placed in main storage, the 125D or 3277 system console will output messages at rates three to five times faster than under normal DOS/-VS.

Full statistics are kept by FTL on transient usage and a separate monitor function is incorporated to provide the information needed to fine-tune the system. FTL can be installed without any modification of DOS/VS and does not require a reloading operation to become functional, the vendor said.

In the U.S., FTL can be leased for $50/mo.

Goal Systems Corp. can be reached through P.O. Box 29481, Columbus, Ohio 43229.

Correction

The proper address for the vendor of the Telecommunications Program Generator ["'TPG' Eases System/3 Work," CW, May 22] is Granat Data Corp., 1456 Peters Blvd., Bayshore, N.Y. 11706.

Service Backs APL Switches

NEW YORK — Aplications, Inc. is now providing a conversion support service for installations involved in moving APL programs from time-sharing services to in-house facilities.

The Aplications service includes use of specialized analysis programs that assist in converting many of the proprietary enhancements used on a network vendor's system to the correct code for the user's in-house environment. Additionally supplied is APL training for the in-house staff and users, a spokesman said.

Custom systems planning and programming are also available.

The complete service costs $325/day, he said from Suite 301, 400 Madison Ave., New York, N.Y. 10017.

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'XALC' Eases Management, Coding of Assembler Work

BETHESDA, Md. — The Extended Assembler Language Coding (XALC) package now available from U.S. Robots, Inc. has been described as an IBM Assembler language programmer's toolbox. It is a library of macro-instructions and macro-controlled subroutines that supplement and extend the OS 360/370 Assembler language, a spokesman explained.

Benefits to be gained by using XALC are lower programming costs, improved software reliability and better management of programming projects, he claimed. The package enables the programmer to code applications more quickly than possible under either conventional Assembler or Cobol, he continued.

"Certain error-introducing features" — not otherwise defined — "found in other languages" are said to have been eliminated or diminished in XALC. The package includes a patching facility that reportedly allows quick fixes during debugging so tests can continue without recompilation.

No GOTOs

Reliability is improved, the spokesman asserted, since XALC promotes GOTO-less coding using simplified methods of subroutine calls and the IF . . . THEN . . . ELSE logic statements in XALC.

The library of routines also frees the programmer from having to code all the register storage, "save area" handling, calling linkage and parameter parsing that usually mark Assembler programs — and often leads to problems if not done properly, the spokesman said.

Management should like the control provided by XALC, the spokesman continued. It reinforces more formal and correct interface methods among components, modular design of systems and programs and the establishment of standards and conventions among project members, he claimed.

XALC is available on a perpetual lease for $7,000 plus a 10% annual maintenance fee after the first year. A reference manual is provided in hard copy and in machine-readable form on the delivery tape.

U.S. Robots is at 4901 Fairmont Ave., Bethesda, Md. 20014.

PDP-11 Sites Offered Fortran Subroutines

HOUSTON — International Mathematical and Statistical Libraries (IMSL) has implemented the IMSL Library on the Digital Equipment Corp.'s PDP-11. These mathematical and statistical subroutines are used as building blocks for scientific and engineering application programming.

Testing was performed on DEC's Fortran IV and Fortran IV Plus compilers. Since the software is independent of the operating system, it is accessible to most users, IMSL noted.

A tape drive is needed for loading the source code provided. Typical utilization requires 32K words of main memory.

An IMSL subscription costs $1,220/year with educational institutions and multiyear subscribers receiving discounts. IMSL is on the Sixth Floor, GNB Building, 7500 Bellaire Blvd., Houston, Texas 77036.

Basic/Four Monitors Electrical Contracts

BEAUMONT, Calif. — An electrical contractor's estimating and job-cost analysis package written in Business Basic for the Basic/Four Corp. small business system is available from Computer Applications Development Associates.

Supporting up to four terminals, the package is said to produce reports similar to National Electrical Contractors Association forms.

The software costs $9,000 and can be ordered through P.O. Box 624, Beaumont, Calif. 92223.

Service Provides Articles

SPRINGFIELD, Va. — The National Technical Information Service (NTIS) has introduced the Journal Article Copy Service (Jacs) to provide users with rapid access to articles from more than 5,000 scientific and technical journals from a single source.

Under Jacs, the user scans a directory published by NTIS to determine if a desired journal issue and article is available through the service. Jacs is said to cover most technical and scientific fields, listing journals by title.

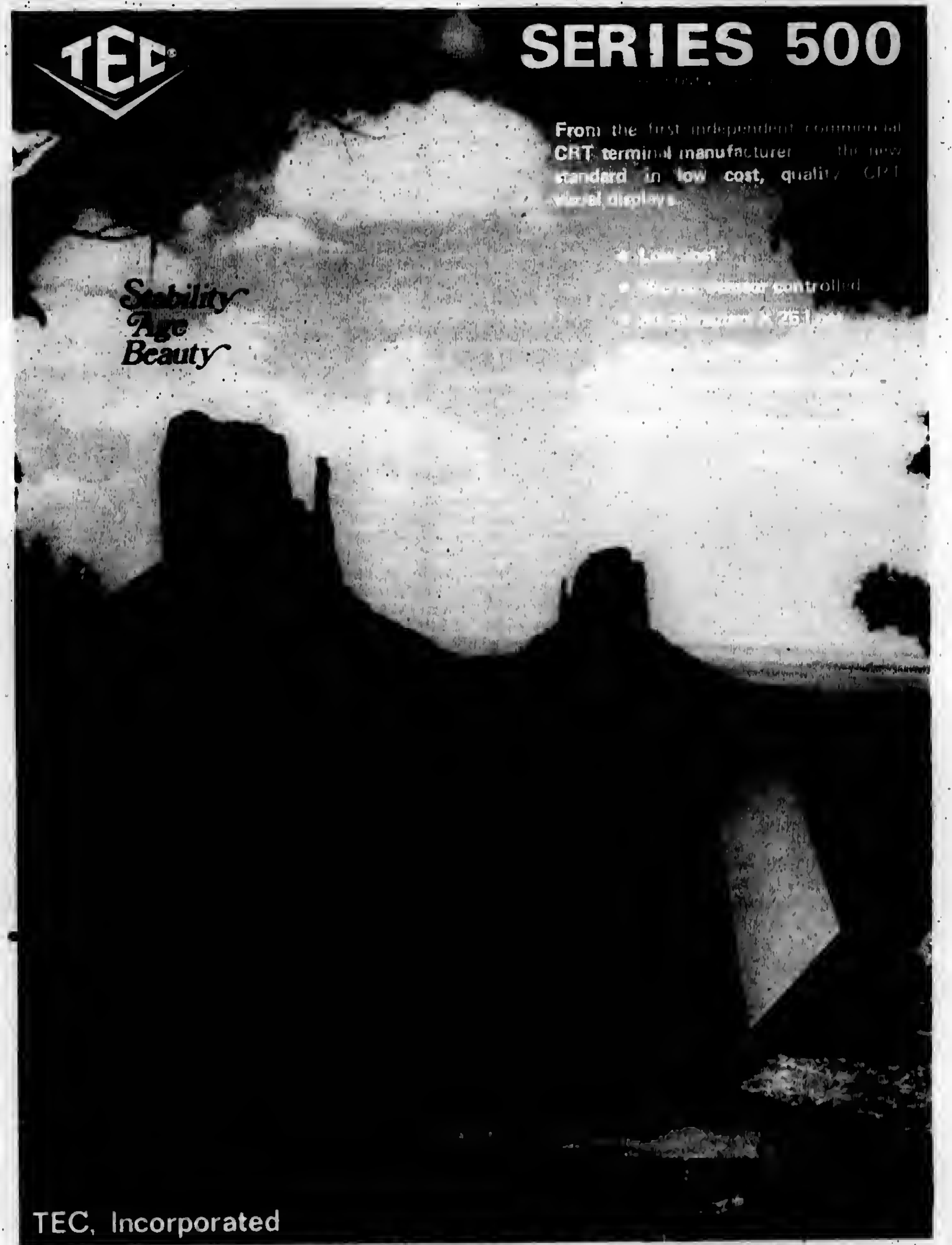
Orders for specific literature can be transmited by TWX, Telex or dial-up terminals. They will also be accepted over a special toll-free "800" number telephone at a small extra charge, a spokesman added.

NTIS does not stock the journals and articles for filling Jacs orders, but does relay orders electronically to an appropriate fulfillment source which might be a library, information service or publisher.

Once the fulfillment source gets the order, the article copy will be mailed to the requester within two days, NTIS said.

The articles supplied through Jacs not only reach the user quickly, but without any concern about copyright violations and royalty fees for the requester. NTIS pays any royalties that are required.

Cost per article is about $6, the spokesman said from 5285 Port Royal Road, Springfield, Va. 22161.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UCS Enhances 'Ansys' for Engineers

KANSAS CITY, Mo. — United Computing Systems, Inc. (UCS) has added an enhanced version of Ansys, a finite element program for large-scale engineering analysis, to the program library available on the company's remote computing network.

Developed by Swanson Analysis Systems and in use since 1970, Ansys is applied to production analysis for structural, nuclear, mining, chemical and automotive engineering work. Ansys Revision 3 is said to include improved elements, expanded analysis capabilities and new input, output and graphics techniques.

Interactive plotting, choice of coordinate systems and interactive or batch modes of input are some of the enhancements in the update. So are element reordering for wave front optimization and "extensive" preprocessor capabilities including mesh and boundary condition generation and piping conversion, according to a spokesman.

Ansys generation of geometry plots now allows interactive plotting coordinate axes and three-dimensional section plots to further enhance the program's graphical output, he added. It provides options for full and reduced dynamic analysis and offers a large element library including planer, beams and three-dimensional solids, he added.

United's Uninet international data communications network connects more than 150 cities in the U.S., Canada and Europe with major data centers in Boston, Mass.; London, England; and here In Kansas City.

UCS is headquartered at 2525 Washington, Kansas City, Mo. 64108.

HIS 66/07 In

WOODBURY, N.Y. — "Practically no conversion" will be required by users as they move their workload from a Honeywell Information Systems, Inc. H635 to an H66/07, which is replacing the older equipment at Calldata Systems, Inc.'s data center in Newton, Mass., a spokesman said from 20 Crossways Park North, Woodbury, N.Y. 11797.

'TMX' Puts Transactions Under RSX

CAMBRIDGE, Mass. — The Transaction Management Executive (TMX-11) from TMI Systems Corp. handles the resources of a Digital Equipment Corp. PDP-11 to enhance the RSX-11M operating system for use in a transaction processing environment, a spokesman said.

The design of TMX-11 is said to be geared toward applications operating on-line in a high-volume, time-critical environment with multiple terminals (usually CRTs) performing data entry and inquiry tasks. Heavy data base use and CPU-to-CPU communications are also typical characteristics of TMX-11, the spokesman added.

The package includes buffer management, transaction queuing, task scheduling, error reporting and external device interface, providing for the emulation of a buffered CRT when using DEC's VT52 terminals, he said.

TMX-11 supports both DEC files-11 and Cincom Systems Inc.'s Total 11 data base management systems. Capabilities added through TMX-11 include multirecord and file locking as well as elimination of data movement by using dynamic memory mapping, the vendor noted.

TMX-11 requires 64K memory on a PDP-11 running under RSX-11M. It costs $40,000 for the first CPU with lease arrangements available. Discounts are also available for multiple CPU usage, the vendor said from One Broadway, Cambridge, Mass. 02142.

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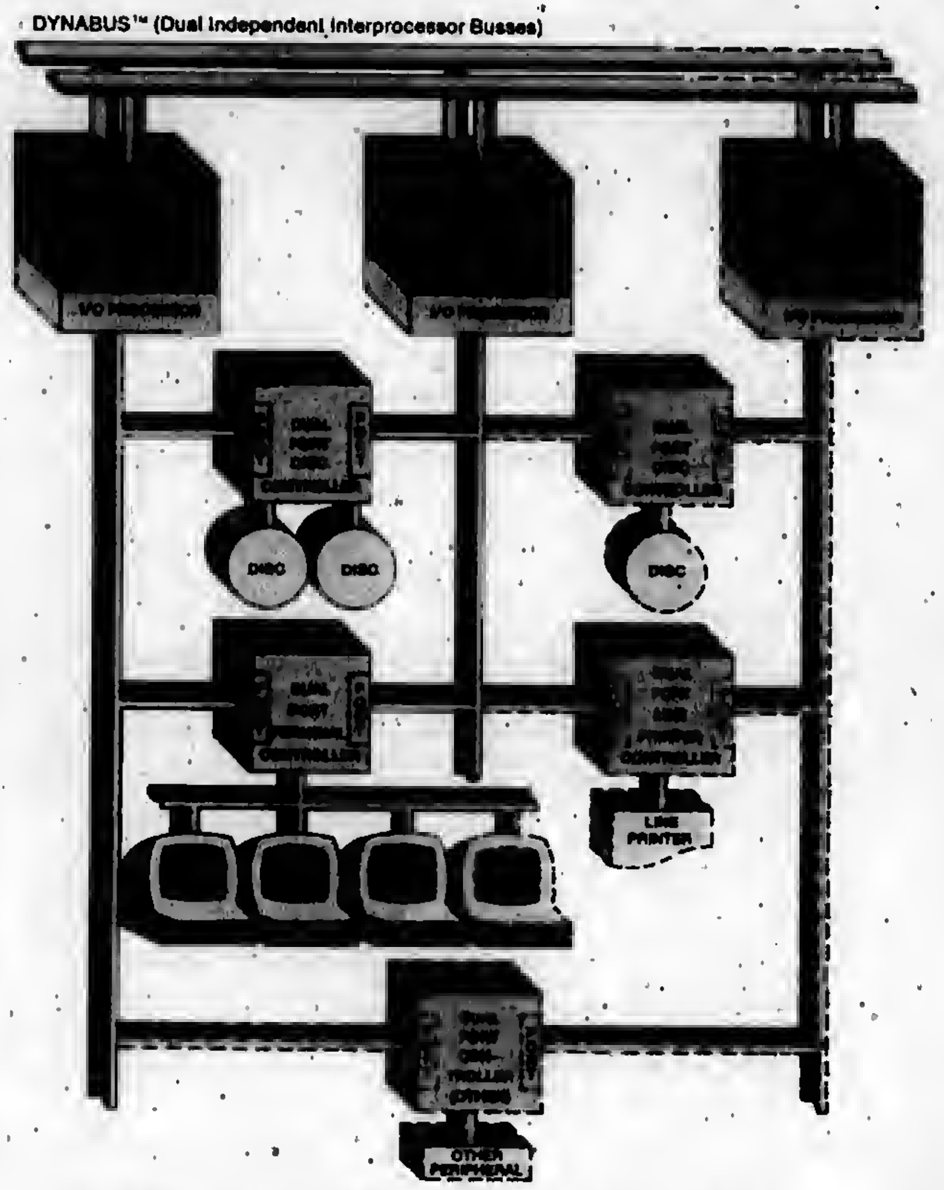

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To End Users and Programmers

Relational Data Bases Not Very Appealing Now

By Stephen L. Robinson
Special to CW

Data Base Corner

In addition to the recent letters about Codasyl vs. non-Codasyl data base management systems, the reader commentaries by Larry Towner and myself have produced several requests for our views on relational data base systems.

One such request, from W.C. Meilander of Goodyear Aerospace, included the following throught: "Ideally these comments would address the relational data base concept only and ignore the present state of hardware/software implementation."

That is, unfortunately, a bit difficult to do. It's like talking about the concept of an electric car while ignoring the limitations of today's technology.

For example, the JOIN operator is basic to the logical operation of a relational data base system. The physical implementation of a *dynamic* joining of relations (as opposed to the *static* establishment and maintenance of interfile relationships) is impractical today. The development of associative memories would change this situation rather markedly

I will try, however, to discuss relational data bases with minimal attention to the limitations of today's computer mainframes. Rather than repeat the basics of relational data base systems, I would direct the interested reader to the article by C.J. Date entitled "Relational Data Base Concepts" in the April issue of *Datamation*, to Date's book, *An Introduction to Data Base Systems*, or to James Martin's book *Principles of Data Base Management*.

It is important to recognize, from the outset, that the relational data base concept, like the Codasyl concept, represents a logical (as opposed to physical) view of data constructs and operations.

I would like to discuss the relational concept from three points of view: that of an end user (non-DP person), that of an application programmer/-analyst and that of a data administrator. In what follows, it should be noted that I have not had occasion to work with an implementation of a relational system, nor have I talked extensively with people using such a system (there being few such people).

I have, however, studied the relational concept, have explored the mapping of such concepts onto various data base packages and have analyzed the trade-offs inherent in physical implementations of various normal forms.

End User View

At the present time, the vendors of the major data base packages are involved in a minor competition to produce the most English-like, user-oriented query languages and report writers. At stake is a large portion of the expanding data base marketplace.

I have been in many DP shops where data base was proceeding satisfactorily until the first end-user system was attempted. The associated problems will be the subject of another column.

Summarizing some complaints of existing systems, the end user would rather not have to worry about:

- Names of fields.
- What fields are in what records (and where in the record).
- What the internal formats of fields are.
- What intrafile record rela-

(Continued on Page 64)

first in FORTRAN.
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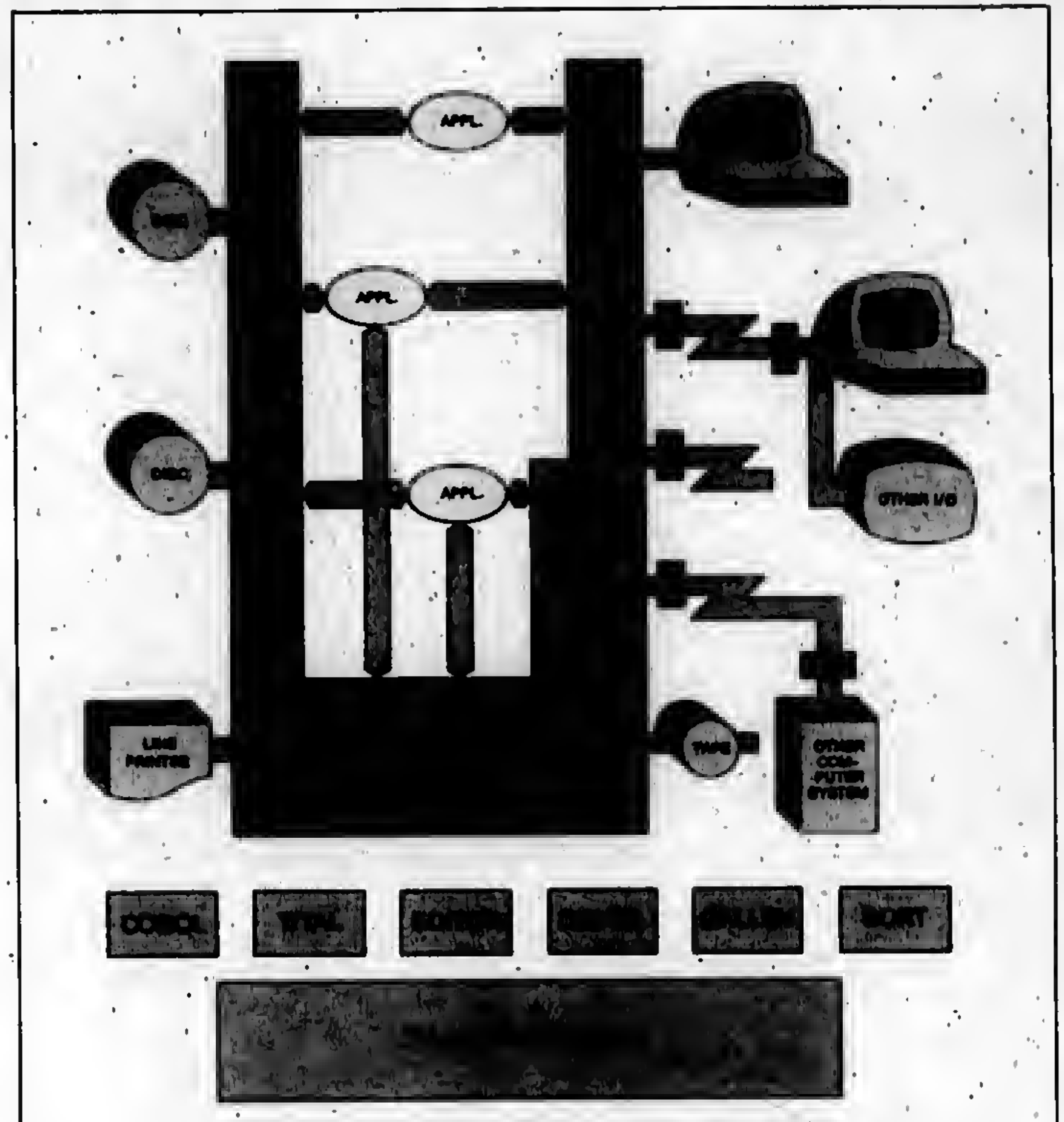

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Program Watches DL/1 Executions

WELLESLEY HILLS, Mass. – The DL/1 Run Control System from Computer Partners, Inc. was developed to ensure the integrity of IBM-IMS data bases and associated applications operating in a production environment under the DL/1 data management system, according to a spokesman.

Data regarding an application's job steps, data base usage, run dependencies, JCL and job step descriptions are stored in the Run Control System data base. This information is then used to initially load the job stream into the job queue, control the sequence or steps processed, ensure that current versions of the data bases are used and recover the necessary data bases if a job abnormally terminates, he said.

After an Abend, the Run Control System data base determines the proper job steps which must be executed to recover and complete the jobstream successfully once the cause for termination has been corrected, the spokesman continued.

Operating on any IBM 360/370 supporting DL/1 or IMS, the DL/1 Run Control System can be purchased for $7,500 from Computer Partners, at 31 Washington St., Wellesley Hills, Mass. 02181.

Relational Approach to Data Less Than Appealing Now

(Continued from Page 63)

tionships exist.

- What interfile record relationships exist.

The relational data base concept employs certain logical operators (e.g., JOIN, PROJECT, SELECT) to select records (excuse me, tuples) of interest. I would like a lot of distance between myself and a non-DP executive if I were required to present the concept of tuples, domains and logical operators.

Quite frankly, most non-DPers want something simpler. That something could be another level of abstraction above the logical relational data base concept or an abstraction above any of the major data base packages.

In short, I don't see any real advantages of the relational concept to end users. They want something even simpler, preferably oriented toward their area of responsibility.

Programmer/Analyst View

The applications programmer/analyst will probably interface with a relational data base system in one of two ways: a CALL mechanism (as in most of the data base packages) or a set of data base verbs which will be embedded in Cobol or Fortran programs and input to a compiler preprocessor (Codasyl).

Quite honestly, I don't see that the logic of JOINing, SELECTing and PROJECTing is markedly simpler than the logic one finds in many existing data base packages.

To summarize again, although I like the logical concept of tuples, and the relational operator set, I cannot believe this would constitute a very strong argument for relational systems.

Administrator Interface

By data administrator, I mean the function responsible for building a data base system environment. Typically, one of the major tasks of such a group is building a logical model of the organization's data.

At the present time, I personally prefer other modeling methodologies to the relational approach. In particular, I prefer the freedom to have repeating groups (i.e., one or more fields which occur multiply in a "record") in my structures.

I find the step of going to first normal form unnatural for those systems on which I have worked. It may well be this is simply a result of conditioning. After working with relational concepts a while longer, I may change my view.

Robinson is an independent consultant, operating as S.L. Robinson & Associates, in Morrisville, Pa.

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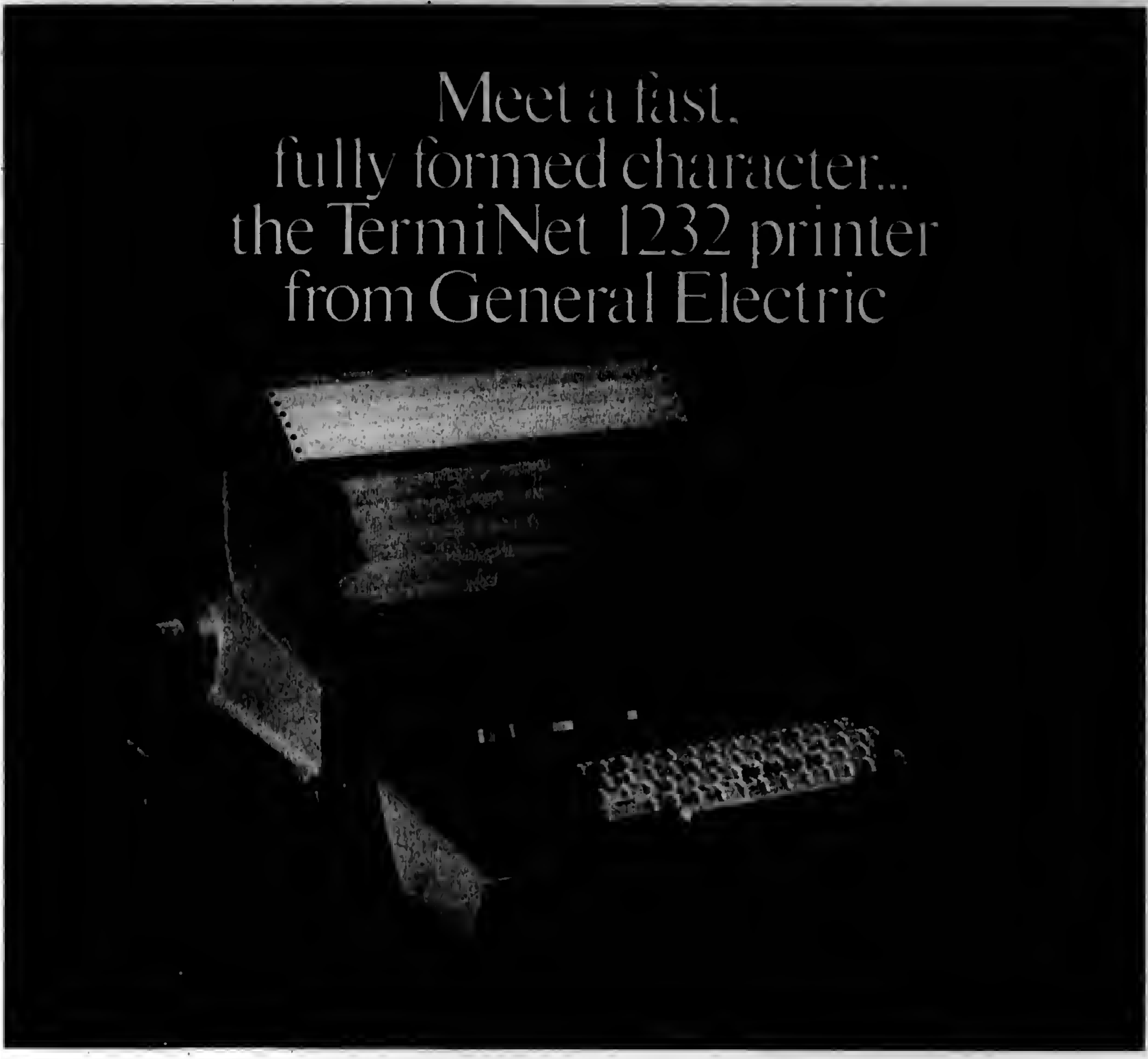
Clarification

In Datapro's recent survey ["Users Rate CDC as Tops in Network Service Study, CW, May 22], United Computing Co. ranked second, with a weighted average overall performance score of 3.4 (out of 4.0) and National CSS, Inc. and Comshare tied for third at 3.3.



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Elevating Talk Moves Stalled System Plan

By Gary D. Ward
Special to CW

Ajax Bolt and Nut, Inc. a growing manufacturing firm, was having trouble with its inventory system. The company always seemed to have an overage of parts and materials that were rarely used, but a severe shortage of the materials that were needed daily.

In fact, the problem had gotten so out of hand that complaints about it had reached all the way up to the operating president of Ajax.

Being a good businessman, the president immediately called in his plant manager and heard all the details and ramifications of the problem. Next, the planning committee (whose main purpose was to make sure the president stayed happy) got involved.

The committee decided the best way to handle inventory was through the computer. After all, that's why they had leased the monster anyway. The committee told the DP director the inventory problem had to be solved in a minimum amount of time.

Jealous Committees

The director called in his project leaders and explained the urgency of the problem. It would require a thorough systems review before processing on any path. The project leaders agreed and, in typical fashion, each formed his own systems review committee.

Each of the systems review committees, as expected, met in secrecy and jealously guarded their solutions — with one exception. A brash systems analyst reviewed the problem and, after a couple of weeks, told his project leader he had the solution.

After looking over the proposal, the project leader smirked and said, "this is far too simple. It's evident you don't understand the big picture."

And so it went. Weeks quickly turned into months as the committees argued about their respective approaches and the benefits of their solutions over everyone else's.

By this time, the DP director had become desperate and had hired an outside consultant. The president, who was unhappy with everything and everybody, was fuming because this expensive problem was becoming more and more severe.

One day, in the elevator, the president overheard the systems analyst explaining the inventory problem and his simple solution to a friend. The president called the analyst aside and asked to be briefed on the proposal.

The president loved the idea and showed it to his planning committee. The committee, in turn, thought it was the greatest idea that Mr. President had ever thought of and told the DP director to implement the plan immediately. The DP director disbanded the committees.

"We've found a solution!" he exclaimed. "Begin implementation immediately."

The lowly analyst was handed an assignment. After reading it, he discovered his ideas in someone else's words. Since he didn't want to cause trouble, he simply went to work on the project — almost six months after he had submitted his proposed solution.

Moral: Good ideas come from above and below. Keep your communications lines open.

Ward is a system aid marketing representative with University Computing Co., Dallas.

Prime Minis Get Word Processing

NEW YORK — The Primacs-I word-processing software from ACS America, Inc. is said to provide users of Prime Computer Corp. minicomputers with "all of the standard features of today's best stand-alone word-processing systems."

The package was designed to operate with the Prime P300, P350, P400 and P500 models utilizing their standard operating systems. It supports up to 63 simultaneous users, unlimited document size and full document indexing and retrieval, a spokesman said.

Features available through Primacs-I include insertion and deletion of text, pagination, upward and downward scrolling and paragraph and decimal tab-setting.

Primacs-I operates with an 80-character, 24-line, 32-function-key Owl CRT terminal and a 520 word/-min typewriter-quality serial printer with interchangeable type fonts. A shared-logic system, the ACS package is co-resident with any standard DP application placed on the hardware, the spokesman claimed.

The software for Primacs-I is available now for $15,000, installed on the user's equipment. If desired, ACS America will also supply the required hardware "at competitive rates," the spokesman noted from 150 E. 42nd St., New York, N.Y. 10017.

National Directory To List Consultants

ST. LOUIS — The Independent Computer Consultants Association plans to publish a national directory in the fall. Any individual, partnership or corporation providing computer-related services will be listed without charge, a spokesman said.

Once published, the book is expected to cost "about $10," he added.

Submission forms for the listings are available from the association through P.O. Box 27412, St. Louis, Mo. 63141.

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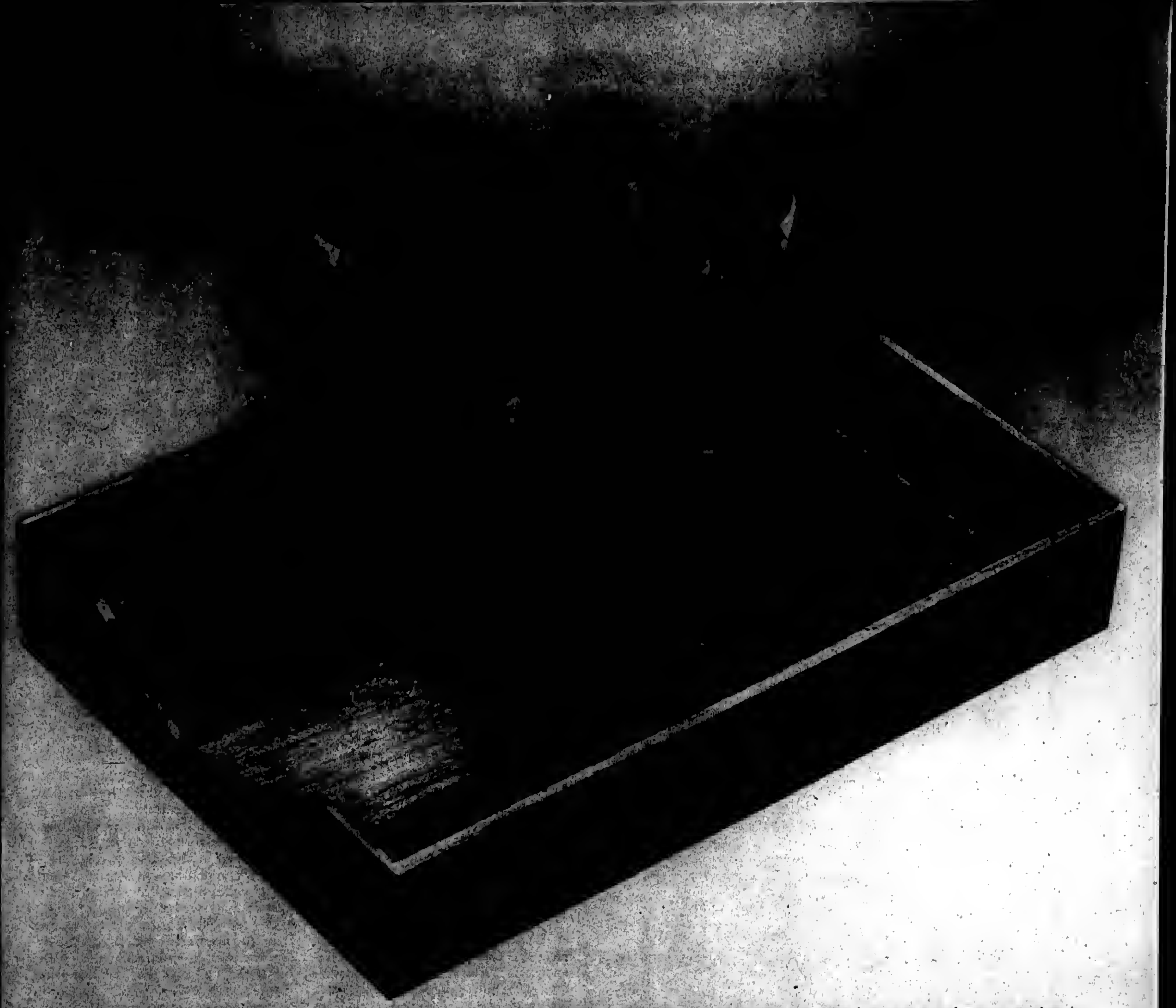

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'Vast Flows' of Data Controlled

Varied Facilities Backed by Remote Nets' DBMS

By Don Tarkenton
Special to CW

PITTSBURGH, Pa. — Many inquiry and retrieval systems appeared in the 1960s as time-sharing became widely used. These systems have evolved into the interactive data base management systems (DBMS) now available from a number of remote computing services.

The key to an enterprise's success is whether it can control the vast flow of data through its organization. It is the ability to meet this goal that is responsible for the success of DBMS. These systems can produce timely and accurate information and can quickly respond to the changing needs of the enterprise.

Characteristic of most DBMS packages is the tendency toward data independence — the separation of the logical structure from the physical structure of the data base. Access at the field level to logical groups of data allows the data base to be different things to different people.

By storing data along its separate functional lines, data base packages can represent a variety of record types, or subschemas, in the data base. This ability to handle different record types leads to the integration of the different parts of an application, such as the part, order, vendor and customer data in a purchasing system.

Integration eliminates redundancy and establishes consistency among the data. The benefit to management is control over the process, because the DBMS provides an overall view of the application.

Access Philosophies Differ

The access methods used by data base systems for processing data differ in philosophy. Some provide very fast access at the cost of overhead and storage space, while others are directed at updating and reporting on large volumes of data while conserving storage and reducing overhead. Many systems try to strike a balance between the two extremes by offering a variety of access and storage techniques.

Most of these techniques are automatically handled by the DBMS and are usually transparent to the user. The user can thus devote himself to developing and using the application.

Data can be treated by the DBMS in a way that affords many capabilities to the user. These capabilities often eliminate the need to learn and use a high-level programming language such as Fortran or Cobol.

First, data can be stored in a number of different field types. The user can pick the type to match his requirements for data format, processing, entry validation, compaction efficiency and reporting ease. Also, subfields and aggregate fields (e.g., month, day and year in a date field) allow differing treatments of the same data.

Further, pseudo fields, also called computed or defined fields, are available in some systems. The user simply specifies a numeric calculation, which can involve other fields, to be performed whenever the field is referenced. For example, PROFIT = PRICE - COST.

Finally, validation of data is usually automatic and often extensive. Validation activites include data type, range checking, table look-up, existence and cross field validation (e.g., ORDER DATE must be less than DATE SHIPPED).

More Revision Capabilities

Applications tend to change and grow more complex over time. DBMS have added extensive revision capabilities which can respond to the situation. It is possible to change validation ranges, add new fields, add new record types and link to new data bases, all without impacting existing applications and users.

Importantly, a few systems are able to dynamically invert specific fields, thus providing rapid access as the user's need changes. These revisions can usually be made without costly dumping and reloading of the data base. Furthermore, the speed and adaptability of data base systems in responding to changes in the application can shorten new development time by orders of magnitude over conventional programming techniques.

One of the biggest drawing points of data base systems is that they are typically easy to use. Proficient users can develop applications in a matter of days. Users can often be trained in the basics of the data base language in a few hours. Significantly, most data base systems are aimed at nonprogrammers — managers, applications specialists and clerks.

The trend in DBMS is to make the language as English-like, or natural language, as possible. Some languages require a key word to begin the command, such as FIND, CHANGE or PRINT, followed by a fairly free-form trailing list of specifications. Other languages are free form with key words appearing anywhere in the command.

Noise words — such as "a," "of," "the" and "me" — can be included to improve readability. For example, PLEASE LIST THE NAME AND TITLE FOR EVERYONE IN MARKETING. Regardless of the degree of structural freedom allowed, most languages are easy to comprehend.

Most DBMS packages are interactive in nature and provide immediate response in terms of timely information concerning an application. Capabilities include record creation and updating, query and report generation.

Simplicity in record creation is facilitated by a number of features. Field values can sometimes be entered in any logical order, either through prompting by the DBMS or by loading in bulk from an external file. Some systems allow the user to specify default values for fields which are automatically stored when a new record is added. Messages concerning invalid records (automatic validation) are sent to the user, and some systems post rejected records to an error file for reprocessing.

Query is often in the form of heuristic searching. The user can browse the data base by means of iterative searches. Each query successively narrows the list of selected records until the desired results are obtained. Alternatively, a query can add records to a previously selected group.

The ability to do report generation is universal to all DBMS. Reports provide the timely information required by management to control the application. Common features include titles, headings, footings, computations, logic testing, detail and summary information. A sort capability is usually available to provide control breaks.

In addition to displaying results on the terminal, some packages can send reports to a high-speed line printer, save them in a file or generate graphic output. The report commands can be stored in a file for later execution. It is often a simple matter to modify these saved commands, providing the flexibility needed to satsify ad hoc requests.

In addition to interactively changing field values and deleting records, some data base systems provide the ability to do transaction processing. In such sys-

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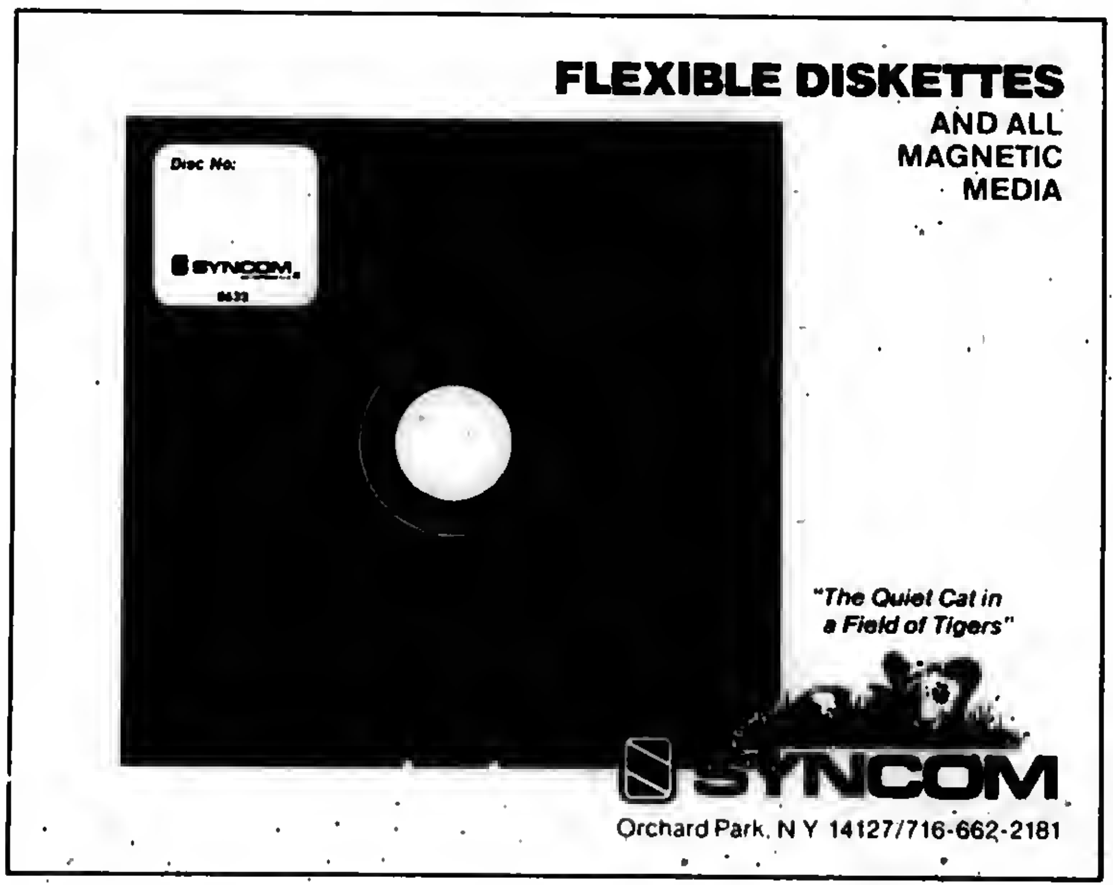

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A/V Guide Lists Wide Range of Training Aids

Despite a lack of increase in training budgets, courses produced by the multimedia vendors continue to proliferate. The 11th annual *Guide to Audio/-Visual Instruction on Data Processing*, released last week by the University of Colorado, lists more than 2,000 course modules from 15 vendors.

J. Daniel Couger On Education

The quality and quantity of training aids continue to grow significantly. Five years ago we had difficulty locating materials to fill the guide. Now we have trouble finding space for all the course listings.

Some subjects, such as operating systems, still are more effectively taught through classroom instruction by a vendor. Some application areas, such as banking, do not have multimedia courses available.

Nevertheless, for the large majority of training needs for all levels from beginning to advanced, multimedia courses have been produced. Also, there are a variety of vendors from which to choose a course.

The absolute number of dollars available for training has increased. Although the percent of the DP budget allocated to training is unchanged, the total DP budget continues to expand. Therefore, more dollars are available for training. Based on the swelling revenues of the multimedia vendors, we can see that most of the increase for training is going in that direction.

This year, Deltak, Inc. surged into the No. 1 position among the independents, displacing Advanced Systems, Inc. (ASI). According to Deltak president Robert King, the company's sales will reach $18 million to $20 million this year. Last year, Deltak had sales near $12 million.

Deltak's Education Coordinator Workshop, held four times in 1977, will soon be offered monthly. So, along with the increased demand for multimedia courses is an expanded effort to train the trainer.

Edutronics' Management Course

In addition to courses for practitioners, the multimedia vendors are continuing to produce user-oriented courses. Edutronics' new course "Using the Computer as a Management Tool" is obviously designed for managers. We find it equally useful for potential managers (business school students).

The 12-module course includes videotapes, participant's course manual, case studies, conference leadership grids, manuals and training charts. The course has been used by the American Management Association and in Honeywell Information Systems, Inc. training programs.

Modules cover the following topics: "Data Is Not Information," "Identifying Information," "Information Services Department," "New Forms," "Describing Processing," "Systems Analysis and Computer Programming," "Sign Here," "Selecting Methods," "How the Computer Works," "Why Can't I Have One of Those," "Implementing the System" and "The Storage Area."

According to Vice-President Pat Sorrentino, some 80 new modules will be released in the third quarter, including the following: advanced assembly coding techniques, IBM's CICS/VS, System 3 RPG, OS utilities, MVS utilities, IMS, TSO, MVS dumps and structured programming.

The vendors are keeping pace with recent developments, both in hardware concepts and software tools.

We're using Deltak's Structured Design Series for our course in system analysis and design, required of information system majors. Included in our course are eight modules from Deltak's structured programming course for programmers and analysts: the programmer productivity concepts (I & II), the team (implementation and interpersonal dynamics) top-down program design and development (I & II), IBM's Hipo and Warnier diagrams.

Deltak will release 75 additional modules during the summer months, according to Serge P. Beauregard, vice-president. Courses and modules are" "VS1 for Operators" (seven modules), "Cost/Benefit Analysis" (four modules), "CICS Application Design" (five modules), "Structured Cobol" (16 modules), "Missiles of October" (six modules), "Data Base Requirements Analysis" (four modules), "Finance for

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DBMS on Remote Nets Include Varied Facilities

(Continued from Page 68)

tems, bulk updates are stored in a transaction file that is then economically processed against the data base. The most powerful of these systems allow different types of transactions — create, change and delete — to be intermixed in the transaction file.

Data base systems provide the ability to query, update and produce reports, either in a stand-alone mode or by interfacing to a programming language, such as Fortran, Cobol or PL/I. The need to use a language outside the DBMS has been virtually eliminated by some systems. These systems have extensive computational, testing (IF . . . THEN . . . ELSE) and branching capabilities.

The most powerful extension of these capabilities has been the development of procedures, also called macros. Procedures are routines, written in the language of the data base, which are used in a production environment to do query, updating and report generation.

The user typically enters parameters (occasionally in response to prompting by the procedure) which control the processing performed. Available techniques include chaining and nesting of procedures and even recursion, where a procedure can execute itself repeatedly.

Finally, today's systems offer the user a variety of security and integrity features. Security measures include passwords at the field, record and file levels, data encryption and transaction logging for surveillance.

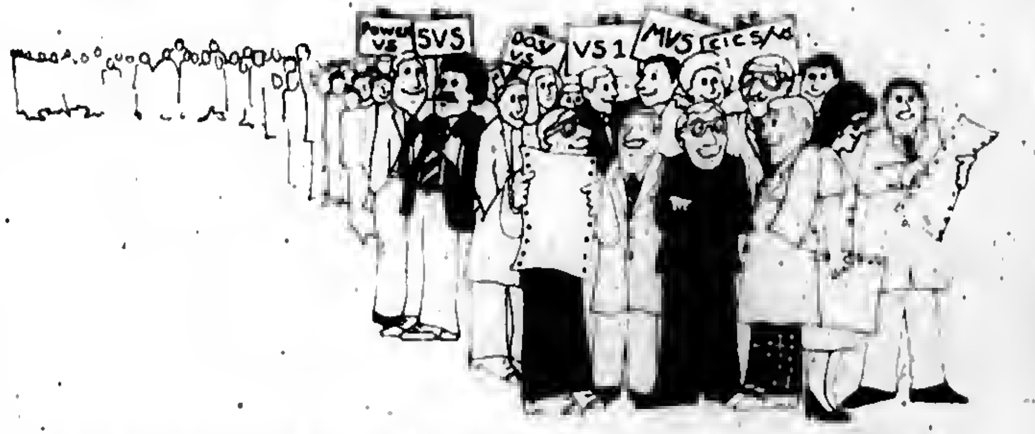
Important integrity checks are built in to protect against loss of data, to correct erroneous updates and to handle concurrent use of the data base. Techniques to insure integrity include backup, checkpoint restart and audit trails. If either the security or the integrity of the data base is insufficient, the user loses control over the application.

No system provides all the features described above, but most provide a mix of capabilities which can be tailored to customer applications. No single system is best suited to meet the processing needs of all users of DBMS. Rather, potential users must first consider their current and future applications and then look for the DBMS which will best serve their needs.

Tarkenton is a senior systems analyst with On-Line Systems, Inc., a Pittsburgh-based remote computing service.

Look Into Johnson Systems'

CICS/VS
UTILIZATION MONITOR AND
CHARGEBACK SYSTEM



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'Dynamo' Now on Minis

CAMBRIDGE, Mass. — Dynamo, a continuous simulation language available on large-scale systems since 1960, has been adapted to minicomputers. Mini-Dynamo operates on CPUs from Digital Equipment Corp., Data General Corp., Varian Corp. and other suppliers, according to the vendor, Pugh-Roberts Associates, Inc.

In its dynamic modeling of industrial, social and engineering systems, Mini-Dynamo is said to work with standard Dynamo equation formats and to produce user-specified tabular and graphical output.

The package also handles automatic sorting of equations for correct computational order and allows a model to be rerun without recompilation, he said. Mini-Dynamo is available for a license fee of $2,500 ($1,000 for educational users) from 5 Lee St., Cambridge, Mass. 02139.

Growth in Available Training Aids Shown in Update of A/V Guide

(Continued from Page 69)

Nonfinancial Managers" (seven modules), "Power/VS" (three modules), "Structured Analysis" (seven modules), "MVS Conversion Guide" (one module), "MVS Selectable Unit Guides" (three modules), "Distributed Processing Techniques" (four modules) and "Project Management" (eight modules).

Rohit Patel, vice-president of ASI, identified nine new DP courses in that vendor's line.

The new course on Jackson methodology and related program design techniques includes an interview with Stan Rifkin, vice-president of Infotech International. Rifkin maintains that the structured software technologies that have developed during the past several years (such as structured design, structured programming, Hipo, top-down design, modular programming and stepwise refinement) have failed to produce exacting, bug-free programs.

"They tend to concentrate on the problem rather than the process at the program design phase," he said.

According to Rifkin, functional-decomposition methods may work correctly using human creativity, experience and intuition at the higher requirements definition and system design levels; but program design needs to be a more mechanical process, corresponding input with output.

His company's Infotech Programming Technique (IPT) is based on the data structure design techniques introduced by Michael Jackson in England.

Other new ASI courses include: "CICS/VS — Release 1.3"; "Metric & DP: A Measure of Progress?"; "Job Analysis: Focusing on the Programmer"; "Software Security — Protecting the Data"; "Mark IV: Processing and Reporting"; "RPG-II Learning Series"; "MVS Dumps (JES2)"; and "On-Line Systems: The Logical Choice?"

The *11th Annual Guide to A/V Instruction in Data Processing* lists the products of each of the suppliers of A/V materials. For a copy, send $4 ($5 if you require an invoice) to *Computing Newsletter*, Box 7345, Colorado Springs, Colo. 80933.

Couger is professor of computer and management science at the Univeristy of Colorado.

'Exchange' Set For Publication

VALENCIA, Calif.— Scheduled to be available "soon" at computer stores or by subscription, the *Software Exchange* will be a bimonthly publication devoted to programs for small systems.

The magazine is expected to carry reviews of user groups, software packages and consultants working with the small computers. Classified advertisements, covering both software for sale and wanted, will also be provided.

Hopefully, each program listed will have a description of its operation and hardware requirements as well as data on where materials that make up the "package" can be obtained, the publisher said.

The magazine will cost $1.50/copy in stores or $8/year for six issues. Other information, including advertising rates and submission forms, is available from *The Software Exchange,* Box 55056, Valencia, Calif. 91355.

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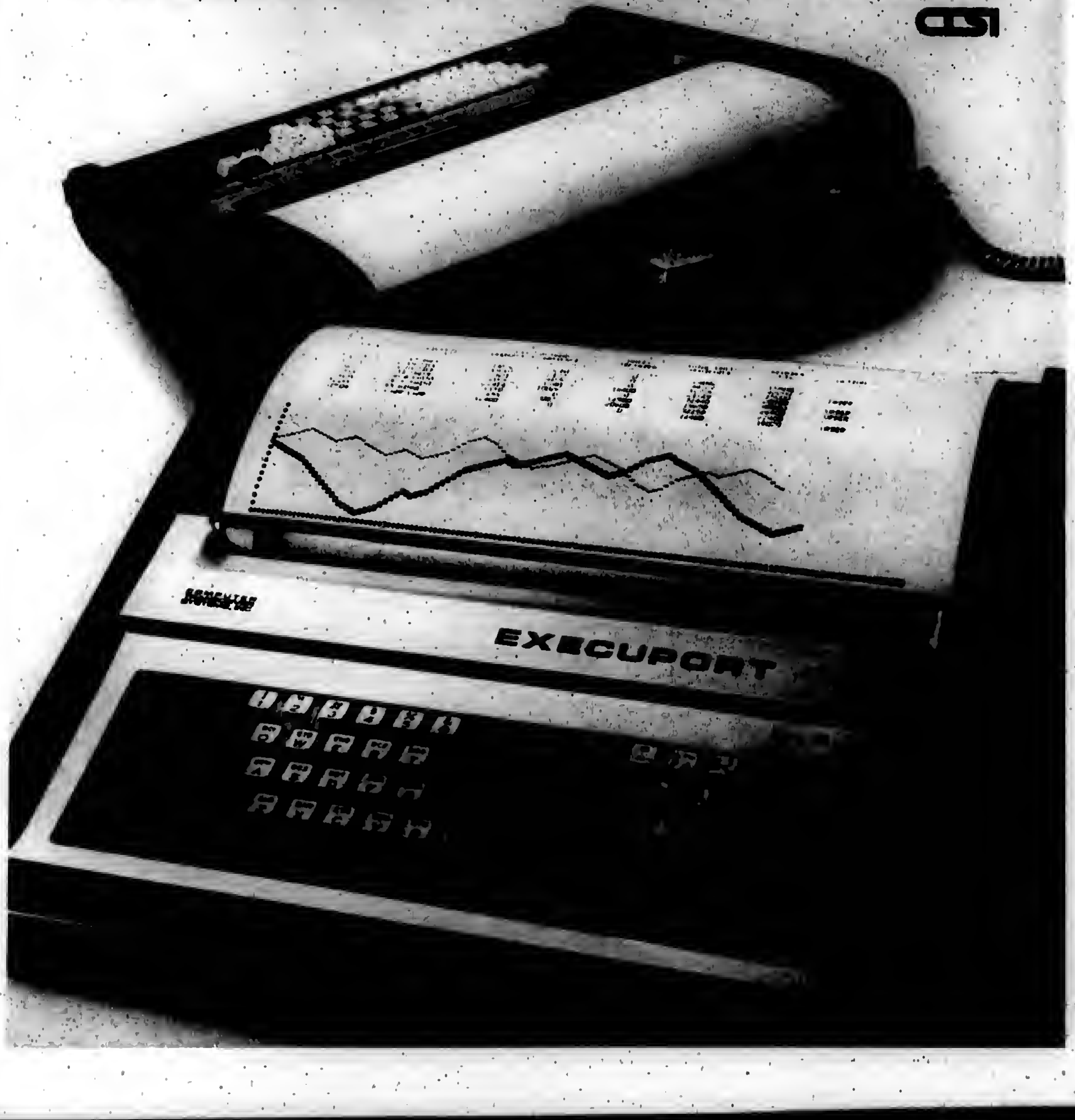
CTSI



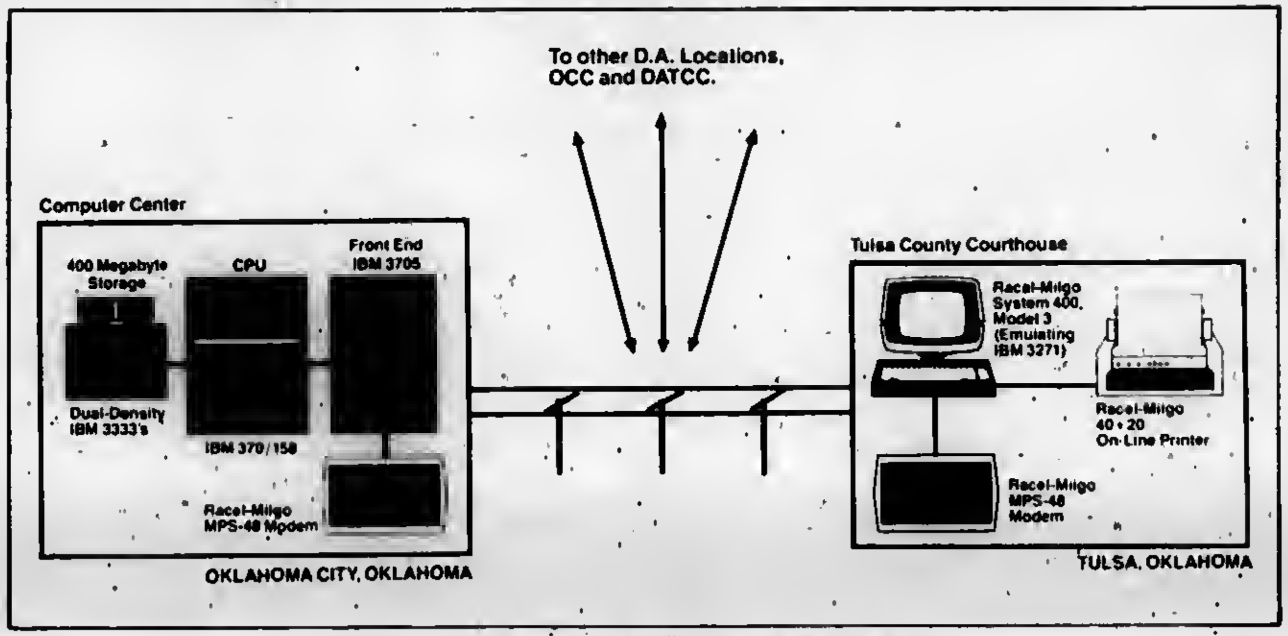
System Serves 77 Counties

Terminal Net Easing Prosecutor's Job

By Glen Wallace
And Jim Wilson
Special to CW

OKLAHOMA CITY, Okla. — Multidropped high-speed terminals and printers linked to a computer center here are providing state prosecutors with immediate DP access for case preparation and management, recordkeeping, report generation, subpoena printing and automatic reporting of case dispositions.

The District Attorney Information System, Dais for short, has been operating with initial funding of close to $200,000 provided by the Law Enforcement Assistance Administration (LEAA). Service to 77 state counties is maintained by the Oklahoma Crime Commission (OCC) under control of the state District Attorney Training and Coordinating Council (DATCC). OCC provides trained computer personnel as well as DP and terminal equipment.



The District Attorney Information System

System terminals and printers are in place at district attorney offices in five Oklahoma counties: Oklahoma, Tulsa, Comanche, Cleveland and Muskogee. The equipment, used to make information requests, to enter information and to print reports and forms, is linked with the DP center here by a leased multidrop line.

Racal-Milgo, Inc. MPS-48 synchronous data modems handle data from these locations at a rate of 4,800 bit/sec, facilitating fast reponse times — typically about three seconds.

Automatic polling or calling of each of the prosecutor locations for messages is controlled by an IBM 3705 front-end processor at the DP center. The CPU at this site is an IBM 370/158, which operates in conjunction with IBM 3330 dual-density storage units.

This equipment, which provides on-line processing and storage capacity of about 400M bytes, currently maintains 200,000 criminal records and 52,000 case-disposition records, with about 4,000 master records added each month.

Data handling and display at the remote sites is accomplished using Racal-Milgo System 400 Model 3 terminals configured to function in either IBM 3275 or 3271 terminal modes. Terminals operating in the 3275 mode operate a CRT exclusively and are located at OCC and DATCC.

System 400 terminals emulating IBM 3271

(Continued on Page 72)

Real-Time Management System Tracks Network Performance

LARGO, Fla. — A network management system that reportedly "tracks" the performance of data communications networks on a real-time basis and provides specific information on circuit problems in conversational English has been introduced by Paradyne Corp.

The system, called Analysis, automatically gathers, displays and stores data on the performance of data communications lines, modems and terminals in point-to-point and multidrop networks.

Two versions of the network management system are available — the CCA, featuring a rack-mounted alphanumeric Touch-Tone entry pad and LED readout, and the CCB, which includes keyboard/CRT terminal and hard-copy printer. Either configuration allows nontechnical operators with no special training to control networks from a central site, the firm said.

Analysis automatically collects data from as many as 144 multidropped lines, displays that data in plain English and provides control over modems throughout the network, according to a spokesman. In addition, it provides management reports on network, line and modem availability.

Analysis is based on Paradyne's MP-48, a 4,800 bit/sec modem which employs dual microprocessors in place of hard-wired logic or LSI circuits. One MP-48 microprocessor is said to handle such functions as equalization, scrambling, encoding and filtering,

(Continued on Page 72)

Both Types of Bread Available To Convenience Store Shoppers

LOUISVILLE, Ky. — At Convenient Food Mart stores here, making a savings deposit can be as simple as picking up a loaf of bread. In 60 of Convenient's Jefferson County stores, IBM 3608 financial service terminals, which are part of Citizens Fidelity Bank's Service Tree electronic banking network, enable customers to do many banking transactions at neighborhood stores.

"Our stores are located and designed to provide handy shopping for our customers," according to Robert Johnson, senior vice-president of Convenient Industries. "We decided to offer self-service banking as another way of helping them."

The table-top terminals have been programmed by the bank to enable transaction card holders to make deposits or withdrawals to and from checking and savings accounts and to make balance inquiries. Cash advances from Visa accounts are also available using the in-store terminals.

Citizens Fidelity customers using the system insert a transaction card, enter a personal identification number (PIN) and select a transaction. The terminal prints an authorization form for the customer.

The terminals are linked to an IBM Model 3602 controller connected to a Model 3705 front-end processor, which is interfaced to a 370/158 CPU.

(Continued on Page 73)

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Oklahoma Terminal Net Eases Prosecutor's Job

(Continued from Page 71)

units predominate in the system. In this buffered mode, the System 400 is capable of simultaneously operating both a high-speed Racal-Milgo 40/20 printer and CRT screen, allowing the keyboard and screen to be used while an incoming message is being printed.

A total of eight System 400 terminals and six high-speed 40/20 printers are in operation, with plans already under way for future expansion.

The basis of data entry in Dais is either written reports or terminal forms filled out by the prosecutor personnel. These reports, prepared when an individual is screened by a prosecutor and after each court appearance, include complete personal data, arrest information, defense attorneys, individuals involved, charges and status, witness listings and trial data.

When a form is completed, the prosecutor's terminal operator keys the information into the System 400 CRT screen. Written forms from counties without terminals are mailed to the OCC terminal center for data entry.

Immediate access to stored data on convictions, court transactions, arrest information, witness records and other pertinent information is reportedly helping prosecutors prepare better cases, make quick decisions and manage a large number of cases.

In operating Dais, a large store of information is built up. On the basis of this data, the system can generate a number of printed management reports for use by prosecutors. Thirty different reports can be generated at the central site.

Dais hopes to expand on-line service to other counties when funds become available.

Wallace is director of the Statistical Analysis Center of the Oklahoma Crime Commission. Wilson is manager of statistics at the Oklahoma Crime Commission.

Unit Tracks Network Ills

(Continued from Page 71)

while the other provides dynamic information on transmission impairments and controls the modem processor during diagnostics.

MP-48 master and slave modems are linked along a low-speed (110 bit/sec), noninterfering diagnostic channel monitored by a minicomputer-based diagnostic processor at the central site.

Information on loss, noise, phase jitter, amplitude and phase delay distortion and other performance parameters is gathered from every drop on the network, assembled and analyzed for exception and alarm states and displayed in conversational English on the CRT screen or LED readout, the company said.

Major components of Analysis are a minicomputer-based central site control unil, one or more MP-48 master modems and up to several hundred MP-48 slave modems located throughout the network.

The central site control unit includes the 16-bit minicomputer with 24K words of memory; a 920-character CRT with separate keyboard; and a disk controller and two floppy disk drives, each able to store 242K characters. The CCB version of Analysis also includes a 120 char./sec printer.

The CCA version of Analysis with manual control is priced at $3,500; the CCB with CRT, microprocessor, dual floppy disk storage and printer costs $36,600.

Remote sites cost $3,000 each, but a remote diagnostic board can be added to MP-48 modems already installed at a cost of $850.

The Analysis systems operates with Paradyne modems at 4,800- or 2,400-bit/sec, Paradyne said from 8550 Ulmerton Road, Largo, Fla. 33541.

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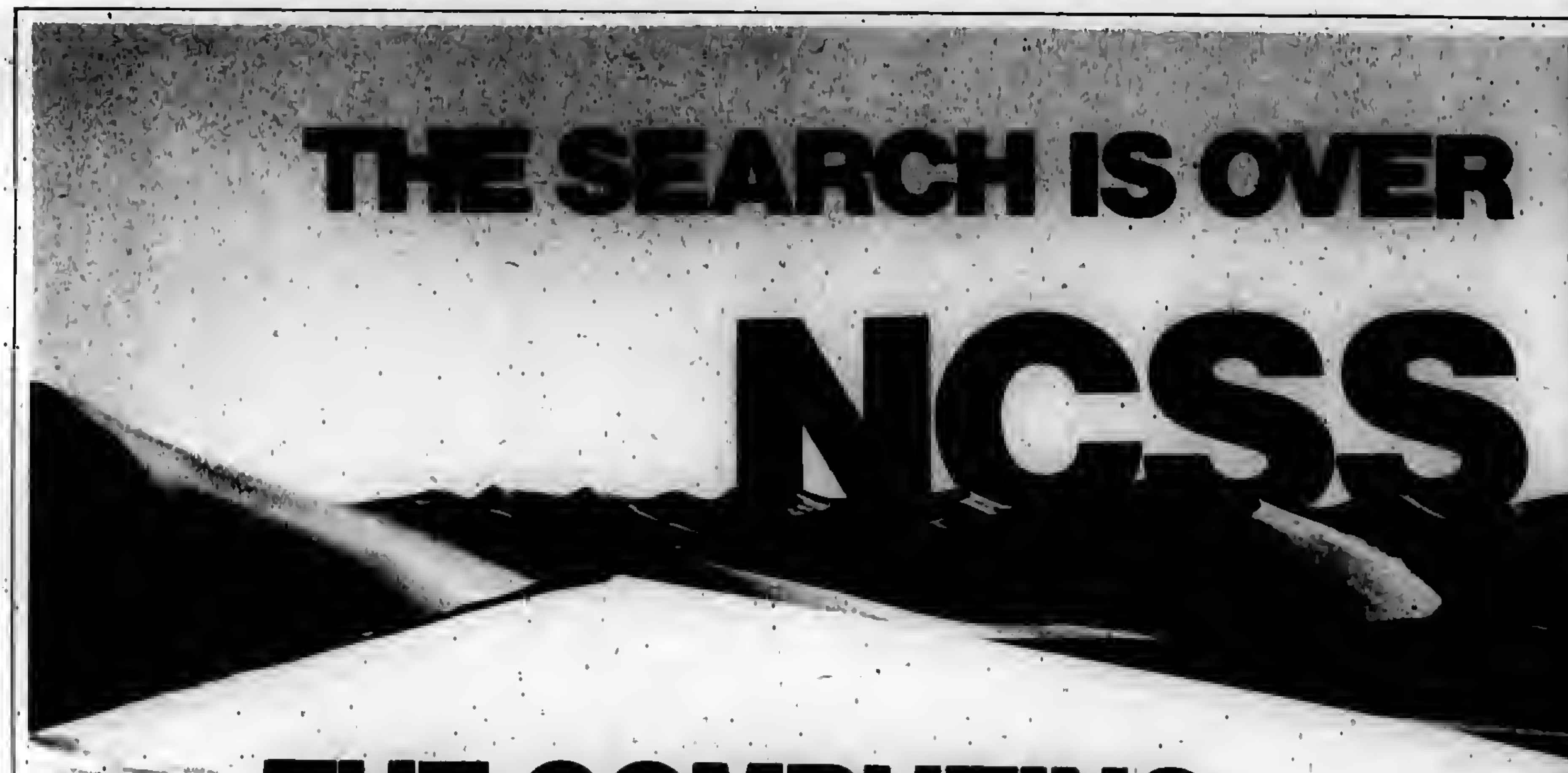

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Because, up until now, you've been relying on someone else's computer—either in-house or timesharing. And, chances are, that computer is IBM-oriented. So, what you're looking for in your own computing system is one most like what you've been using.

And that's where your difficulties begin.

Since you can't find a system that will let you do things the way you're used to doing them, you face monumental problems. With program conversions. With people training. And, with hardware costs.

You're also concerned about adding applications to the system as your operations grow. And, you're worried about back-up before you even worry about start-up.

At best, you now find yourself trying to find a system that will solve just some of your problems. You're willing to compromise on the other problems. And, in the end, you'll settle for some kind of a system you can call your own.

Direct Message Entry Terminal Bows

WESTLAKE VILLAGE, Calif. — A direct message entry terminal has been announced by Franklin Systems Corp. Designated the Franklin TO-2000, the system reportedly modernizes Telex and TWX operations by eliminating the need for Teletype 33ASR or similar entry units.

This results in cost savings of up to 90% on normal Teletype operations, depending upon the number of operators and shifts in use, the company claimed.

The TO-2000 scans, at 330 char./sec, messages typed on a standard IBM Selectric typewriter and either sends them to a paper tape punch, eliminating tape preparation, or to the Franklin Auto-Dial and Memory System, which transmits directly into the Telex or TWX network and receives on a printer, according to the firm.

The TO-2000 features automatic sending if no errors or unreadable characters exist and CRT text editing.

The system, including an optical character recognition unit, CRT with keyboard and paper tape punch, sells for $60,000. The rental price is about $1,500/mo on a five-year lease. Franklin is at 733 Lakefield Road, Westlake Village, Calif. 91361.

Software Gives CDC Users RJE Link to Sycor 445

ANN ARBOR, Mich. — Sycor, Inc. has enhanced the communications capability of its Model 445 distributed data entry and processing system by adding Control Data Corp. remote job entry (RJE) to its program library.

In addition to the printer, CRT screen and keyboard of the CDC UT200 terminal, the Sycor 445 system offers a choice of five printing speeds and the use of disk files, diskette, cassette and magnetic tape, a spokesman said.

Users of Sycor 445 systems are not confined to the peripherals available on the UT200 or similar CDC terminals, he added.

Users of 445 systems can tailor the RJE software to fit the requirements of the CDC host computer and the available transmission capabilities by configuring the software for items such as line speed and number of buffers. This is done by setting configuration instructions which are stored on the 445's disk, the firm said.

The system reportedly allows the RJE user to concurrently perform data entry while communicating with the host computer. Since up to eight Sycor CRT units can be attached to the 445 system, other tasks can be done while the software is running, according to the company spokesman.

The CDC RJE software will be available free of charge to 445 users in October. A typical 445 configuration; including 5M bytes of disk memory, four data stations, one bidirectional printer and a communications adapter sells for $60,000.

Lease rates are $1,397/mo on a one-year lease, $1,277/mo on a two-year lease and $1,156/mo on a three and a half year lease, all including maintenance. Sycor is located at 100 Phoenix Drive, Ann Arbor, Mich. 48104.

Store Offers Bread, Cash

(Continued from Page 71)

To complete the transaction, the customer takes the authorization to the checkout clerk. The clerk takes the checks or cash to be deposited or gives cash to the customer for withdrawals.

According to Johnson, offering the service not only helps customers, but benefits the stores as well. "We've seen increased traffic in the stores offering self-service banking," he said. "It gives customers another reason for shopping at Convenient Food Marts."

Well, prepare yourself for a pleasant surprise. You don't have to just settle anymore, because National CSS, Inc. is introducing the NCSS 3200 Series of computing systems.

370-COMPATIBLE. With the NCSS 3200 you can continue to do data processing the way you always have because the NCSS 3200 is 370-compatible. That's the way the operating system was designed over 10 years ago. It's 370-oriented which means you don't have to worry about program conversions. Or retraining your people.

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IBM Enhances Data Collection System

ATLANTA — IBM has added enhancements to its 5230 data collection system that "enable it to move into new business environments," according to the firm.

One addition is the Model 5239 Value Read Module and Attachment Feature, which can record material weights at various stages of an operation as well as read cycle counts, run times and linear measurements, the firm said. By combining such readings with other data, including job or employee information, the computer can generate billing data and inventory lists along with production and other management reports.

Value Read can operate in manual, protected, semiautomatic and automatic data entry modes, the firm said. The module and attachment will be available in September for $1,940 or the feature can be leased for two years at $61/mo.

Another enhancement is the Model 5236 data entry station, designed for areas such as hospital nursing stations, library check-out counters, stockrooms, loading docks and quality control laboratories, the firm said.

A spokesman said that the 5236, like the Model 5235 data entry station, can be used with Value Read and the Badge Contracts Closure feature enabling employees to control such devices as gates, lights and alarms by inserting their badges at an entry station.

A basic 5236 sells for $1,580 or leases for $55/mo for two years. It will be available in December.

In addition, through bisynchronous communication, the 5230 can be attached to the IBM 5110. Informtion collected at various entry stations is transmitted to the 5110, which can generate various management reports, according to the firm.

IBM 5236 Data Entry Station

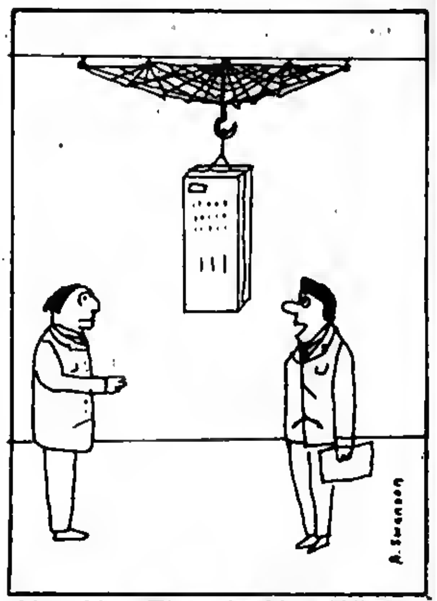
Scan-Data Gives Fast Food System Remote Access

CHICAGO — Scan-Data Corp. has introduced an addition to its Positran fast food order entry and operations control system that reportedly enables fast food owners and operators to communicate directly with the system from remote locations over standard telephone lines.

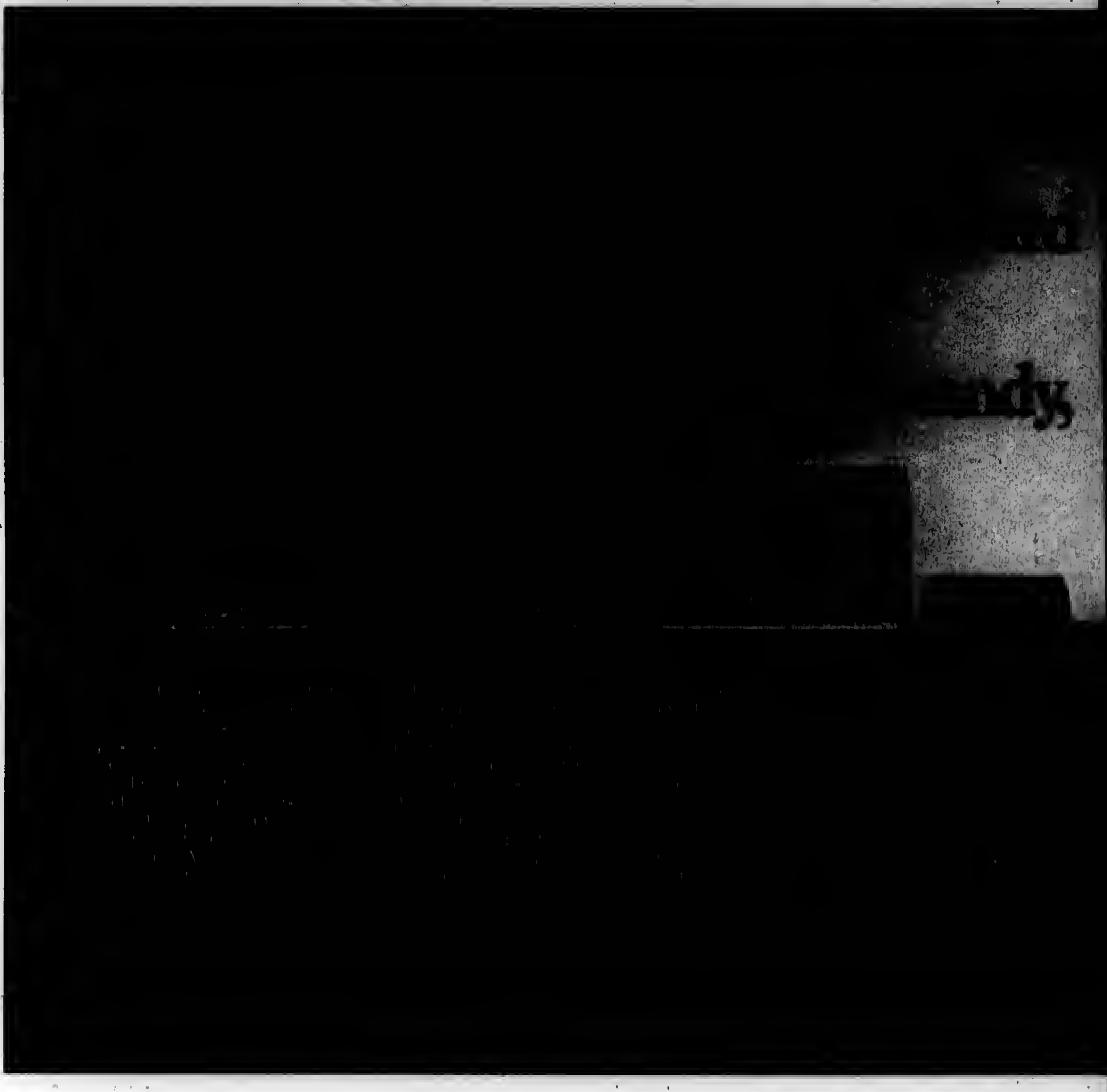
Called Telstat, the option enables an owner-operator to monitor and participate in store operations through the use of a keyboard printer or display terminal, according to the firm.

Any of the more than 70 Positran management accounting and control reports dealing with cash control, sales analysis, inventory control and labor cost control can be accessed over telephone lines from another store, a central office, home or any remote location, according to the firm. In addition, Telstat provides the ability to change prices, recipes, pay rates and other base information; to monitor sales activity by product, cashier or for the entire store; and to observe inventory, labor and cash status, the spokesman said.

The Telstat option is available from Scan-Data for $1,000 with delivery in 60 days. The firm is located at 800 E. Main Street, Norristown, Pa. 19401.



'No, No, That Is Not What I Meant When I Told You to Hook the Computer up to a Network.'



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Multifunction Terminal Handles IBM 360, 370

MINNEAPOLIS — Control Data Corp. has introduced what it said is the first in a series of multiple-function terminals that can be operated as stand-alone processors or terminal devices by business users of IBM 360s and 370s.

The basic configuration of CDC's C-760 multifunction terminal includes a microprocessor-controlled keyboard and CRT display, read-only memory and 49,152 characters of random-access memory, flexible disk storage and controller and a forms-programming language.

This configuration can be expanded by adding an optional matrix printer, a second flexible disk drive, one 16K-byte memory increment and a Business Basic software compiler, a spokesman noted.

The C-760 CRT terminal incorporates a Zilog Z/80 microprocessor, expandable memory and IBM-compatible communications protocols, with printer and floppy disk interfaces and a detachable keyboard. Up to 2,000 characters of data can be displayed in a format of 25 lines with 80 char./line.

The CRT is compatible with IBM 2770, 3770 and 3780 terminals and provides data communications with a host computer at speeds of 1,200- to 9,600 bit/sec, according to the spokesman.

User application programs are stored and entered into the C-760 through the flexible disk subsystem. The subsystem contains a microcontroller, power supply and one or two disk storage units to provide either 512K or 1M byte of formatted data storage.

Depending on the length of the line, the unit prints at rates of 70- or 200 line/min with a speed of 180 char./sec, CDC said.

Two Languages

User programmability of the C-760 terminal is supported by two languages: a forms language that permits clerical operators to generate and execute application programs and an optional business version of the Basic compiler for use by technical operators with more sophisticated program requirements.

The forms language allows an operator to display a form on the terminal screen and define the characteristics of each data field contained in the form. Through a set of registers, intermediate data is carried forward and arithmetic operations are performed at the point of data entry.

When a form is completed, the information can reportedly be stored on a flexible disk, printed or transmitted to the host computer

Extensions to the Basic language in the business-oriented package include 14-digit-precision arithmetic and the ability to handle data strings up to 255 characters in length. These and other enhancements improve the business programming capability of the C-760 terminal, CDC claimed.

The purchase price for a minimum C-760 terminal with CRT, 49,152 characters of memory, floppy disk and the forms language is $8,671. A terminal configuration that adds a second floppy disk, matrix printer and Business Basic sells for $12,750.

One-year lease prices for these configurations are $256 and $384, respectively, per month; monthly maintenance is priced at $85 and $165. Deliveries will begin in June.

CDI Miniterm Gets 32K Option

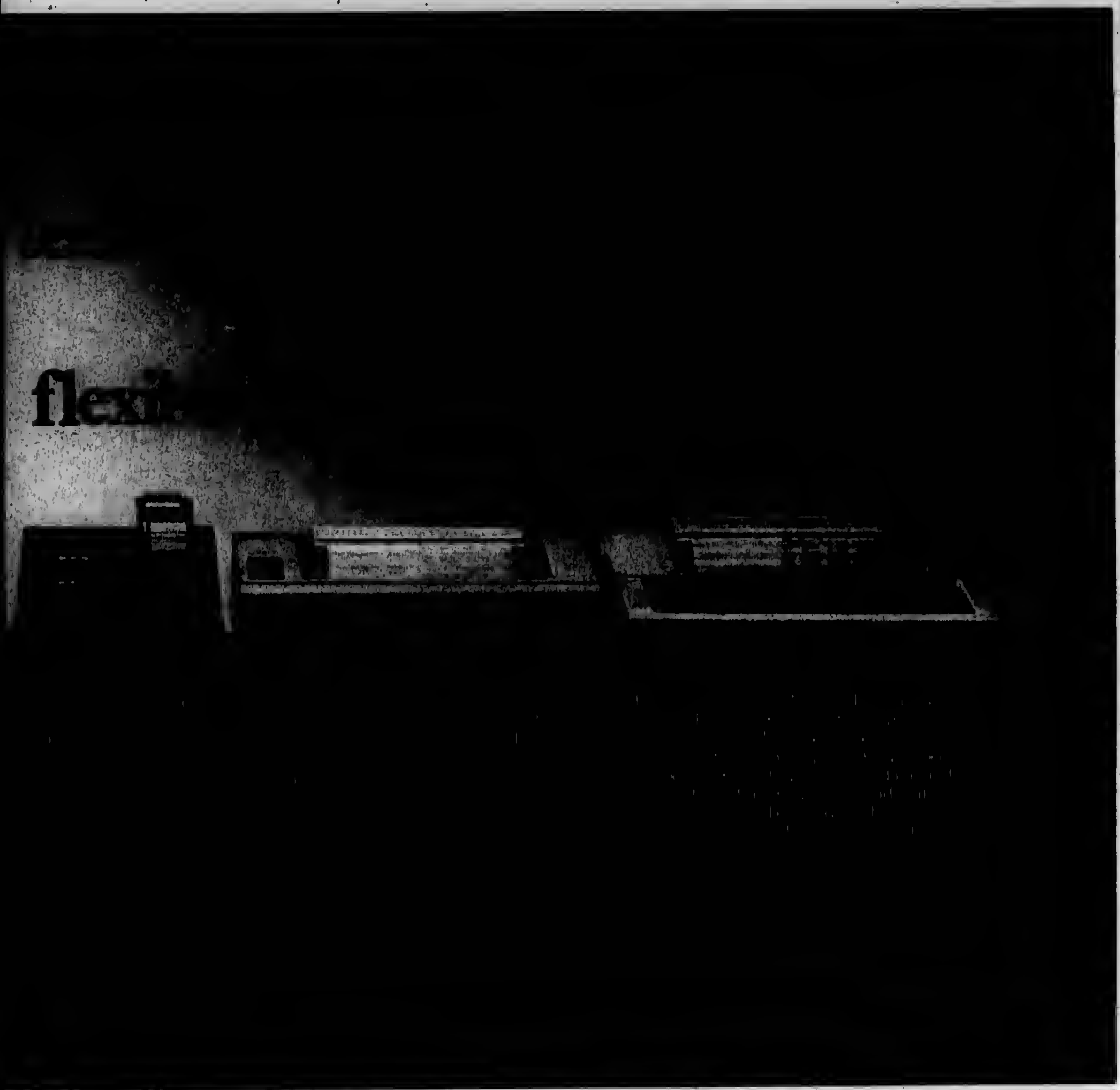
BURLINGTON, Mass. — Computer Devices, Inc. (CDI) has released a 32K random-access memory (RAM) option to its line of Miniterm 1204 desktop and Miniterm 1205 portable automatic send/receive terminals.

These terminals feature an integral 32K RAM and a built-in minicassette tape transport with 68,000 characters of removable storage, according to a spokesman.

The increased memory capacity combines with a three-mode keyboard, a 35 char./sec buffered thermal printer and switch-selectable Ascii or binary code, CDI said.

The 32K option is priced at $750. The base price of the Miniterm 1204 is $3,385, including a one-year warranty, or $165/mo on a one-year lease.

CDI is at 25 North Ave., P.O. Box 421, Burlington, Mass. 01803.



These Hewlett-Packard terminals are compatible with all the major interface standards and work with computers from a range of manufacturers. They come with full HP support, service, training, and documentation.

To find out more about these (and others) in our growing line of terminals, call the HP office listed in the White Pages. Or send us the coupon. If you don't see exactly what you're looking for here, let us know. There are plenty more where these came from.

HEWLETT hp PACKARD

Canadians Set Electronic Mail

REXDALE, Ont. — A Canadian electronic mail service is scheduled to go into service in November. The designers of the Facscan system, Ivor Kaye & Associates here, estimate it will cost 98 cent/document to provide a two-hour delivery service between users in the areas served.

The service will initially operate between Montreal, Ottawa, Toronto and Vancouver. As demand increases, most of the major centers in Canada will be covered, the designers said.

The cost of the service is "distance-insensitive," the firm said.

In addition, the company plans an express service which will provide a 15-minute delivery service at $1.35 per document and overnight delivery for 70 cents.

System users require a standard facsimile terminal. These are available from suppliers such as Xerox Corp. and 3M Co. for about $55/mo rental or about $1,600 outright purchase, the spokesman said.

Kaye hopes to expand the service eventually to include transatlantic and transpacific facilities, hinging on agreement from foreign administrations and Teleglobe Canada. The company also plans to interface its equipment with a U.S. corporation.

The service has been approved by the federal Canadian department of communications and intercity transfer of information will be via CNCP Telecommunications.

SDLC Logic Chip Has HDLC, ADCCP Acceptance

NEWPORT BEACH, Calif. — An MOS/LSI programmable Synchronous Data Link Control (SDLC) chip has been introduced by Western Digital Corp. The SD 1933A/B has an NRZI encode/decode option and a 1.5M bit/sec transmission rate, according to a spokesman.

Said to be compatible with IBM, High-Level Data Link Control (HDLC) and Advanced Data Communications Control Procedure (ADCCP) protocols, the SD 1933 chip interfaces parallel digital systems to synchronous serial data communications channels employing IBM's SDLC line protocol, the firm said.

The chip was designed for use by vendors of OEM terminal equipment.

In applications such as telecommunications, switching networks, packet switching or in mainframe terminal communications, the SD 1933 reportedly replaces nearly 70 logic ICs currently required for the same function, according to the firm.

The 40-pin chip features synchronous full-duplex operation, programmable modem control interrupts, error detection and a go-ahead option for loop applications, the spokesman said. The SDLC chip may be used with all types of mainframe, minicomputer and microcomputer data buses, Western Digital claimed.

The SD 1933 SDLC protocol includes zero insertion and deletion, CRC generation and checking and automatic detection and generation of special control characters such as Flag, Abort, Invalid and Idle.

The 1933 is compatible with Western Digital's Model 1833 direct memory access (DMA) controller, the firm said.

Prices for the package begin at $25 in 100-unit quantities. Western Digital is at 3128 Red Hill Ave., Newport Beach, Calif. 92663.

Kaufman Adds Concentrator

LOS ALTOS, Calif. — A data concentrator/multiplexer designed for inquiry/response systems has been announced by Kaufman Research. The Model 811 allows up to eight lines at up to 19.2k bit/sec access to a single computer port, the vendor said.

Buffer storage of several hundred characters per line reportedly makes it feasible for a small computer system to support many devices without losing data.

Application areas include transaction systems, front-end multiplexing and remote concentration of data lines, the firm said. Kaufman Research can supply units with special user protocols, such as line editing and preprogrammed responses.

Prices begin at $2,600 from Kaufman at 99 Sylvian Way, Los Altos, Calif. 94022.

Shop Floor Terminal Reads Badges, Cards

BUFFALO, N.Y. — A bench-mounted shop floor terminal, designed to be located in production work areas, warehouses and receiving and shipping departments for data entry, has been announced by Sierra Research Corp.

The SDA-706MP reads any number of cards or badges interchangeably under software control, according to the firm. Standard 3.25-in. Hollerith cards or badges are used in the reader and up to 80 columns (user-selectable) may be read, the firm said.

The microprocessor-based terminal has a 10-key numeric keyboard and features a 16-digit alphanumeric display, 10 function keys and system status indicators, according to a spokesman.

The unit is priced at about $6,000 from Sierra Research Corp.'s Data Systems Division, P.O. Box 222, Buffalo, N.Y. 14225.

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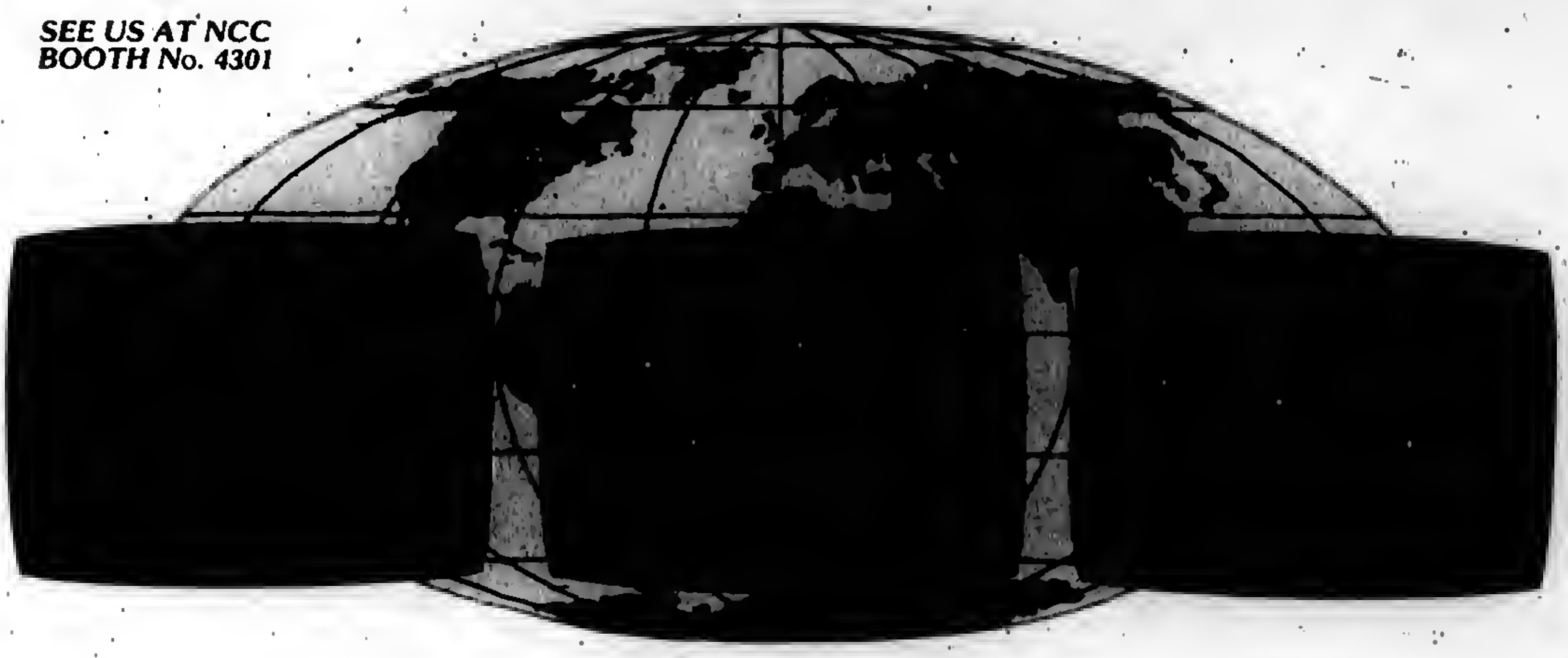

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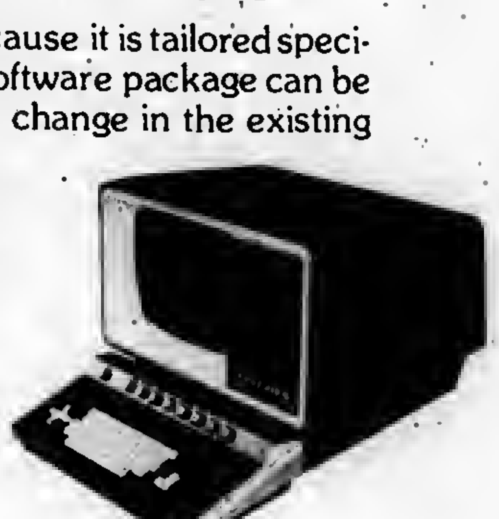

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Better Software Essential

Networks Helping Airlines Cope With Traffic

By Sidney F. Quint
Special to CW

Domestic airlines have rapidly expanded their use of computers and of communications links in recent years, and that trend will continue indefinitely for two simple, but compelling reasons: the phenomenal growth in air traffic is fast making manual systems obsolete. Second, intense pressure is being exerted by fuel, labor and equipment amortization costs. To survive, the airlines must increase efficiency in their operations wherever possible, and automation can allow them to do so.

Automation began for most airlines where it has for other businesses — in accounting and other "traditional" DP functional areas. It was the requirement for real-time reservations systems, however, that caused terminal-oriented networks to begin mushrooming some 10 years ago. Today, such networks are continuing to expand with the inclusion of travel agencies in addition to airports and airline ticket offices.

At the same time, real-time reservations networks continue to expand, terminals are appearing in a multitude of other operational areas. Perhaps the largest of these is departure control, encompassing ticketing, check-in and the issuing of boarding passes.

But automation is also under way or planned by many airlines in such areas as cargo control, crew scheduling, catering, maintenance control systems and the updating of information for airport flight monitors. Clearly, the more an airline automates, the more that airline sees what can be automated.

Forces Behind Trend

Behind the trend toward automation among domestic airlines is the declining cost of terminal systems hardware, the evolution of multifunction terminals and the increasing efficiency of communications links made possible by technological advances in high-speed modems, concentrators and other communications-related hardware.

But at the same time that hardware costs are coming down and communications efficiency is increasing, the massive volumes of data generated by rapidly expanding automation is posing problems of circuit saturation for some carriers.

The trend toward redundant computers has all but eliminated problems from processor failures. A variety of solutions can minimize problems stemming from the unavailability of communications lines through saturation or other causes. Those solutions include adding additional lines or adding higher speed lines.

Other solutions will become more clear as communications technology continues to evolve. More widespread implementation of IBM's Synchronous Data Link Control (SDLC) protocol, with its potential for providing more efficient utilization of communications links, may provide a partial answer for some carriers.

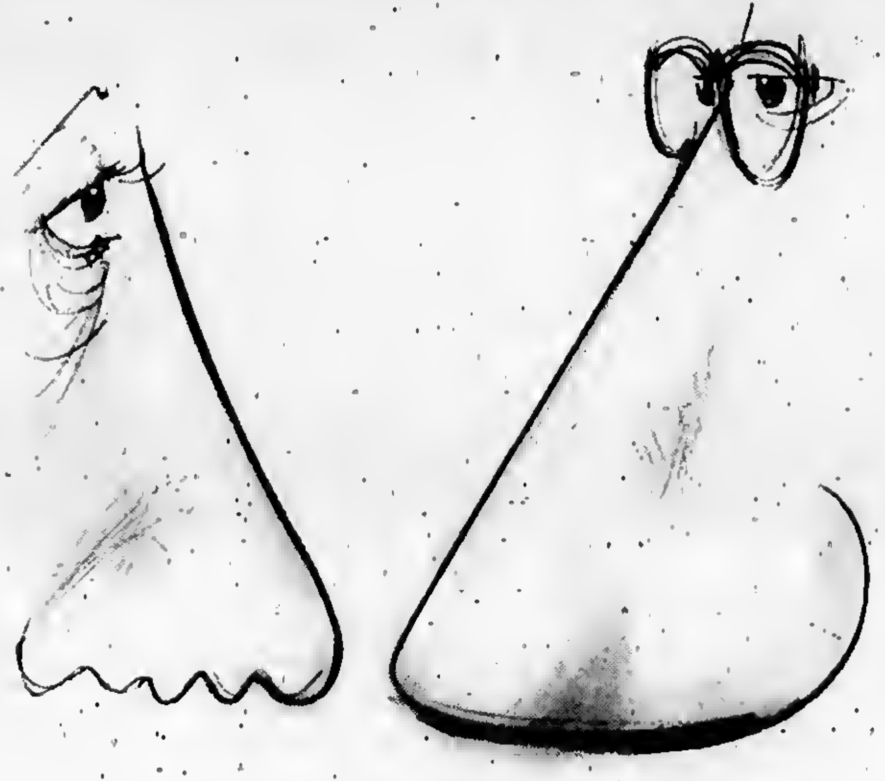
Possible Directions

Some examples of recent trends in communications technology as they apply to airlines will shed some light on possible future directions, although the specific growth paths each airline will take will depend upon the airlines' individual requirements and priorities.

Intertwined in the problem of saturation in communications links are mainframe addressing, polling and terminal response times, and one evolutionary trend relating to all three involves more widespread use of distributed processing concepts.

Under IBM's Programmed Airline Reservation System (PARS) discipline, for example, each mainframe interchange address can serve at least 36 device addresses. An addressing problem arises if fewer than 36 devices are installed at a given location; potential device addresses are

(Continued on Page 78)



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Tek-Com Adds Coupler

SUNNYVALE, Calif. — Tek-Com, Inc. has announced a 0- to 1,200 bit/sec full-duplex acoustic coupler.

The Model TC 3003 acoustic coupler operates asynchronously full-duplex over voice-grade telephone lines and the long-distance direct dial network, according to a company spokesman.

A corresponding auto-answer modem, Model TC 4004, will operate at 0- to 1,200 bit/sec when a TC 3003 is used at the remote location. Both models are compatible with the Bell 103-type modems at 300 bit/sec.

Price for each unit is $695, with 40-day delivery.

Tek-Com, Inc. is located at 1143 Sonora Court, Sunnyvale, Calif. 94086.

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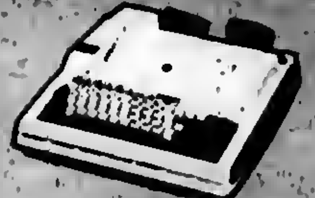

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Chain of Fireplace Shops Claims POS System Saving Time, Money

COLUMBUS, Ohio — King's Row Fireplace Shops, Inc., headquartered here, has "saved a lot of time and made cumbersome and difficult jobs easy" with Point-of-Sale Business Systems, Inc.'s POS system using Digital Equipment Corp. equipment.

Although the firm is still in the process of incorporating programs into the system, Rich Kelly, general manager of the company, claimed the system is already saving not only time but skilled people. "With our manual general ledger system, you had to have quite a knowledge of what you were doing. Now we can simply summarize the information and give it to somebody to input into the computer and it sorts it all out for us," he said.

The retail company uses NCR Corp. 250 cash registers in its 14 stores. "Each store sends in transaction records on cassette every day and POS Business Systems was able to couple the NCR 250s with DEC equipment so it could read the cassettes. Now inventory is automatically recorded — there's no manual work in it at all," Kelly said.

The hardware installed at King's Row is the PDP-11/03 CPU with 32K MOS memory, 10M-byte disk storage, two VT-52 CRTs, an LA-180 line printer, time-sharing monitor and POS interface.

The system, installed since December 1977, is presently being used for inventory, payroll and general ledger, Kelly said. Accounts payable and accounts receivable are in the process of being installed.

Kelley has no major complaints about the system and would "very definitely" recommend it to other companies, he said. The only problems occurred shortly after installation when software gaps became evident, resulting in frequent "breakdowns" of the system, he said. "While we thought the program looked good on paper, in practical use it was not good. When it broke down, we'd have to wait five days for them to come out and correct it," with work backing up in the meantime." He called the problem "really minor compared with the whole situation."

Kelly said he has no specific upgrading plans at the moment because he is "pretty thoroughly set up." He added, "We probably will in the future because there may be something else I don't know about now."

Cost of installing the system, including all software and excluding the cash registers, is $50,000 or $1,115/mo for five years.

Better Nets Helping Airlines Cope

(Continued from Page 77)

wasted in the airline's computer.

That problem can be expected to become more severe as reservations networks, for example, are expanded to include more and more travel agencies, which typically require fewer than six devices.

The problem is compounded by the time required to poll each interchange on a network, and that polling time, in turn, affects response times at each terminal device. The effect becomes greater as traffic on the network increases.

An intelligent communications line control unit can relieve the mainframe processor of the need to poll each interchange on a network. Linked to the mainframe, this controller represents one or more interchange addresses yet is able to handle multiple downline circuits with multiple interchanges on each.

All the device addresses on their individual interchanges may be mapped into device addresses of the host interchanges, using address translation techniques. That eliminates the problem of wasted addresses.

Polling Process Speeded Up

By polling the downline interchanges at a higher and independent rate than the mainframe would have been able to poll, and by transmitting to the mainframe only when a terminal connected to an interchange that is downline from the communictaions line control unit has traffic to send, the communications line control unit can speed up the polling process by as much as a factor of three. That maintains efficient terminal response times.

The key to the capability, however, is software rather than hardware, and advances in software technology will likely determine the future of airline communications. Software can complement a remote terminal capability, for example, by allowing downline terminals to function as if they were locally connected to the mainframe.

Unified communications networks may prove to be the ultimate requirement for meeting the expanding computer and communications needs of domestic airlines.

Sidney F. Quint is *director of marketing, transportation at Raytheon Data Systems, Norwood, Mass.*

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Telpar Builds Micro Printer

ADDISON, Texas — A full-duplex I/O printing terminal, the T-48C, has been announced by Telpar, Inc. for use with microcomputer systems.

The printer, the PS-48C, is a 48-column, self-contained, Ascii-coded device utilizing an F8/3870 single-chip microprocessor as the system interface and controller, according to the company.

Operation is possible in any of four modes: TTL parallel, TTL serial, RS-232C serial and 20mA loop serial, a spokesman added.

The PS-48C operates interactively, printing one character at a time as characters are received. Print format is a 5 by 7 dot matrix and the throughput rate is 24 char./sec, the firm said.

Where requirements exceed 48 columns, the system automatically prints on the next line, the spokesman noted.

The KB-59C keyboard is formatted for both Teletype and typewriter capability. When interfaced to the printer, it results in a full-duplex, I/O terminal with bit-serial input and output.

Printer Features

Features of the PS-48C printer include no ribbons or ink; 96 Ascii characters, both upper and lower case; signalling rates of 110- or 300 bit/sec in serial mode and up to 960 char./sec in parallel mode; local line feed for advancing paper; and parity check (odd, even or none).

The T48-C terminal is priced at $888. The PS-48C printer is $666, with the KB-59C keyboard offered at $222.

OEM prices for these products and the printing mechanism, with or without interface, are available from the company at 4132 Billy Mitchell Road, P.O. Box 796, Addison, Texas 75001.

Terminal Helps Price Dream Home

TORONTO — A terminal-based "design-a-home" system developed by the Residential Group of The Cadillac Fairview Corp. Ltd. is helping to make it easier for house hunters in the Toronto area to find and purchase new homes.

The free service, first demonstrated at the Canadian National Home Show here in April and believed to be one of the first offerings of its kind in North America, allows prospective buyers to use a Data 100 Corp. terminal system to design a home to match their specific needs.

By key-entering answers via the system's keyboard to statements displayed on the system's CRT screen, buyers are led through a series of 21 questions regarding on the type of house and type of options they want.

After computing an "estimated" price for the home by comparing the buyer's responses to a table of statements stored on the system's 5 million-character disk, the terminal system prints out the full set of questions and answers on an attached printer.

At this point, the system asks a series of personal questions about the applicant's lifestyle and financial situation. The system then calculates and prints out the "estimated" price of a home which the buyer can comfortably afford.

If the cost of the dream home is more than what the buyer can reasonably afford, the system allows the buyer to reenter information into the terminal and redesign the home to fit the affordable price range.

By preprogramming the system to accept certain responses and reject other out-of-range conditions, the entire design process takes less than two minutes.

"It's quite simple," according to Glenn Robeson, manager of systems and procedures for the Residential Management Group of Cadillac Fairview and the man responsible for designing the program (in cooperation with the sales department). "If the buyer says that he is not married, the system eliminates any further questions about the buyer's spouse.

Cadillac Fairview expects to customize the service to adjust for varying real estate values in other Canadian cities.

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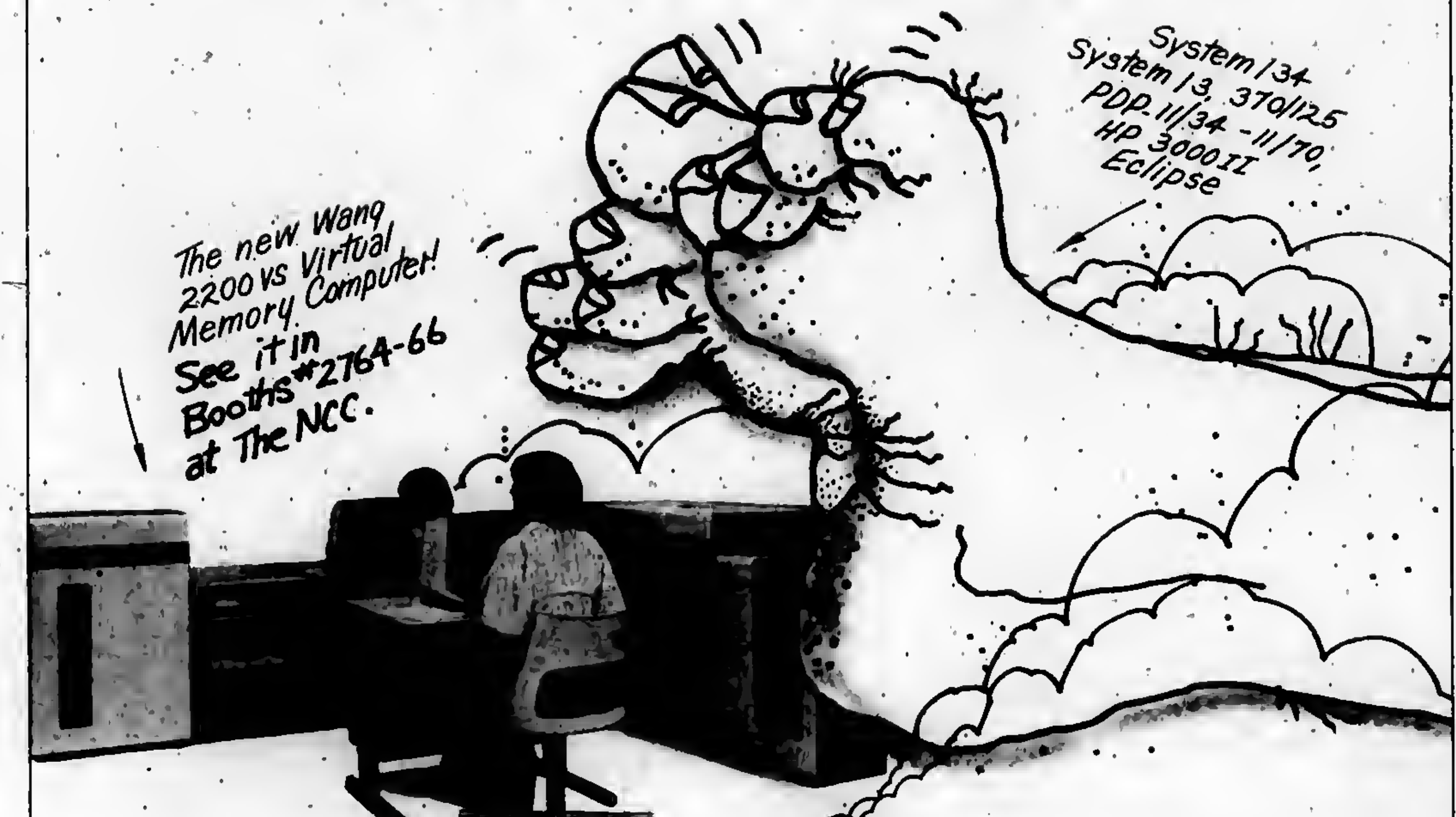
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Calma Has Erasable Display for Graphics

SUNNYVALE, Calif. — Calma Co. has developed an erasable display option featuring a 21-in. video monitor refreshed from a solid state memory for interactive graphics systems.

The Vector Memory Display (VMD) is being offered as an option for all Calma computer-based design, drafting and mapping systems, according to a company spokesman.

VMD provides a 40-foot-lambert image and such features as selective erase, pan and zoom and instantaneous context switching, the spokesman said.

Selective erase allows screen graphics to be deleted or modified and the effect is instantaneously reflected on the screen, the firm said.

The pan and zoom capability allows the designer to move the image smoothly across the screen, to zoom in on the image to inspect the fine structure or to view the total design.

Instantaneous context switching enables the designer to add or delete a layer in the view, the firm said. It also means that "menus" can be added and deleted instantly, under the control of the designer.

VMD incorporates up to four 64-word, 16-bit memory boards jointly developed by engineers at Calma and Intel Corp. The vector memory is capable of holding enough vectors to represent a schematic, printed circuit board layout or mask for a complex integrated circuit, the firm claimed.

The system uses a conventional digital television imaging system, but incorporates a very large memory as well, the spokesman said.

The user loads the vectors into memory and, whenever he wants to change the picture, rewrites the raster memory in real time from this data. Data in the raster memory is refreshed in 25 msec and then continually refreshed onto the monitor, the spokesman claimed. The image continually refreshes itself at 40 frame/sec, according to the firm.

The option can be added to certain existing Calma-based systems, the spokesman said, with the price dependent on software. The price for a typical configuration, including the option, is about $250,000. Such a configuration would include a CPU, magnetic tape, at least one disk and three input stations.

Calma is located at 527 Lakeside Drive, Sunnyvale, Calif. 94086.

Modem Handles dc Links

ISELIN, N.J. — Siemens Corp. has introduced the Modem N10 for transmission over dc-coupled two-wire or four-wire lines. The unit is suitable for speeds to 19,200 bit/sec according to the firm. Like other modems operating in the voice frequency band, N10 may be used for speeds of 200-through 9,600 bit/sec.

The N10 features a new type of balancing network for two-wire duplex operation with high-speed balancing option, the firm claimed. No extra measuring instruments are necessary. It is capable of multipoint operation for a large number of stations and includes a test facility to check that equipment is functioning properly, a spokesman said.

The Modem N10 employs binary dc keying for transmission, a method that is used in high-level termination systems for telegraph networks.

The Modem N10 is packaged in a flat case with the basic circuit plus power supply and the send-and-receive facilities arranged on a large-size board. A balancing circuit, synchronizing frequency clock and scrambler can be installed in the field; their plug connectors are provided, according to the firm.

OEM price for the unit will be in the range of $730 when the modem is available in the fall of 1978. Delivery will be in 30 to 60 days.

Systems are available from the Data Communications Department, Siemens Corp. 186 Wood Avenue South, Iselin, N.J. 08830.

TNI Adds Converter For Magnetic Cards

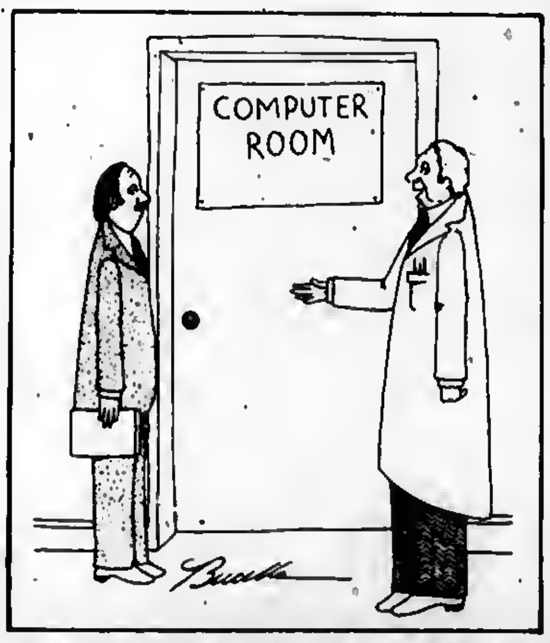
CHICAGO — Telesystems Network, Inc. (TNI) has introduced an IBM magnetic card converter with an RS-232C interface cable that will permit it to be interfaced to any appropriate port or communications terminal, according to the company.

The TNI 202 converter will accept single- or double-sided cards and read them into the target system at a rate of 500 card/sec or about 10 seconds for a full (5,000-character) magnetic card.

The converter can run a teletypewriter system by punching tape or communicate card contents to any word processor, computer, typesetter or optical character recognition system equipped to accept its interface, the firm said. It uses 115V ac current.

Priced at less than $5,000 including 90-day warranty, the TNI 202 carries a service contract which is available for $40 a month.

Telesystems Network Inc. is located at 410 N. Michigan Ave., Chicago, Ill. 60611.



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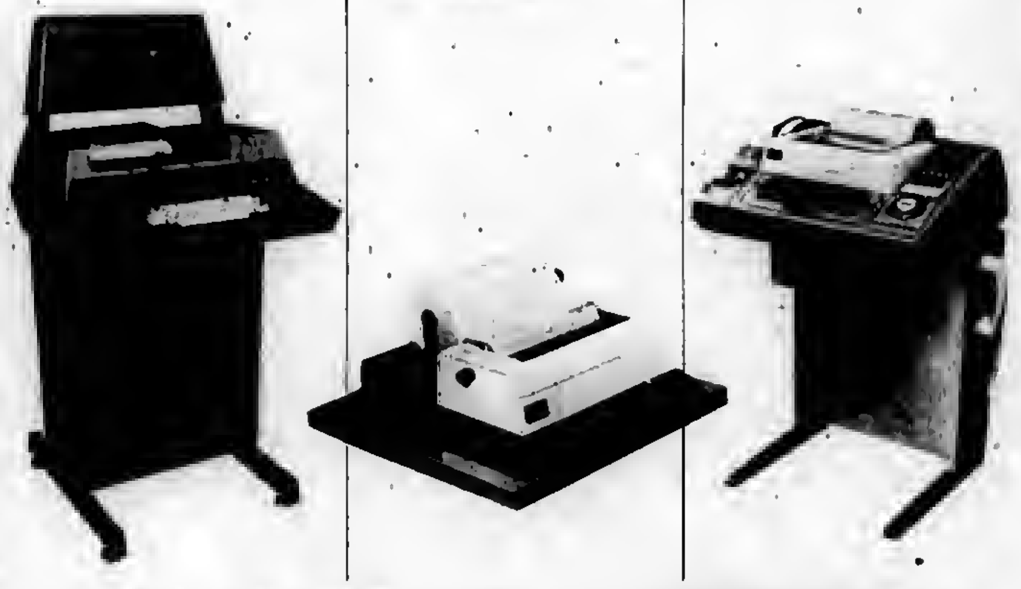

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THE "WAVES" IS HERE!

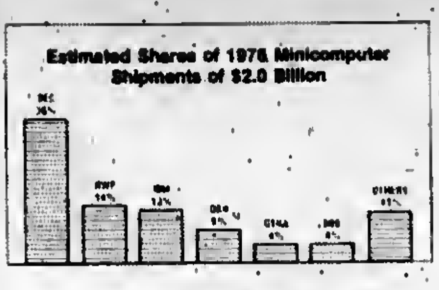
Charles P. Lecht's new book, *The Waves of Change,* is off the press and ready for shipment. It incorporates the serialized excerpts that appeared in *Computerworld* between April and October, 1977, with significant updating and revision, brand new material not previously published, and a host of informative illustrations.

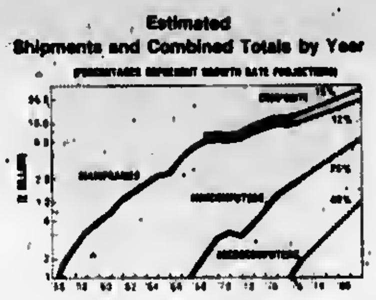
The Waves of Change presents a global view of the data processing industry, assessing the technological and economic currents by which it has been, is, and (in the author's extensively documented opinion) will be directed in future.

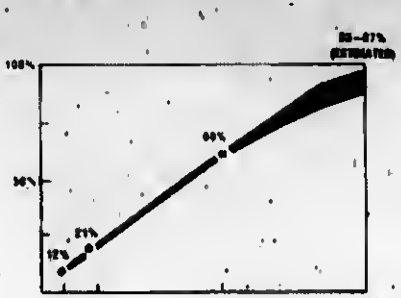
Furthermore, it accounts for the impact on developments in the DP field of the psychology of both users and vendors. Patterns of thought and perception, and the ways in which such patterns manifest themselves through judgments affecting the direction taken by technology and product planning strategies, are certainly at least as vital to our understanding of the state of the DP art as are the purely "technical" breakthroughs themselves.

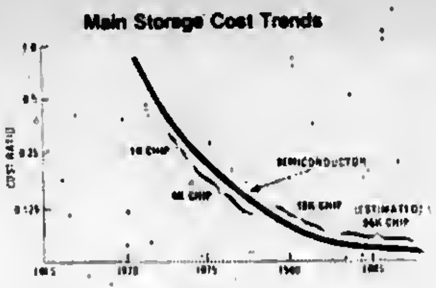
The Waves of Change addresses developments in the hardware and software realms —both single events and "trends"—at length. It explores the competitive positions of manufacturers, the middle- and long-term impact of the burgeoning mini/micro families, the problems faced by corporate management in assessing the role of hardware/software usage methodologies (and the value of specific systems) as these apply to their particular needs, and many other subjects of intense interest to all who are affected by DP.

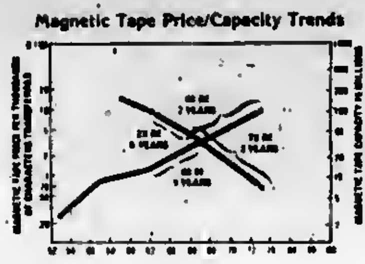
The Waves of Change is a series of wide-ranging essays united by a dual sense of purpose: to assist the reader in evaluating where we are (and why); and to provoke him to consider the implications of rapid change upon his ability to adapt and survive.

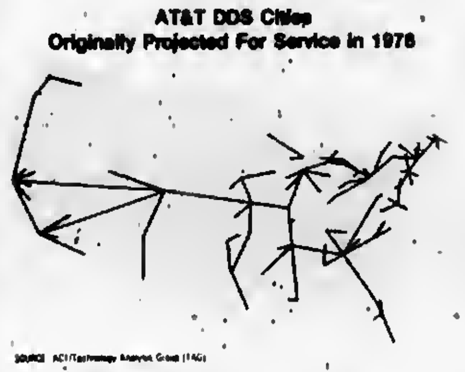


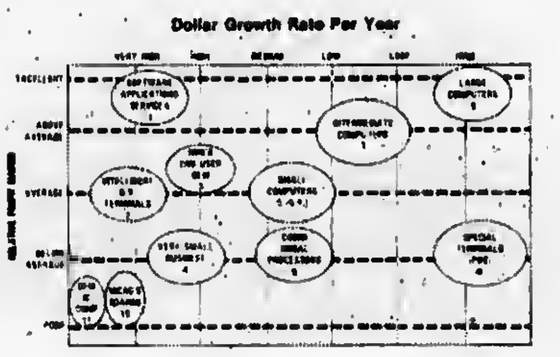


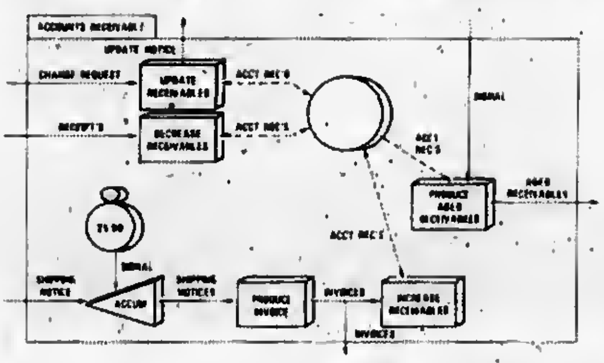


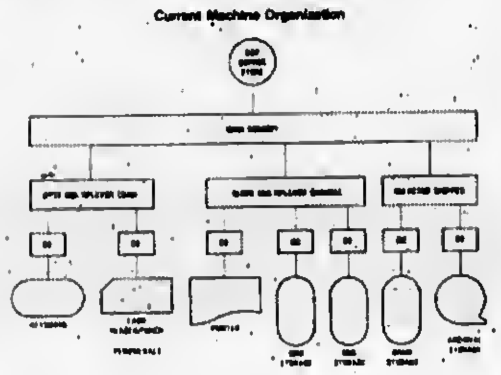


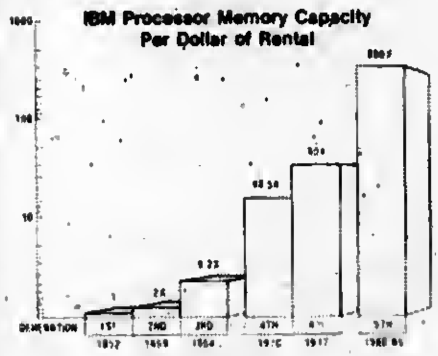


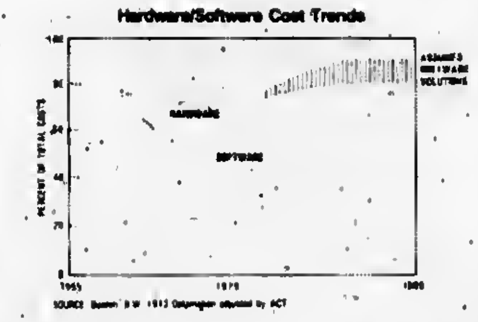


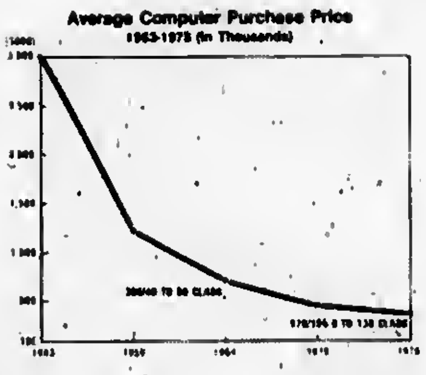


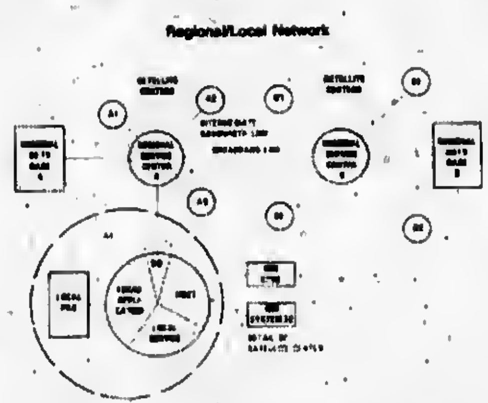


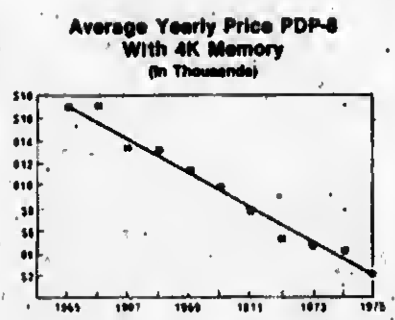


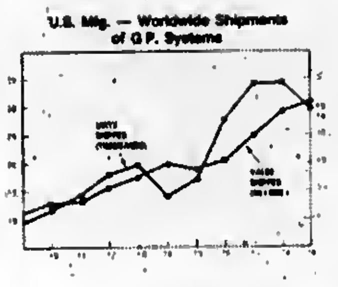


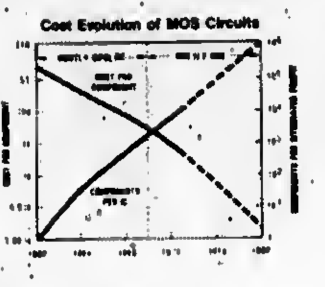


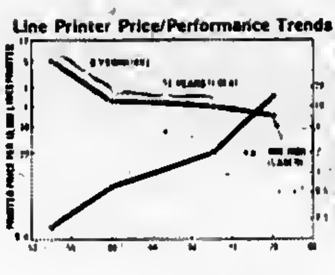


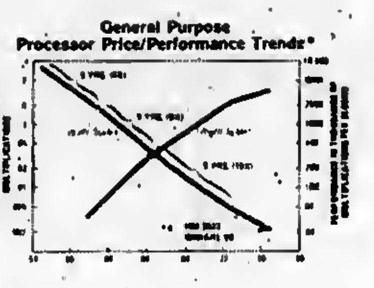


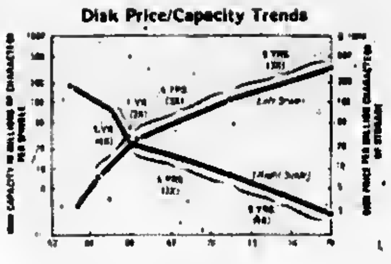


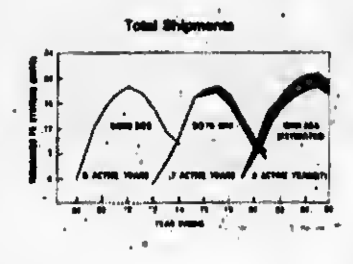












ABOUT THE AUTHOR

Charles Philip Lecht is founder, President and Chairman of the Board of Advanced Computer Techniques Corp. (ACT), a computer software and consulting firm.

Lecht holds a B.S. in mathematics from Seattle University and an M.S., also in mathematics, from Purdue. His involvement in the computer field extends back to 1951, making him an "old-timer" in a very young industry. He founded ACT in 1962. Since then the company has grown from a one-man show to an international complex employing some 400 persons.

Lecht is a noted speaker and author whose books, in addition to *The Waves of Change,* include three on computer languages and one on project management.

Lecht is a member of the **Young Presidents Organization, The Hudson Institute,** the **DPMA,** the **ACM** and the **New York Academy of Sciences.** Profiles of him have appeared in the *New Yorker* and *Datamation.* Recently, he has been asked by the CBEMA to argue its case against the proposed I/O interface standard before the Brooks Subcommittee of the U.S. House of Representatives.

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IN DEPTH

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TSUNAMI

By Charles P. Lecht

PREFACE

This installment of *Tsunami* is the first of two to address the subject of the Federal Republic of Germany (FRG) and its role in the DP cosmology. It warrants repeating here that our intention in singling out particular foreign theaters of DP activity and competition for exploration in *Tsunami* is broader than merely providing the reader with technical and economic survey material (although that certainly plays an important part).

A large part of our design in this book is to give the reader (and ourselves) the opportunity to gain a fresh perspective on the whole technical/financial/psychological/political picture in the U.S. by going abroad and looking back over our shoulder, as it were.

Part I of Chapter III seeks to establish a general framework within which to set forth the historical, technological and philosophical place of the computer industry in the FRG — more often referred to throughout this chapter as Germany. We devote ourselves especially to defining Germany's position in the world's computer manufacturing community, giving special emphasis to its relationship to that of the U.S. (and Japan, for reasons which will become clearer as we proceed).

Part 2 will tune to a finer focus on the details of Germany's present technoeconomic profile. We will accomplish this objective by singling out a number of companies that produce computer systems technology and applications in Germany today.

CHAPTER III
Part 1

On the first day in May 1978, a day of celebration for most of the world's population, a communique was received by Advanced Computer Techniques Corp.'s Technology Analysis Group in New York City[1]. Entitled "Fujitsu's Push Into EEC[2] Market: Joint Business Agreement With Siemens to Confront IBM Dominance," it said.

On the 27th of April, Taiyu Kobashi, President of Fujitsu (Japan's largest computer manufacturer), announced that Fujitsu and Siemens, the largest domestic computer company in West Germany, had reached an agreement on joint marketing of Fujitsu's ultra large-scale computers throughout the EEC market. A contract confirming this association will be officially signed this June, following a detailed study of the agreement. Thus, after six rocky years of negotiations, the computer industries of Japan and Europe will unite to form a viable offense against IBM.

This agreement will represent the first entry of Japanese ultralarge-scale computers into the European market and, as a by-product, will surely stimulate Fujitsu rivals Hitachi and Nippon Electric Co. [NEC]

The terms of the agreement are said to be that :

1. Fujitsu will export IBM 370 series-compatible machines on an OEM basis to Siemens which will, in turn, market and support them under the Siemens brand, thus strengthening Siemen's Large Systems Division.

2. Fujitsu will purchase Siemens laser printers and other equipment and combine them with Fujitsu large-scale systems.

3. Fujitsu will offer its technical support in joint development of software.

The agreement will enable Fujitsu to penetrate a market (i.e., the EEC market) three times larger than that of Japan. Fujitsu will thus have secured its grasp on an important, new steppingstone in the computer export industry, beyond that represented by its earlier capital involvement in Amdahl Corp.

Siemens has been suffering from a deficit in its Computer Division since the establishment of Unidata as an intended challenge to IBM's strong dominance of the European market. One of the weaknesses in the Unidata venture had been that Unidata did not develop/manufacture large-scale computers. By means of this new joint venture business agreement with Fujitsu, Siemens now plans to mount a serious, well-equipped assault on IBM's premier position.

The joint business plan had a prior, indirect but unsuccessful expression in the relationship obtaining between Furukawa and Fuji Electric; Fuji Electric was formed jointly by Furukawa and Siemens, and is Fujitsu's parent company as well.

The future preeminence of U.S. computing is not assured, the president of Advanced Computer Techniques Corp. believes. Attempting to gain "a fresh perspective on the whole technical/financial/psychological/political picture in the U.S. by going abroad and looking back over our shoulder, as it were," Lecht here offers the first half of an overview of the German computer industry.

The plan was revived in earnest yet again a year and a half ago, triggered, perhaps, by the downfall of Unidata and IBM's subsequent announcement both of its 30 series and of price cuts on its current models. The agreement finally announced last month embodies a new commitment to "go ahead," in concrete terms.

The literal interpretation of this communique makes it quite clear Germany has no intention of remaining the captive market of U.S. computer systems manufacturers that it has been for more than 25 years. It also suggests the emergence of other phenomena whose implications reach beyond the mere loss of business the U.S. computer industry could suffer as a result of a Siemens/Fujitsu (and possibly Amdahl) venture.

Although the Siemens/Fujitsu announcement did not mention Amdahl, reliable sources maintain Siemens-Amdahl negotiations are under way. Because I believe it inevitable that Amdahl will participate in the venture, it is referred to throughout this chapter as the Siemens/Fujitsu/Amdahl venture.

Between the Fujitsu M180-II and M-200[3], the two systems in direct competition with IBM's 3032 and 3033MP, lies a 5-Mips gap begging for Amdahl's 470V/6-II (if not a Siemens 7.700).

Anyway, it is a credit to both Amdahl and Fujitsu management that they appear to have discovered each other and the first clear alternative to IBM in the large systems area — the same product at a cheaper price (or, as IBM might claim, enjoying the advantages of an indirect IBM subsidy).

There may be some merit to the argument of those who associate our loss of industry leadership to the Japanese connection through which such firms as Amdahl and, say, Itel, have been revitalized. But any criticism of these companies for "helping the U.S. to succumb" strikes at the heart of our free enterprise system and is therefore unwarranted.

Since the U.S. government is without a clearly expressed policy regarding its computer industry's value to our national economy and defense, the Fujitsu/Amdahl type of involvement is no real surprise — we can only admire it, even if it happens by accident. Dr. Gene Amdahl himself might agree that his company's deep entanglements with Japan's computer industry leader could move even the strongest U.S. competitors to cry "foul" as they cope with the enormous pressure of competition from Japanese products — at home, no less. Now, with Siemens joining the team, the competition will have cause to cry "foul" yet more frequently.

I draw the same conclusion that I know every fair-minded American, including Dr. Amdahl, would: Fujitsu's support of Amdahl simply demonstrates the Japanese are more intelligent than we are — in the private as well as the governmental sector. In view of this, it's good to know that, should the balance of power in electronics output ultimately favor Japan, we have in Dr. Amdahl at least one more link of goodwill in the web of friendship which binds us.

A recent *Fortune* article stated, "Overall, in 1977, the nation [U.S.] took in $2.95 billion in fees and royalties on transfers of technology — quite an increase from the $666 million in 1965. The U.S. surplus on technology exchange last year ($2.95 billion less the outflow of fees and royalties for foreign technology) amounted to $2.67 billion. That was not so very much less than the $3.25 billion trade surplus the

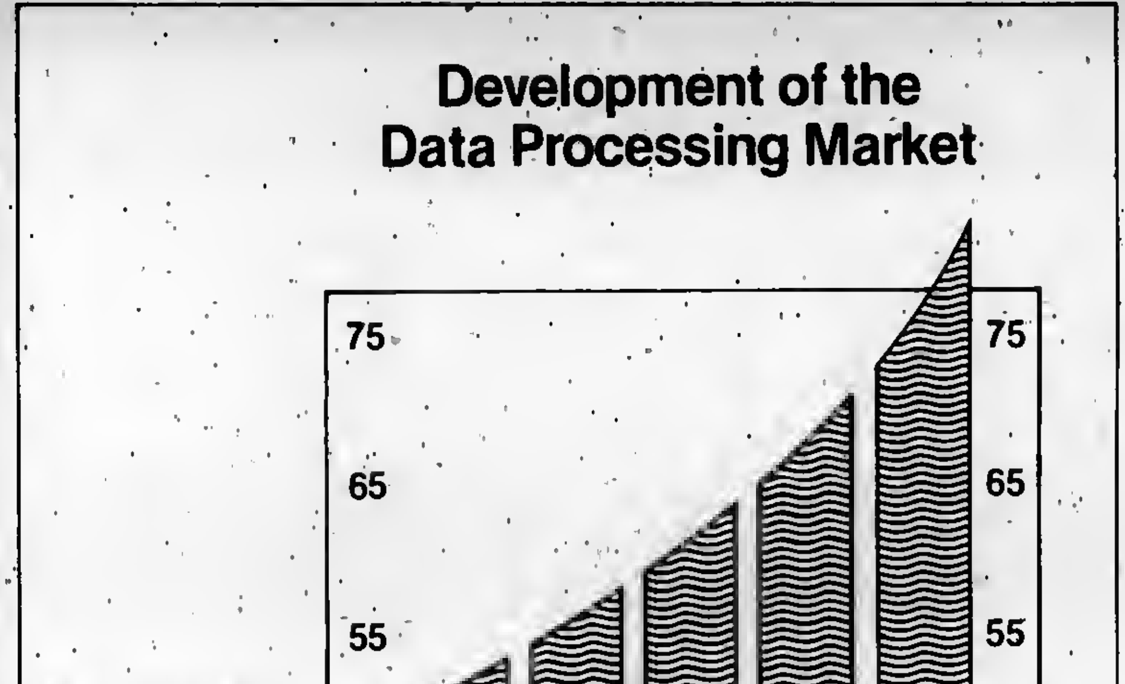

Figure III-1. The value of the installed general-purpose computer base (excluding minis and special-purpose systems) in the FRG should nearly double (to $15 billion) by 1980, up from about $8 billion in 1975. At that time the German market may represent 18.5% to 19% of the combined U.S. and Western European installed base.

U.S. earned last year in all manufactured goods."[4]

U.S. business in general can hardly afford a further reduction in that specialized sector responsible for the main (and majority) contribution to a balance-of-payments surplus. The introduction of competitive large-scale, non-U.S.-manufactured processors in Western Europe by Siemens will help to do this.

However reluctant we may be to consider the consequences to us of the loss of our current, but eroding, position of world leadership in computer technology, it would nevertheless be prudent to do so. Thus far, our concern seems to have been limited to the danger of unwitting transfers of technology to belligerent nations or their allies. But the impact of losing the R&D funds that are available to the scientific community only in the presence of a balance of payments surplus is equally grave.

In point of fact, such funding fell from 2.8% of the gross national product in 1968 to 2.25% in 1976, according to National Science Foundation figures. Ultimately, this translates into a real drop in effective spending for our national defense.

Since computer systems are acknowledged to be critical to the waging of war (or the ability to do so) in the 1980s, it is clear enough that we can maintain our military preparedness only by arresting the vicious, downward spiral of market share loss that leads to R&D reductions and therefore to fewer advancements in critical areas of technology and, finally, to an impaired defense posture.

Germany's newly reinvigorated, home-owned computer systems industries are especially important after Japan's. Recent developments suggest a highly underrated German capability in computer systems development and manufacture.

And although not primarily home-owned, the impressive number of systems developed and/or manufactured in Germany by German people primarily for use in Germany (over 80% of Germany's DP needs are met by German-based manufacturers) suggests a degree of self-sufficiency to which even the Japanese might yet aspire.

The recent success of German minicomputer manufacturers clearly demonstrates their self-sufficiency in this range of systems (they now hold more than 60% of their own marketplace, worth over $200 million, while exporting almost 60% of the value of their production). In the small- to large-scale general-purpose systems range, German-based (though not primarily German-owned) manufacturers account for greater than 85% of the total marketplace.

Siemens is the lone, German-owned manufacturer controlling a sizable segment of the German marketplace (20%, through products in the small to medium-range marketplace) with its nearly plug-compatible IBM 370 115 through 158 systems (models 7.722-1 through 7.760 and pending 7.770). Virtually all large systems (IBM 370/-158 class and upward) are made in Germany or exported to Germany by U.S. manufacturers.

Germany's total computer systems marketplace (approaching $2 billion in annual shipments, including peripherals), so long dominated by U.S.-owned manufacturers, is thus to undergo siege by the impressive Fujitsu/-Amdahl product line through Siemens. (In my opinion, Siemens could not have picked better friends with which to siege.)

Further to this point, IBM, Honeywell Information Systems, Inc., Univac and the other large mainframe manufacturers stand to lose ground in the EEC in particular and Western Europe in toto, not to speak of Germany. The still swelling tide of U.S. domination by which the EEC and Western Europe computer systems marketplace has for so long been overwhelmed may thus be about to turn and to ebb (see Figure III-1).

Star on the Rise

That Germany's star as a technological power is on the rise is clear to anyone who has watched the recent German-owned computer system manufacturer community recover following 20 years of unimpressive growth and a series of late 1960s, early 1970s partnership traumas. The establishment of a viable computer systems business controlled by German-owned enterprise has to some extent suffered from its postwar dominance by just about every important technology-exporting country in the world.

Unlike Japan, a technological prodigy geographically isolated in a sea of comparative underachievers, Germany in modern times has lived cheek-by-jowl with countries which are on a par with it in development. Thus, during the period of its reconstruction in the '50s and '60s (the first 20 years of the computer era), the German computer systems marketplace, although hobbled by the same kinds of retributive trade and production agreements as Japan, saw much more real contention by non-German manufacturers than did Japan. Even such nontechnology-bound factors as the cost of freight transport to Germany from technology-exporting countries strongly influenced the path Germany was to follow, as contrasted with that open to Japan.

With its production base undergoing redevelopment following its destruction and/or removal (the Soviet Union carried off whole manufacturing plants), the Germany of the last 25 years, surrounded by a supermarket of competing technological products, had more options than did Japan when faced with make-or-buy decisions. Quite naturally, Germany felt less compelled to invest its hard-earned deutsche marks in the establishment of a home-owned computer industry

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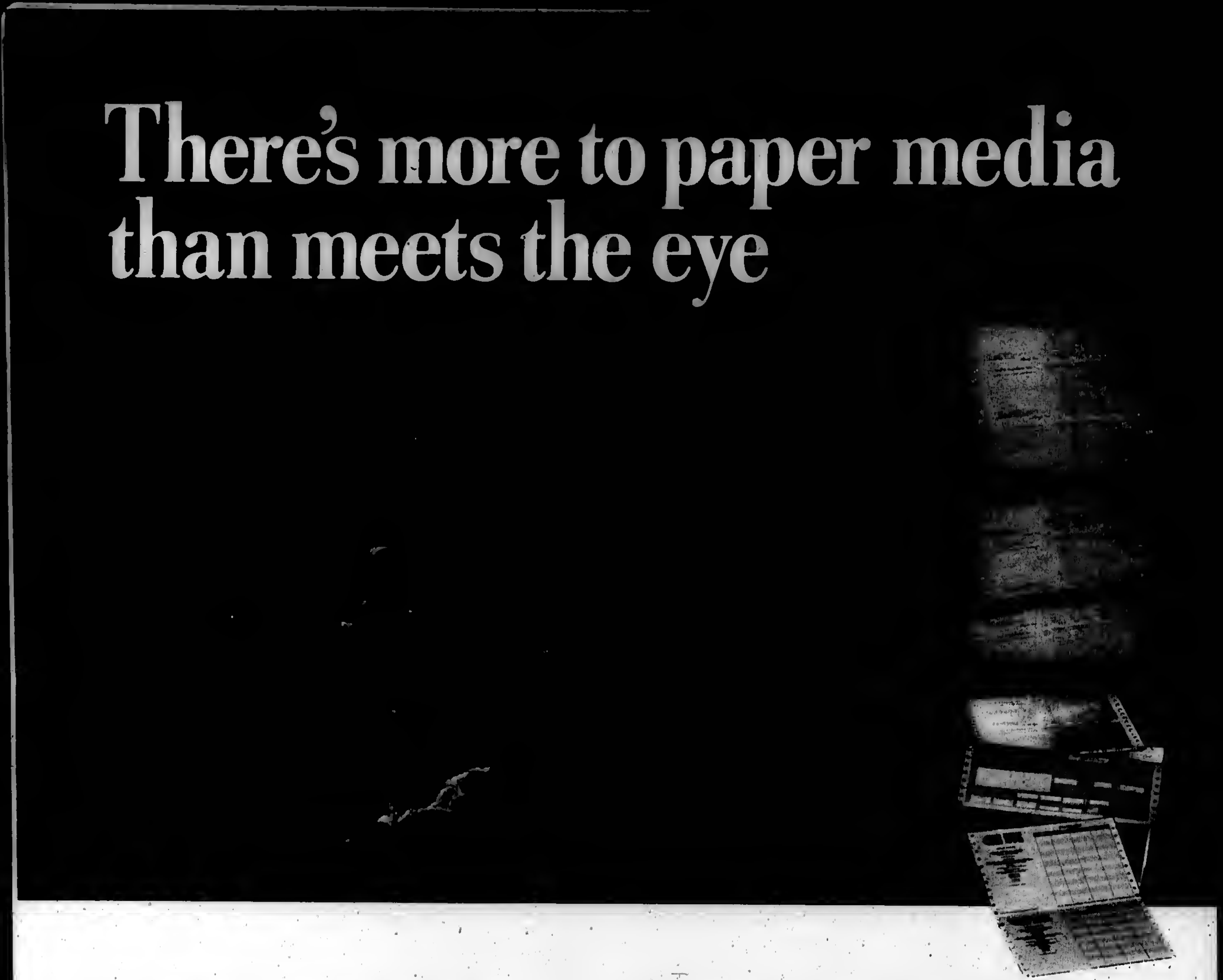

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CONTROL DATA CORPORATION

More than a computer company

(Continued from Page 83)

than did Japan yen in their own.

Figure III-2 shows the still-increasing DP imports by Germany until 1974, a year of reversal. The reversal was achieved through the continual heavy investment of foreign (mostly U.S.) capital in German-based production facilities.

In Chapter II, we noted that Japan's urgent need to establish its own home-based computer industry was stimulated by many factors, not the least of which were its lack of natural resources and its recognition that superiority in electronics solved this problem twice over. First, it provided Japan with a heavyweight revenue-producing industry utilizing far fewer resources than would other industries of comparable profit protential. Secondly, through electronics, technical difficulties in development of synthetic replacements for natural resources might be overcome.

Certainly, lack of scientific ingenuity or industriousness among the German people was not the cause of Germany's choice of direction, for history has proven otherwise. Thus, subject to an intense bombardment of products from advanced Western countries as well as from the Far East, and tempted to buy time to regenerate its war-shattered electronics industry, Germany seems to have exercised a reasonable, even "constructive," option in letting its home-owned computer industry lie fallow — that is, until recent days.

Many excellent German companies, while bent on improving their technological base in spite of limited funds, entered into agreements which ultimately proved damaging to their own vitality. For example, extremely talented and highly competitive companies like Siemens suffered through calamitous relationships with such computer systems losers as RCA in America and entered into a potpourri of equally ill-advised, if less significant, agreements with other manufacturers in the U.S. and elsewhere. Nixdorf was only a developer and manufacturer of computer subassemblies for other U.S. and foreign vendors prior to 1968.

The few attempts made by European-owned companies to create a Western European computer industry, as exemplified by the Unidata venture, seem to have resulted in further dissipation of the growing strength of Germany's home-owned computer industry. IBM's heavy entrenchment in German competition through its German-based research, production, marketing and sales support facilities, and its holding of as much as 72% of the marketplace (if-sold value in 1965), further exacerbated the situation (from a competitive standpoint) and further ensured IBM's position as the leading manufacturer of computer systems in Germany today.

That IBM's market share in Germany has dropped (58% in 1977) may be-

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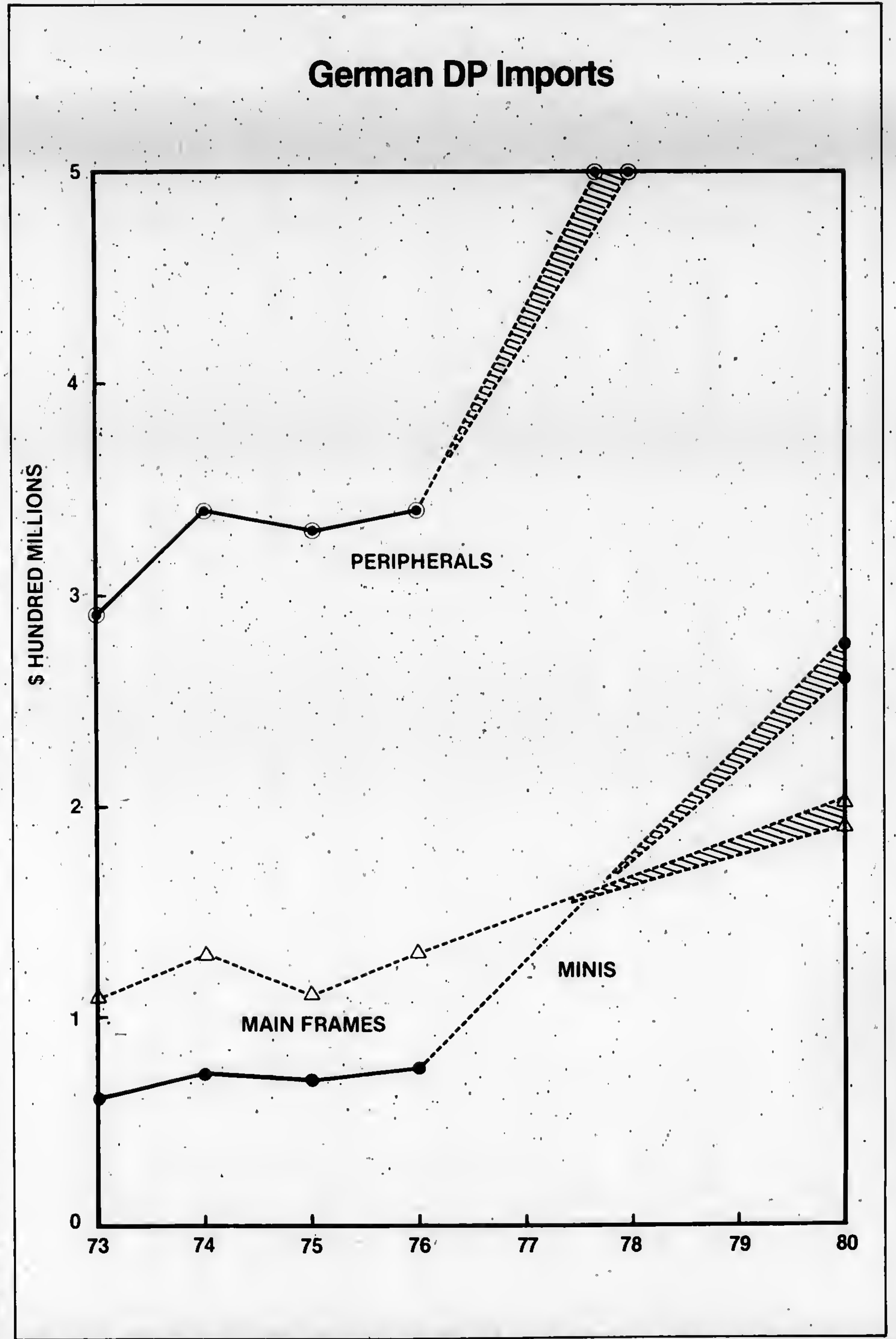

Figure III-2. Peripherals also command the largest share of FRG imports today, although Siemens and Nixdorf (among others) are becoming more self-reliant, asserting their independence from foreign I/O devices. The popular Siemens laser printer, in fact, should become a major DP export product by 1979-80. Mini imports are insignificant at this time, since the domestic manufacturers — Nixdorf and Kienzle — are leaders in their own marketplace. Mainframes represented about 24% (or $130 million) of DP imports in 1976 and are likely to drop to 16% of all DP imports by 1980.

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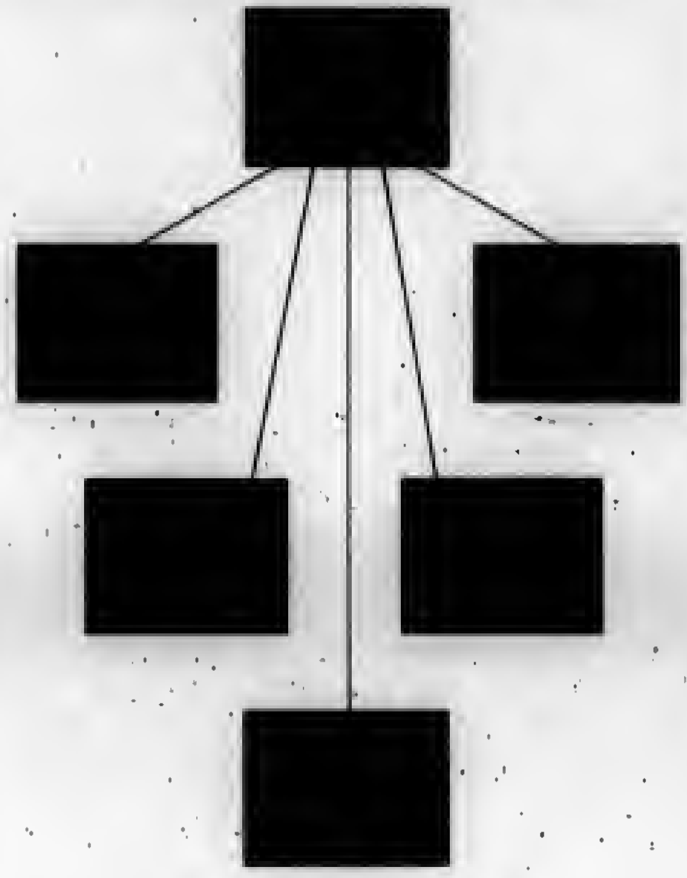
We've combined the capabilities of our 8170 interactive product with our 1660 distributed data processing product, both leaders in their respective fields, to provide a powerful *new* system for distributed data processing. We call it the Harris 1670. It's the *one system* you've been waiting for that will perform five basic data processing functions: local or remote batch, data entry, local interaction and remote interaction *concurrently.* Combining two major Harris resources enables us to produce the 1670 in volume, assuring you a competitive price and unbeatable performance. This single, modular system can fill your terminal requirements — batch, 3270-compatible, and data entry — and is capable of growing with your processing needs in all these areas.



The five typical elements of a distributed data processing system.

Sophisticated new HARRIS 1670 distributed processing system offers local or remote batch processing, data entry, and local and remote interaction concurrently. CRTs are individually switchable between local and host files.

Batch Processing

When devoted to remote batch communications, Harris' multi-task operating system enables the 1670 to perform any of the sophisticated RJE functions of the 1610 and 1620 models. In addition, the 1670 offers local batch processing with ANSI compatible COBOL and batch utilities, including SORT/MERGE.

Data Entry

You can choose from two format-driven data entry packages, easily implemented by data entry personnel. The two packages, Format 10 and Format 41, make your data entry jobs simple, efficient and effective.

User-Written Programs (Local Inquiry)

We offer an easily learned, English-like high level programming language (REGAL), for optimized screen management and for applications such as source document capture and interaction with the local 1670 data base. CRTs running REGAL programs can be located either at the 1670 site or remotely. Additionally, the CRT can control station printers to produce required hard copy.

Remote Inquiry (3270-Compatible Interaction)

This capability enables the CRT operator to connect through the 1670 to 3270-compatible programs at a remote host site.

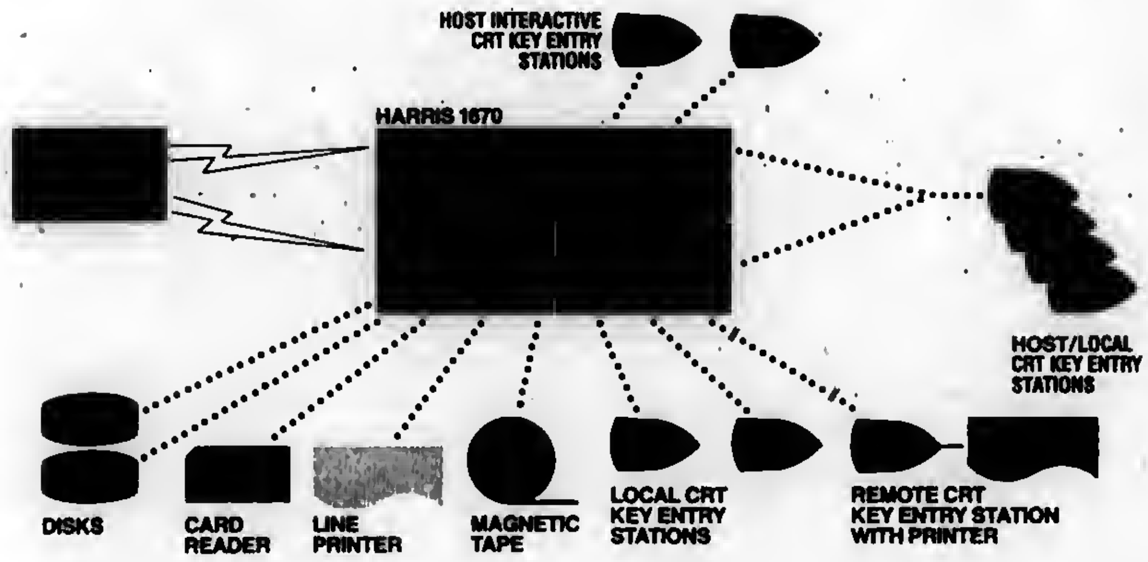
Selectable Mode CRTs can be used to perform operations in the 1670 mode (including data entry and user-written programs), or to switch to 3270-compatible host programs. Switching is controlled individually at each station by the operator, and the system automatically ensures data integrity when switching from one mode to the other. Selectable Mode enables you to off-load the host by performing processing locally for the majority of your requirements, saving host resources for those occasions when data is not stored locally. Compare this feature when you're evaluating distributed systems!

No Changes Required at Your Host

The fact is, both RJE and 3270-compatible applications can be executed using the 1670 with no changes or new investment in host software. What's more, you *continue* to save since we can upgrade most Harris 1600 and 8170 systems to 1670s with minimal disruptions to your operations.

Do It All with Harris

To sum up, there's no need now to shop around for a variety of systems to handle your requirements for remote batch, local or remote interaction or distributed data processing. Start with Harris and you're assured a migration path from the system you need today all the way to one you'll require in the future.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Its programmability allows you *to customize the B550 to solve* your *needs.*

Worldwide customer solutions by our B500 series include: ☐ Newspaper Text Editing ☐ Bank Electronic Funds Transfer ☐ Stand Alone Invoice Preparation ☐ Foreign Language Text Preparation ☐ Process Control ☐ Telex Preparation ☐ Airline Ticket Reservations ☐ Factory Data Collection ☐ Word Processing System ☐ Disc Operating System ☐ Diagnostic Testing and many more.

See us at the NCC
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BEEHIVE INTERNATIONAL

USA:
EUROPE:

(Continued from Page 85)

speak less of a diminution of IBM's strength than it does a continuously changing and unfolding definition of both computer systems products and marketplaces[5] in the latter part of the 1970s[6]. That it confirms a rising German ownership of the means to compete successfully in the domestic computer system marketplace is evidenced by the availability of a wide diversity of high-quality, low-end systems emanating from within such companies as Kienzle, Nixdorf, Triumph-Adler and others.

Thus Germany, one of the last of the top four world users of computing equipment to nurture its home-grown, home-owned industry in such a way as to capture truly significant market segments, is now coming into its own; the ebbing of our tidal wave of products into the German marketplace is at hand.

Diminished Dependence

From Figure III-3, it is clear that the Japanese computer industry, through the increase of its exports to Germany, is helping to reduce Germany's still heavy dependence on U.S.-owned industry. It should be borne in mind that in the balance of things, while Japan owns two-thirds of its own computer industry production (it has three "IBMs" including one foreign-owned, home-based manufacturer — see Chapter II), it produces less than it needs to meet internal demand than does Germany.

Thus, the introduction of Japanese systems to Germany through Siemens, while not increasing Germany's home-owned computer industry growth, serves to diminish Germany's dependence upon the U.S., such dependence amounting to 72% in the small to large general-purpose systems arena in 1976 (see Figure III-4).

Accordingly, the domination of the Western European computer systems marketplace by U.S. companies, amounting to over 75%, will diminish too.

Skills Shortage

Assuming German- and Japanese-based (but foreign-owned) plants are staffed by local nationals, the potential of the German computer industry to satisfy its own needs without importing is greater than Japan's (i.e., if the foreign ownership were to leave). With help from Japan, a main area of German technological weakness causing heretofore severe dependence upon U.S. companies is overcome.

Changing technology, a strong mark and weak dollar and a U.S. government unsupportive of its own industry could accelerate Germany's self-sufficiency in computer systems manufacture by German-owned enterprise, especially after Siemens engineers obtain the right to manufacture Fujitsu's IBM-like large processors. All things considered, no other Western European power is in a similar position —

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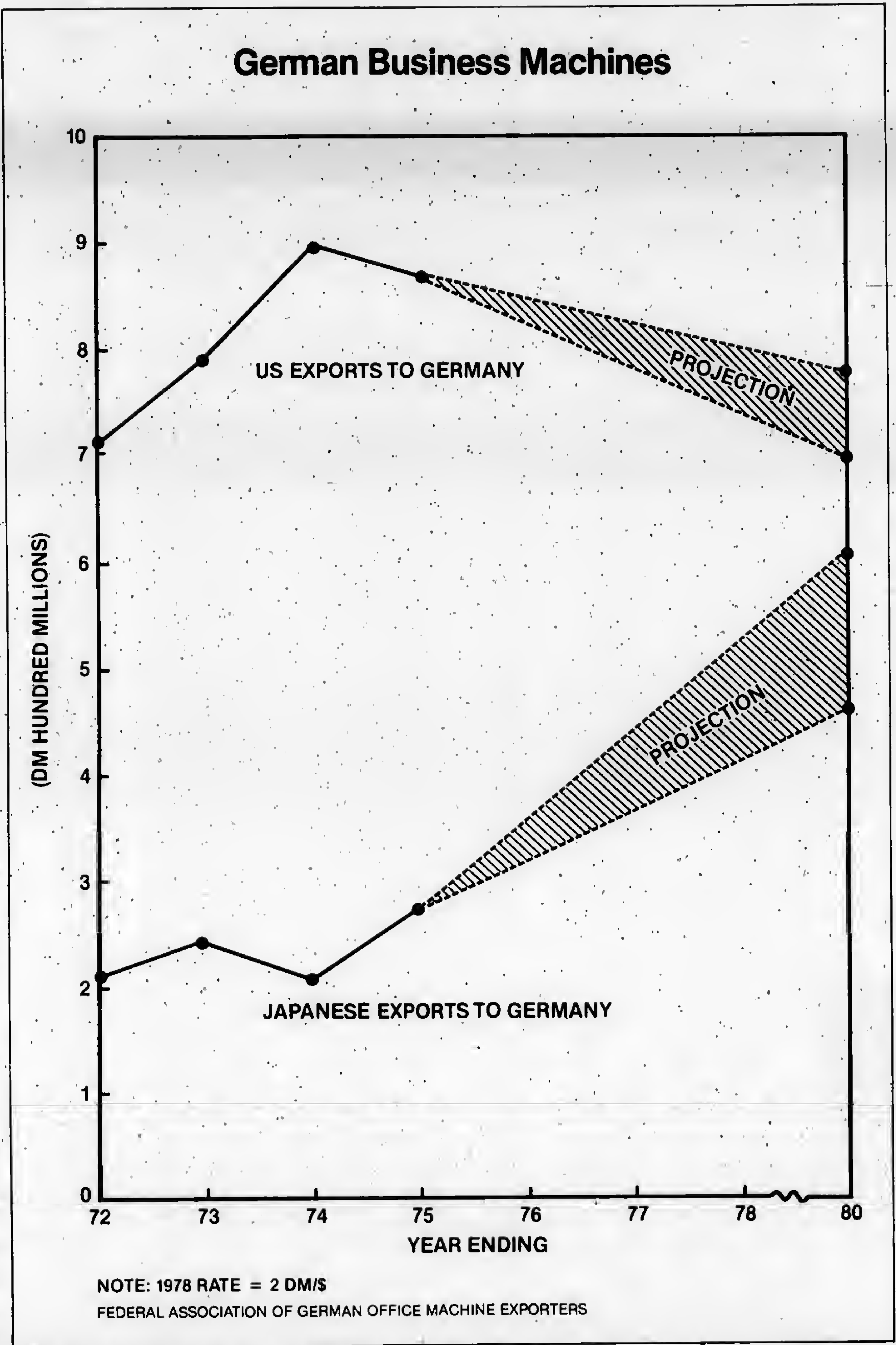

NOTE: 1978 RATE = 2 DM/$

FEDERAL ASSOCIATION OF GERMAN OFFICE MACHINE EXPORTERS

Figure III-3. According to the Federal Association of German Office Machines Exporters, U.S. exports to the FRG have declined from about DM900 million ($450 million) in 1974 to approximately DM850 million in 1975. In contrast, Japanese exports to the FRG have increased from DM200 million in '74 to nearly DM300 million in '75. However, we believe that the recent Siemens/Fujitsu/Amdahl agreements to import "big ticket" ($3 million to $5 million) mainframes to the FRG will not only reinforce this trend, but accelerate Japanese exports to the FRG — so that by 1980 the value of Japanese exports to FRG could well match, if not exceed, the value of U.S. exports.

(Continued from Page 89)

with due respect to our friends in France, England and Italy. But this will be covered in later *Tsunami* chapters.

And, while the shortage of professionals skilled in the design and development of computer systems has at times abated, the general trend has been for that shortage to persist and increase. In view of the explanations we have offered as to why the German-owned computer industry matured so slowly, the existence of such a critical shortage of skills for home-owned industry in many areas of advanced technology should come as no surprise. At this point in time, most top scientists are working for foreign (mostly U.S.) firms.

That those at the forefront of technology, like Siemens, are any less prepared to meet its challenges than their colleagues abroad is clearly not true. The problems are of *number*, not quality of skilled people. This is evidenced by recent German announcements of general high-technology products as well as use by U.S. companies of German know-how.

The Siemens laser printer is no weak competitor in the world marketplace. For example, it is currently purchased by Itel Corp. for resale in the U.S. by Burroughs Corp., Univac (pending), Control Data Corp. (pending) and, of course, Fujitsu. Other firms are likely to follow suit.

Further to the point, IBM elected to develop its new E series system in Boeblingen, its planned worldwide replacement for the once strong, now weak low-end 370/115 and 370/125 systems (also developed in Boeblingen).

E Series Slip

According to an April 27 *Wall Street Journal* article, overzealous IBM-Japan salesmen, apparently untrained in and thus, one presumes, unsympathetic to U.S. antitrust law, violated its requirements for inscrutable silence on the new E series product. Noting a further Justice Department attack on IBM in the U.S. for allowing its Japanese subsidiary to operate according to Japanese tradition, the article went on to say, "In any event the violations . . . have prompted inquiries by Japan's Ministry of International Trade and Industry into possible violations of the Japanese antimonopoly law . . . U.S. antitrust and Japanese anti-monopoly laws seem to be as different as Hammurabic severity is from Rabelaisian generosity.

The IBM E series systems — the product of Germany made by Germans, ostensibly acting as Germans and spoken about (preannounced?) in Japan by Japanese, acting as Japanese — to be officially announced in the first quarter 1979 somewhere, already have the U.S. Justice Department angry at IBM. I wonder if Japan's judiciary would attack Fujitsu if Siemens' salesmen touted a new computer in Germany before announcement in Ja-

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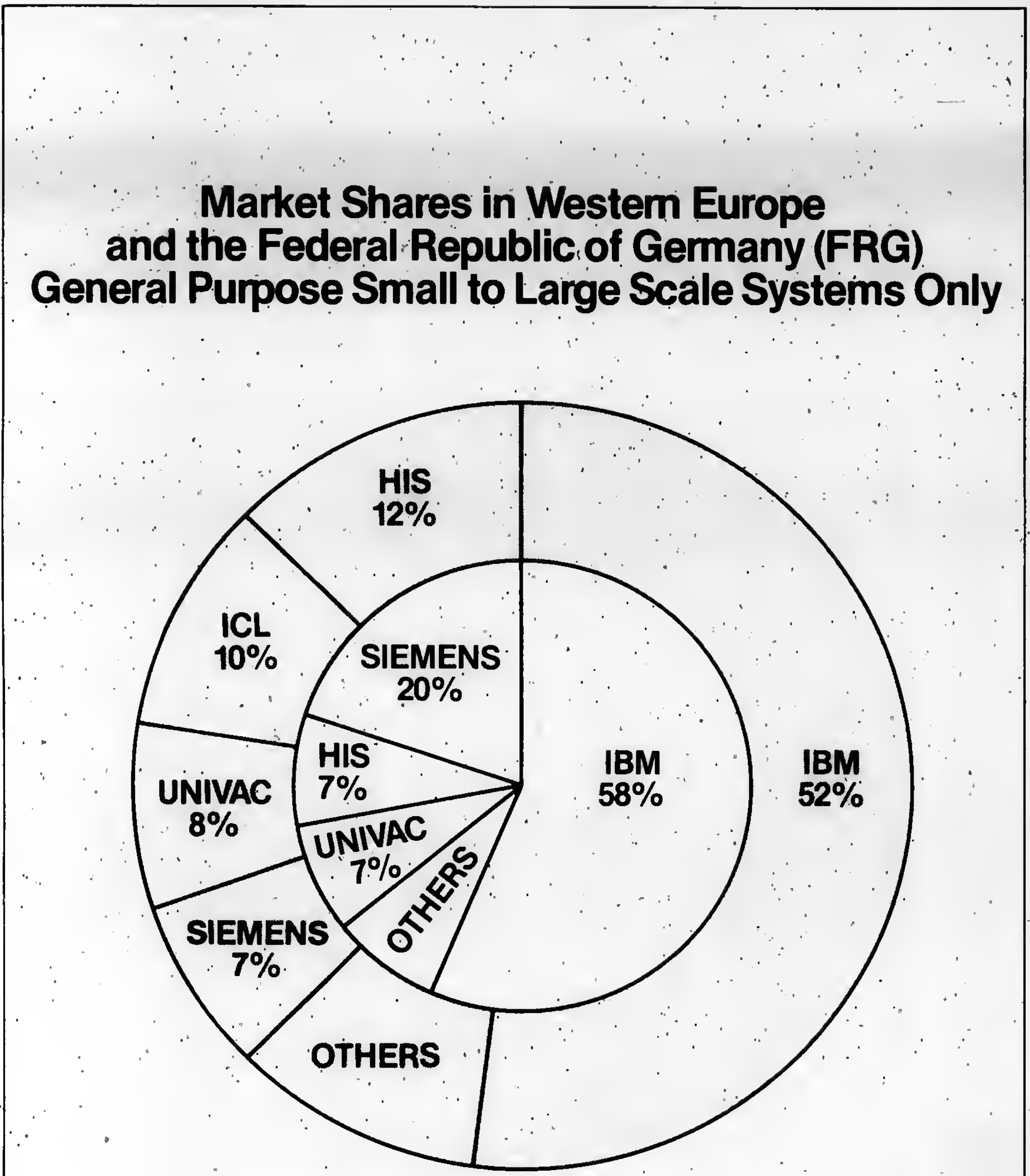

1977 INSTALLED BASE BY VALUE
SOURCE: ACT/TAG ESTIMATES

Figure III-4. The year-end 1977 market share chart shows the positions of the major general-purpose mainframe vendors in both Europe and Germany. IBM's market share in Western Europe is about 52% (by value) and 58% in the FRG, down from 72% in 1965; HIS is next with 12% in Europe and 7% in the FRG; ICL controls about 10% on the continent, but its installed base in Germany is insignificant; Univac maintains 8% in Europe and matches HIS with 7% in Germany. Siemens currently holds a 7% share in Europe — primarily the northern countries — and is No. 2 in Germany with a 20% market share. Assuming that the recent Siemens/Fujitsu/Amdahl deal to import very large-scale (IBM 370/168-3-and-up range) mainframes is successful, Siemens' market share should increase dramatically during the next two to three years at the expense of IBM and other U.S. suppliers.

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NATIONAL —SPECIAL LEAR SIEGLER ISSUE—

INFORMER

May 29, 1978

AT LAST! THE TRUTH CAN BE TOLD!

SHOCKING REVELATIONS PROVE, BEYOND A DOUBT, LEAR SIEGLER'S PLANS TO DOMINATE THE NCC!

Lear Siegler, Inc., reeling under enormous pressure brought to bear on its mysterious Project X, has finally consented to declassify its hush-hush undertaking.

Overwhelming outcries of the past several weeks have made Project X's continued secrecy impossible, and the INFORMER's relentless war against it was, apparently, too big a burden to shoulder.

At a press conference held late yesterday, a group of high-ranking LSI officials and Project X engineers unveiled the fruits of their months-long clandestine labor. Project X's sealed doors were opened, and the wonder devices were seen and described in detail for the first time. It was an awesome sight, seeing the mechanisms in all their glory, there where they had their mysterious origins. INFORMER reporters noticed several involuntary gasps from others unprepared for the display.

Originally designed to guarantee complete mastery of this year's NCC (National Computer Conference), Project X was, from the beginning, shrouded in secrecy and bedeviled by persistent rumors. Our intrepid undercover reporter, working perilously close to exposure deep within LSI HQ, risked detection constantly in his efforts to leak Project X data. Only through the greatest vigilance and determination was he able to prolong his subterfuge and continue to supply us with information.

Now, however, his perseverance has culminated in success, and Project X is a mystery no longer. Our unflagging campaign against the project, coupled with public outcry, has accomplished what the government was not prepared to do, and the secrecy is over.

Within the pages of this week's INFORMER, the fabulous devices of Project X are reviewed in detail. Now, at last, here is the full story on Project X and the culmination of its labors.

The INFORMER wishes to publicly applaud its diligent, selfless staff of reporters, field operatives, and agents who, through their unceasing efforts, made this moment what it is—the disclosure of Project X.

COMPLETE DETAILS WITHIN

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LEAR SIEGLER

ADM-31 Proves 2 Pages Are Better Than One

The ADM-31 is a low-cost, high-reliability desktop CRT with full editing, formatting and *two pages of display.* Not as an option, but as standard equipment. Which means the ADM-31 affords twice the display potential of terminals costing up to twice as much. And that's a pretty clever idea.

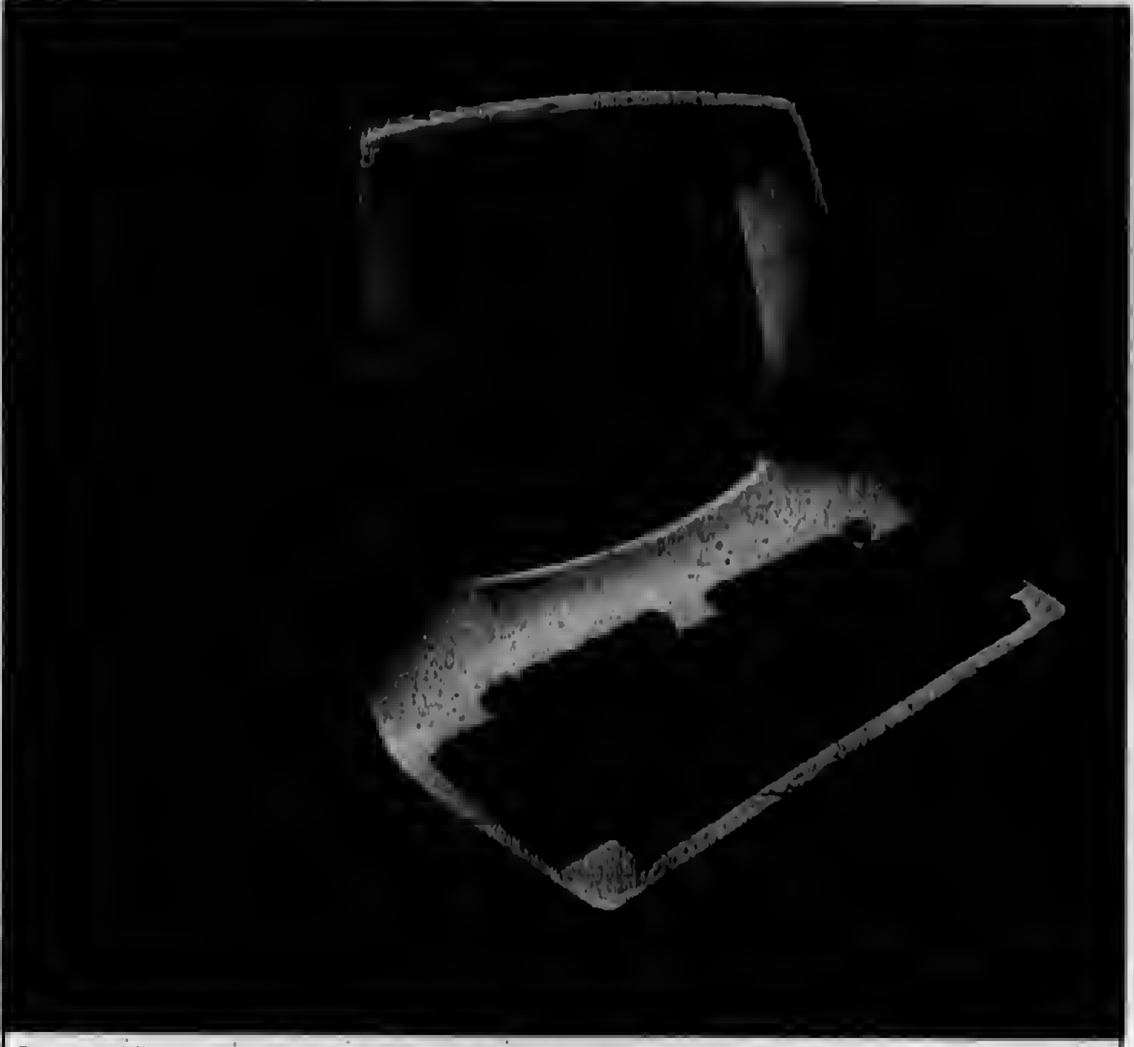
The ADM-31 is completely self-contained, with a keyboard, control logic, character generator, refresh memory, and interface. What's more, it incorporates a microprocessor which augments its reliability while making it even easier to use. Block transmission and *protected fields* are standard. And the terminal also comes with a printer port option, if you require printouts along with your readouts.

The ADM-31's amazing 90-key keyboard is actually capable of more functions than are now available on the ADM-1. What's more, the keyboard itself is integrated with the main logic, and is capable of generating all 128 ASCII characters (upper and lower case, numerics, punctuation, and control). Among other things, it features an integral numeric pad, with period, comma, tab, minus, and numerals arranged in a familiar calculator format. And it also includes a caps lock key (to lock the keyboard into upper case display).

The ADM-31's editing capabilities let you clear the screen, or use a destructive cursor for a character change. Read and load cursor permits sensing of the current address, and direct, absolute addressing to any X-Y coordinate. The controls let you skip protected fields, backspace, forespace, move up, down, return, home, and new line. And you can store the Control Characters, and they'll display as a reverse image.

The ADM-31 comes with *character insert/delete*, line insert/delete, erase to end of line/field/screen, and back tab. All standard equipment. The ADM-31 can also clear to protected spaces, clear to unprotected nulls, and set and reset copyprint.

Who says a machine can't edit?



Project X's new ADM-31 desktop CRT, seen here with 90-key keyboard and Caps Lock Key. *PROJECT X PHOTO*

ADM-42 All But Thinks For Itself

The ADM-42 is a semi-intelligent terminal that gives the user flexibility of format, security, editing, interface, and transmission. Like the ADM-31, it features a full two-page display as standard equipment. And it also comes with an optional extended memory capable of adding data space in 2-page increments up to a maximum of 8 pages.

The terminal boasts a bright, easy-to-read, 2000 character display, a full 128 ASCII character set, 16 function keys for 32 separate commands, and five separate cursor control keys. You can also order an optional Programmable Function Key feature that lets you define the function keys. An alternate character generator with line drawing set is also optionally available.

The ADM-42's status displays on-screen disclose a wide range of information at a glance, and special symbols indicate the entry of all control characters in memory. The ADM-42's Field Protect Mode also allows rapid data entry into forms or instruction pages.

Like the ADM-31, the ADM-42's displayed data is formatted in 24 lines per page, with 80 characters per line. In addition, it offers something the ADM-31 doesn't. It has an 80 character 25th line, established and reserved exclusively for status indicators, or special messages.

An additional special capability of the ADM-42 is Field Blanking/Underline. You or the computer can designate areas of the display as blanked fields, and the designated areas are then blanked from the display. Or an Underline attribute may be substituted for Field Blanking by switch control.

With Field Blinking, you or the computer can designate areas of the display as blinking fields. These areas of the display will then blink on and off.

And with Reverse Field, you or the computer can designate areas of the display as reverse images. These areas of the display will then reverse on and off.

The ADM-42, like all LSI products, is upward compatible. That means when you upgrade to the ADM-42, you don't worry about rewriting your software, or replacing any other peripherals. Just plug the ADM-42 into the system you've been using all along.

You'll discover this terminal is a truly efficient, cost-effective step upward that'll enhance your system out of all proportion to its price.

Project X's amazing new ADM-42 is a semi-intelligent terminal designed for a host of computer-related tasks. *PROJECT X PHOTO*

REVEALS ALL!

Ballistic Printer™ Tougher In The Long Run

The 300 Series Ballistic Printer is a low-cost, 180 cps printer with a built-in microprocessor that gives you 15 switch-selectable form lengths, 15 perforation skip over formats, and full horizontal and vertical tabulation control. Space and blank character compression. Interface control for serial, parallel, or polling and addressing operations. Plus a non-volatile forms retention system that retains these programmable settings when power to the printer is turned off.

The 300 Series has a character buffer that's optionally expandable to 2048 characters. With the 2048 buffer, the printer can fully buffer a 1920 character CRT screen of data without waiting for the screen to transfer to the printer on a line-by-line basis. And the buffer affords quick dumps of full 1920 character CRT screens.

Like all LSI Ballistic Printers, the 300's dependability and negligible duty cycle restrictions originate with its ingeniously simple, patented Ballistic print head. It actually operates without moving cores attached to its print wires. Instead, it uses small armatures that propel its matrix wires in free flight to the platen.

The 300 Series comes with a full 96 ASCII character set, with up to 128 printables optionally expandable to two sets of 128. The printer has, in addition, an elongated character capability, and 10 pitch with 12 and 10/16.5 dual pitch options.

This printer isn't built just simply. It's built simply to last.

Project X's new VDP-410 does just about anything you want it to do.

PROJECT X PHOTO

Project X's 300 Series Ballistic Printer must be seen to be believed.

PROJECT X PHOTO

VDP-1000 A Complete Small Data System

The VDP-1000 actually features many attributes commonly associated with larger systems costing many times more.

Attributes like BASIC, COBOL, and ASGOL programming languages for business and system applications. A virtual memory operating system (VMOS) that lets you develop stand-alone or segmented programs without regard to physical memory size. And up to 40 megabytes of disk storage capacity. You start with a choice of two disk systems and three languages, and configure your system from there.

The basic VDP-1000 consists of a 16-bit CPU, 32K, 16-bit words of dynamic RAM, the world-renowned Dumb Terminal,™ a 180 cps, bidirectional 300 Series Ballistic Printer, and either a 10 megabyte cartridge or 1.25 megabyte floppy disk. All of the electronics, CPU, memory, and disk come in a full-size, wood-grain desk that leaves the surface clear for the console and printer. And there's also convenient work area for the operator.

Once you have the basic system, you add additional storage as you need it. Or want it. Up to four 10 megabyte disk drives or 5 megabytes of floppy capacity. You can upgrade the console with a choice of five smart terminals. And you can add a second or even a third programming language as your needs change or multiply.

The VDP-1000 is exactly the system to meet your needs exactly.

Project X's incredible data system gives you all the features you need, at a price lower than you'd expect.

PROJECT X PHOTO

VDP-410 An Intelligent Building Block

Meet the VDP-410.

It's a low-cost, 16-bit CPU with enough speed and ports to support a variety of peripherals. It provides OEMs with the flexibility to configure a multitude of systems. From communications controllers without external storage capabilities, to sophisticated time-sharing systems with a string of terminals, printers, and disks, the VDP-410 feels right at home in any and all of them.

The 410's DMA channel provides easy expansion. You can even get a cable and an expansion chassis with five slots for 15″ cards and a hefty power supply. LSI also offers a disk controller and 10-megabyte disk that complements its entire line of terminals and printers.

The basic system consists of a CPU with 200 nanosecond instruction cycle time, and 16-bit, 32K word memory with a 250 nanosecond access time, and I/O capabilities for communication with three external devices. The CPU, by the way, also includes an expansion port with serial/parallel I/O capabilities.

The VDP-410's instruction set, memory organization, and I/O architecture are compatible with hardware made by Data General and other manufacturers. Operating systems, file management systems, and programming utilities are available from leading software houses as standard packages, so it doesn't take any custom configuring to please the VDP-410.

The VDP-410's instruction set is Nova* compatible, and provides memory access, arithmetic, logical, and I/O functions. It's augmented with load/store-byte, inclusive/exclusive OR, exchange accumulators, multiply/divide, and block mode. And this offers the OEM an incredibly powerful instruction set for tasking and data management.

SEE PROJECT X REVEALED AT THE NCC

June 5th, at Booth 1519.

You won't believe your eyes when you see the staggeringly low prices on Lear Siegler's entire line of products. Prices so low they could only have come from Lear Siegler.

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OS USERS *sans* TSO...

HEARD ABOUT **BRAEGEN'S TSO?**

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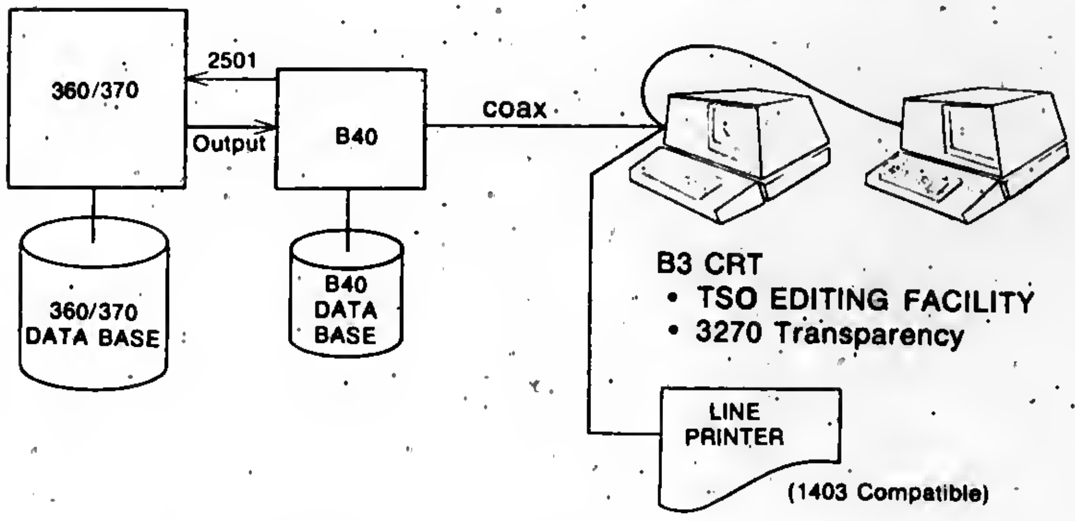
It works with 360 or 370 DOS or OS.

How is this possible?

The Braegen B40 Intelligent Controller attaches directly to your 360/370 channel. No reprogramming is required and no 3270 support software is required. The interface for transferring files between your 360/370 and the B40 is standard 2501 card reader compatible. Your programmers use Braegen's B3 CRT/Keyboard terminals and a full-function *interactive editor* to update programs on the B40 Disk Data Base.

And the B40 does this independently, so your 360/370 is more available. Batch jobs are submitted from CRT's for compile or execution. Meanwhile, other jobs can also be submitted from your other card reader.



Really?

Yes.
The result is you get the benefits of TSO without 360/370 overhead. And the same B40 can also include 2501-compatible card readers, and 1403-compatible line printers, to ease your unit-record load. Locate these (and the terminals) in the programmers' area, up to 7500' from the computer center via coax cable.

There's More?

Yes.
The B40 works with existing library or data files. Programs, data, and JCL decks can be easily transferred between the B40 Disk Data Base and your 360/370 files.

If you have 3270 support now, the same B40 can concurrently run as a 3272, along with our unique features such as Address Switching, Multiple Interfaces, Multiple drops/coax, and 7500' coax length.

Get On-Line Now

DOS users can do all this using any model from 360/25 through 370/168. DOS/360 or DOS/VS. You *don't* need a 370x, a megabyte of memory, or *any* software changes! Works great with POWER or other spooling packages.

OS users also get benefits. Since your 360/370 isn't swamped with TSO overhead you get immediate CRT response time.

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BRAEGEN

(Continued from Page 90)

pan. I doubt it, but the whole situation bespeaks problems facing U.S. industry as it internationalizes within the framework of archaic law.

For example, if we had cause to believe that reducing IBM's market share in Germany would help HIS and Univac expand or other U.S. firms enter, some merit could be found in current Justice Department actions looking into IBM's apparent E series slip in Japan. Now, with Siemens waiting to take over its German marketplace should IBM fall victim to restraint of international trade actions, I seriously doubt the two "second" companies (HIS and Univac have 7% each) would benefit.

Furthermore, a movement to Siemens of IBM engineers — the same ones who have been privy to IBM secrets — may ultimately cause us to bid *auf wiedersehen* to Germany as a major U.S. marketplace.

Acquisition Moves

German industry employs about 50,000 people in *production* of DP products, and the number is growing. Even though one would think that the disparity between the values of the dollar and mark in recent years might encourage the further purchase of foreign-produced products, German plans for converting an already self-sufficient production base from U.S.-ruled to German-ruled status seem overriding.

For the time being, acquisition of U.S. companies seems more consistent with these plans — the recent acquisition of Entrex by Nixdorf and Siemens' partial acquisition and joint venture with Advanced Micro Devices (AMD), for example. In any event, German industry's plans involve the augmentation of current capabilities through further acquisition of foreign firms or joint ventures.

Thus, bringing in Japanese systems directly competitive with IBM's while building its strength abroad, Germany prepares its electronics industry for an *anschluss* vis-a-vis the U.S. manufacturing community. The current drive to implement an earnest training program for developers and users of computer systems technology will increase the probability of victory in our time.

Looming Battle

As some cynics may consider Dr. Amdahl the "Lord High Muck-a-Muck" of the Japanese computer industry, Tom Watson Jr. may be considered Germany's Kris Kringle. With IBM or IBM-like technology swamping the German countryside and IBM's designation of Germany as its No. 2 worldwide marketplace, one can hardly help but conclude that IBM influence there is strong.

Ironically, IBM's designation of Japan as its No. 1 competitive threat means this threat, brought to Germany via the Fujitsu/Siemens/Amdahl trio, will allow Dr. Amdahl to test the

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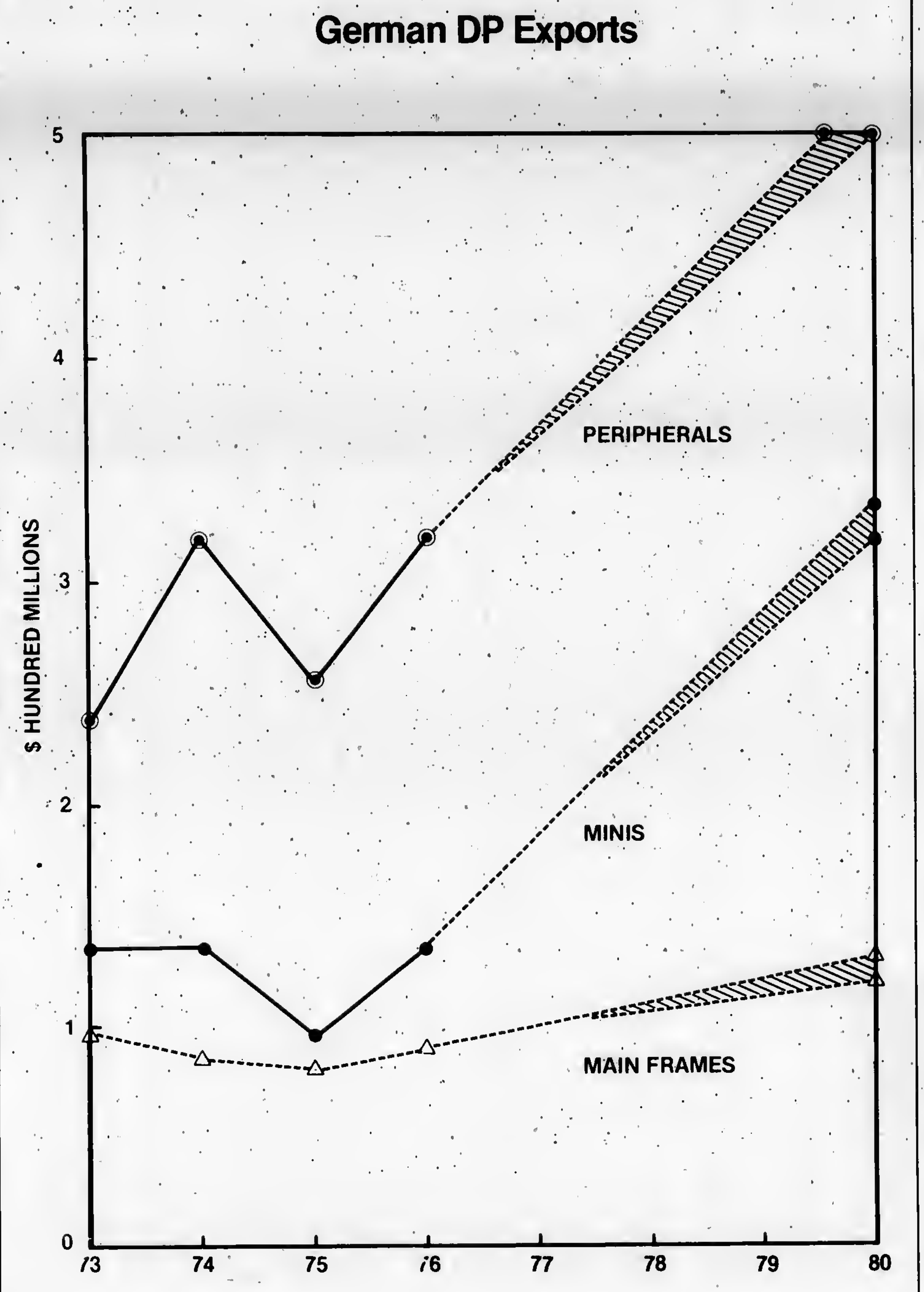

Figure III-5. FRG exports are most dramatic in the I/O peripheral area, accounting for nearly 60% of all DP exports, or $320 million out of $545 million in 1976. Minis should increase to $350 million by the end of the decade, up from $135 million. General-purpose mainframe exports are relatively weak at this time at $90 million, or 16.5% of the total. However, the Siemens/Fujitsu/Amdahl deal is likely to increase this figure well beyond the $130 million projected by 1980.

ITEL'S ADVANCED SYSTEM/6. UNTIL NOW IT ONLY EXISTED IN THE FUTURE.

A revolution in price/performance alternatives, the Advanced System™ 6 processor complex is Itel's most technologically advanced large-scale computing system. It's not a copy or re-engineering of any other system. In terms of price/performance, the AS/6 outperforms both the IBM 370/168-3 and the newly announced 3032. And utilizing high-speed Large-Scale and Medium-Scale Integration circuitry, the AS/6 is three to four times more powerful than our AS/5.

Like the AS/4 and AS/5, Itel's AS/6 is designed to be a direct replacement for its IBM equivalents and is fully compatible with IBM 360 and 370 software. But our AS/6 has several clear advantages over its IBM counterparts.

For example, the AS/6 Model 7032 Central Processor takes the concept of High Speed Multiplication one step further and gives you High Speed Arithmetic, including High Speed Divide. And the 48K expandable Reloadable Control Storage is a standard feature on this new Advanced System. In addition, the AS/6 is air cooled, so there's no need for the costly, intricate water cooling systems required by comparable IBM CPU's. Dramatic technological advances also permit the AS/6 to be lighter, take up less floor space and consume less power than equivalent systems.

With the new AS/6 and the rest of our Advanced System computer line, Itel offers a broad range of sensible alternatives with substantial price/performance advantages. But then, when it comes to price/performance, Itel has always had a considerable edge. Our AS/4 and AS/5 are alternatives designed for the future. And now we're taking the future a step further.

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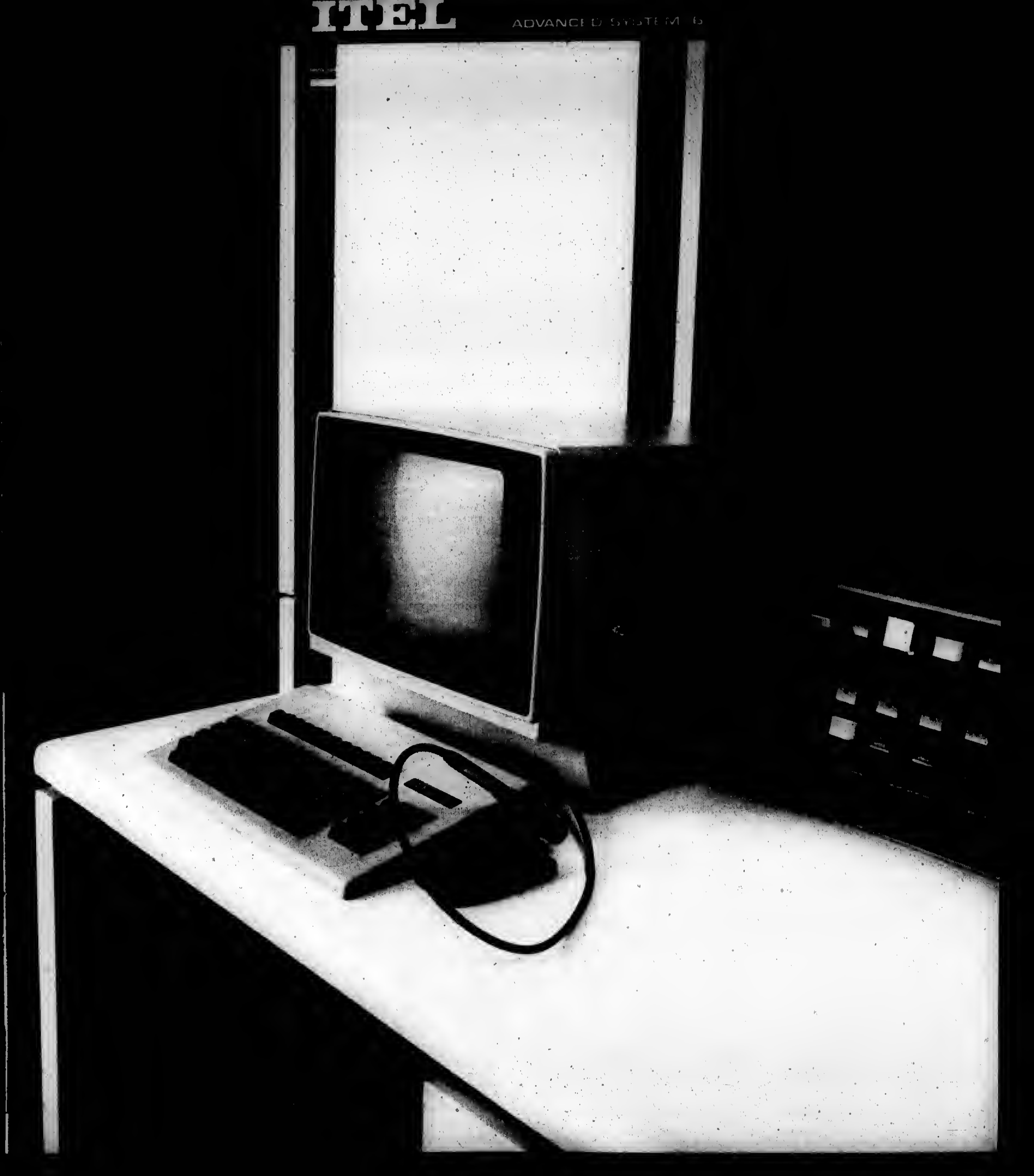

ITEL
ADVANCED SYSTEM 6

IBM HAS A LOCK ON DOS

DFAST IS THE KEY

Five years ago, Tower Systems, Inc. pioneered the concept of a disk management system for DOS users. Today, DFAST is the most extensively used disk management system in the world. And for good reason. DFAST provides more features, offers greater versatility and is supported better than any other similar system. Over 400 DFAST users world-wide can attest to that.

DYNAMIC FILE ALLOCATION . . .
DFAST allocates file space from available area on a disk pack. The user is only required to specify the number of tracks for a file, not the starting relative track number.

***AUTOMATIC SECONDARY EXTENT GENERATION . . .**
When a disk output extent has been exhausted the system will automatically generate additional extents with no operator involvement or JCL modification.

***ALLOCATION BY LOGICAL RECORDS . . .**
Disk allocation may be requested by number of anticipated logical records. The system will calculate the correct allocation based upon the available DASD device types.

AUTOMATIC VOLUME RECOGNITION (AVR) . . .
The AVR feature of DFAST allows the system to automatically make logical unit assignments by the serial number in the EXTENT card. DFAST will make these assignments if the logical unit is unassigned or assigned to the wrong pack..

PUBLIC SPACE MANAGEMENT . . .
DFAST will allocate area within a user-defined pool of disk drives.

DEVICE INDEPENDENCE . . .
Programs may be run on any DASD device type without re-compiling.

***GENERIC DEVICE INDEPENDENCE . . .**
DFAST allows the generic device type to be changed at execute time. Disk files may be changed to tape or vice versa without re-compiling the problem program.

***PRIORITY FILE DISTRIBUTION . . .**
User may define the search priority for allocation. Avoids stacking all files on same drive. Provides up to three-fold increase in thruput.

FILE CONCATENATION . . .
DFAST allocates files as close together as possible, thus eliminating unwanted seek time between files on the same pack.

FILE PROTECTION . . .
DFAST allocates area from any available space on the disk, thereby making it unnecessary for operations to delete unexpired files.

***ALLOCATION ON TRACK BOUNDARY . . .**
Allocation of files is by track boundary resulting in more efficient DASD utilization.

FILE DELETION . . .
The DFAST system supplies a support program that will expire files by file name. This program may be included in production job streams to delete files when they are no longer needed by the system.

PARTITION INDEPENDENT . . .
DFAST provides a facility for maintaining file uniqueness between partitions. This allows the same file name to be used by more than one partition at the same time on the same disk pack.

TRANSPARENT TO DOS . . .
DFAST requires no modifications to the DOS Supervisor, JCL Language, or user Programs.. DFAST is DOS and DOS/VS RELEASE INDEPENDENT and is compatible with all other software packages.

HARDWARE SOFTWARE COMPATIBILITY . . .
DFAST runs on any model 360 or 370 using the DOS, EDOS, DOS/MVT, or DOS/VS operating system and supports all disk drives (2311, 2314, 3330, and 3340, 3344, 3350, 3330 MoD 11).

NO USER CORE NEEDED . . .
DFAST functions in the transient or SVA area and requires no changes to user programs or partition allocations.

JCL SIMPLIFIED . . .
DFAST does not require explicit fixed addresses for files, thus relieving the necessity of manually mapping the disk.

EASE OF IMPLEMENTATION . . .
DFAST is cataloged in the users core image library and starts working immediately. No changes are required to existing programs or operational procedures.

RELEASE UNUSED FILE SPACE (SD FILES) . . .
When a sequential disk file is closed, only the amount of area used by the program is protected in the VTOC. The unused area is then available for use by other files. This feature allows the user to make more efficient use of his disk resources.

ENQUE/DEQUE OF DATASETS . . .
Files may be protected across partitions at execute time.

***REBLOCK FEATURE . . .**
Allows user to modify block size at execution time without re-compiling program.

***PASSWORD PROTECTION . . .**
Files may be password-protected to prevent unauthorized access.

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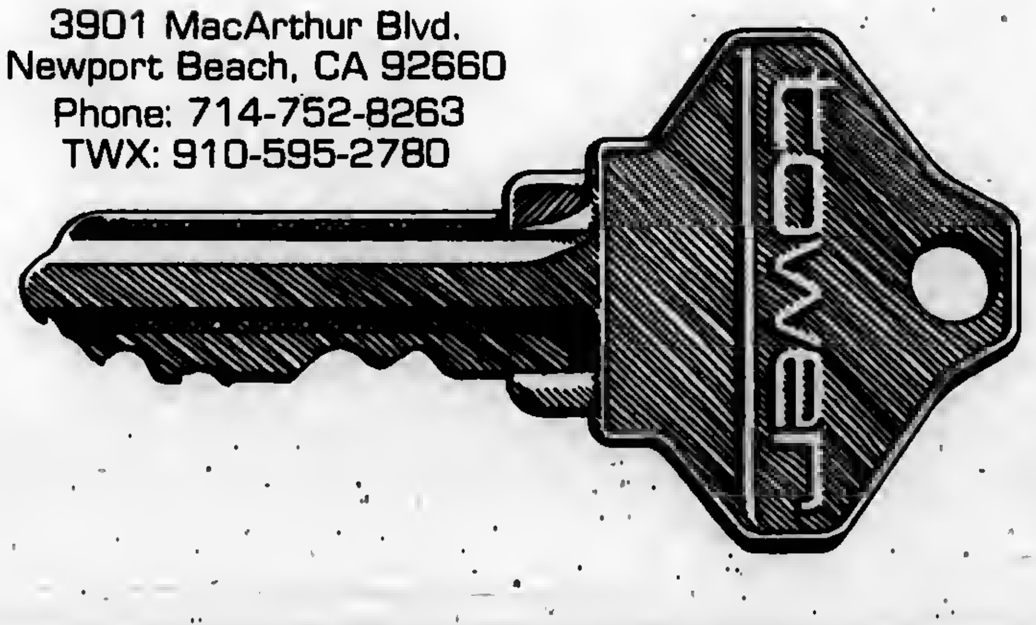

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soundness of his theory of "the case for large systems" once again. How about entrance in the German marketplace of the upgraded Amdahl design (e.g., the Fujitsu M-200 can include up to four processors in multiprocessor configuration, and it uses Fujitsu-developed OS-IV-F4 operating system software) against IBM's 3033 MP for starters?

With this clash looming, and a combined Japanese/German technological front in the EEC in the offing, the consequences to the U.S. computer industry could be serious.

Government R&D Support

The "peripheral" approach we have adopted thus far to our subject of "Germany today" — through the hot topic of the Siemens/Fujitsu/Amdahl plan and a comparison of the stimuli for the sudden rise of the Japanese-owned and the sluggish rise of a German-owned computer system industry — has been intentional.

Up until the past few years, Germany's skills were chiefly being poured into foreign (mostly U.S.) computer systems. The Germany of today is a far cry from that of even five years ago in terms of the number of success stories that can be told about domestic manufacturers' improvement of German-owned technological self-sufficiency and the effective launching of government-supported plans to improve the entire DP situation.

The German government plans to provide about 459 million deutsche marks (DM), or $230 million, for R&D projects in its DP industry during the four years from 1975 to 1979. In contrast, its R&D funding during the 1967-1974 period (seven years) amounted to nearly 800 million DM ($400 million at current rates of exchange).

A breakdown of company R&D support funds follows:

%		1975-79
62	Siemens	286 million DM
12	AEG-Telefunken	55 million DM
9	Konstanz[7]	41 million DM
14	Nixdorf	62 million DM
3	Kienzle	15 million DM
100		459 million DM

Note that the largest companies received the lion's share, i.e.; Siemens with about 71% of all R&D. These funds, together with matching company expenditures, will at Siemens be spent primarily on:

- The "Y-line" new computer generation.
- Components (microprocessors, memories, charge-coupled devices, etc.)[8].
- Fiber-optic transmission links.
- "Viewdata" (future audio/video device with keyboard).
- Electronic mail technology.

Indeed, it is hard to imagine more capable contenders for control of IBM's German marketplace than a Siemens further strengthened at the high end of its product line and a Nixdorf and Kienzle already strong at the low end with small business systems and minis, especially as IBM's grip on that market weakens. And with Siemens already building almost plug-compatible IBM equipment, Fujitsu essentially doing the same and IBM building IBM equipment, the mind boggles at the stream of IBM or IBM-like technology Germans, or for that matter the EEC and possibly Soviet bloc countries (Soviet Riad and IBM 360 and 370 technology are very close cousins) will be using in the 1980s.

It might be argued this phenomenon could be of some benefit to noteworthy manufacturers of non-IBM-compatible equipment, like Univac and HIS. Such arguments may all turn out to be futile games in logic based on hopeful scenarios that assume, for example, price wars causing reductions in quality of support which may make other manufacturers' products more attractive.

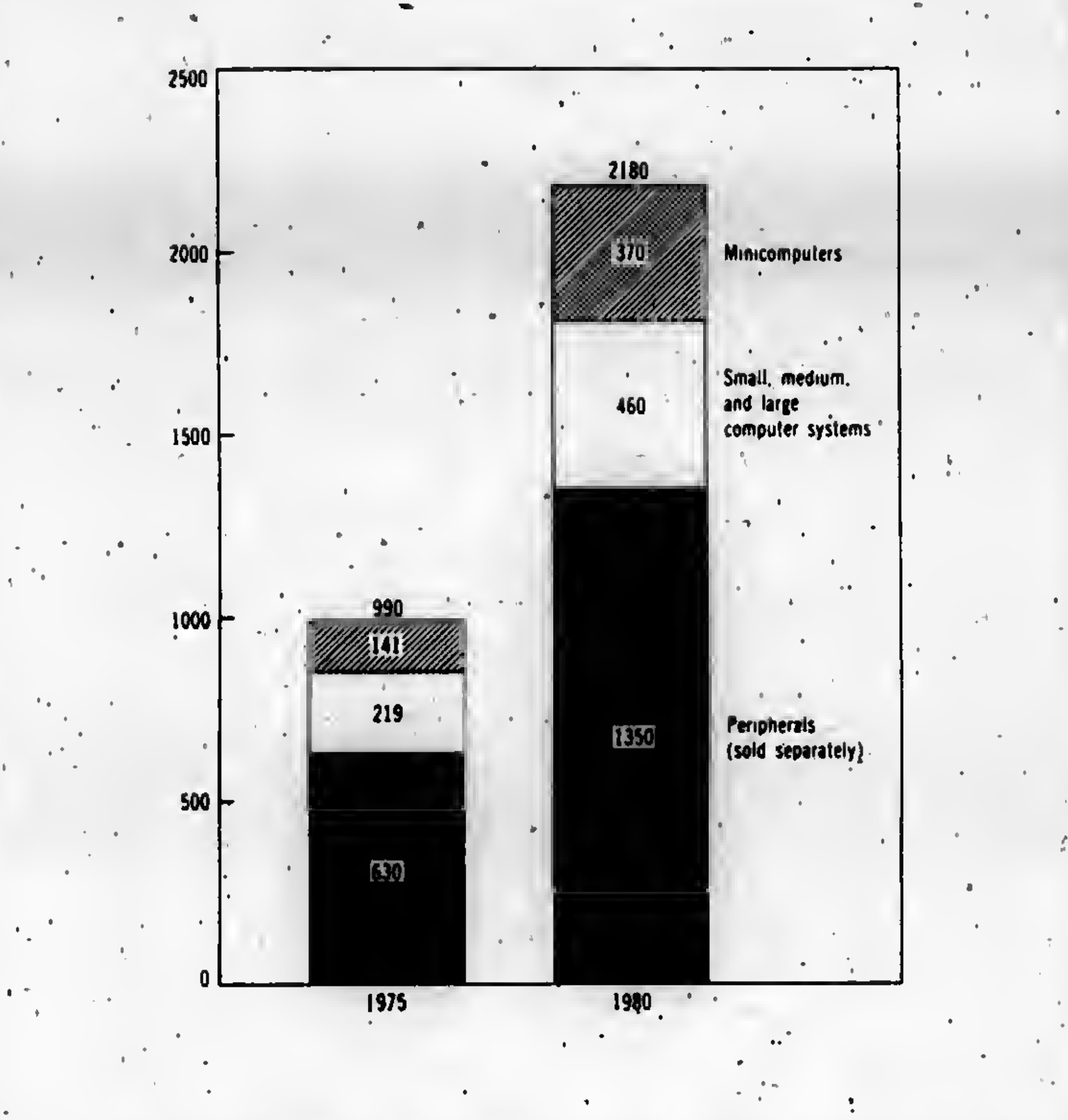
With the U.S. government bent on breaking up IBM, the German government, for its part, seems bent upon bringing it to Germany already broken up. However that may be, little value can be argued for a weakened HIS, Univac, Burroughs, CDC, NCR Corp. and Digital Equipment Corp. By and large, all their systems are of radically different architectures, the data structures and software mostly incompatible in critical ways, and their continuation highly dependent upon the product choices these companies represent to critical, analytical and intelligent, if not highly sophisticated, users.

HIS, among the few successful producers of general-purpose computing equipment in the world, now holds 7% of the German marketplace, as does Univac, also among the finest and the few successful large U.S. computer systems companies.

It is hard to see how either of these two companies, themselves battered by international crosscurrents, could be benefited by a Siemens/Fujitsu/Amdahl venture. Since all other manufacturers taken together (that is, all other but IBM, Siemens, HIS and Univac) constitute roughly 8% of the German marketplace — most of which involves small system sales — the introduction of new, powerful, IBM-like systems in Germany will hit HIS and Univac where it really hurts: in their products line, mainly at the upper end. That their processors can easily be argued to be better suited to certain kinds of applications is without a doubt true. I fear that German users eyeballing the future may regard such factors as the availability of trained staff as overriding in the selection of processor technology. Thus, however advanced or available HIS and Univac technology may be, its future cannot help but be adversely affected by the entrance of Fujitsu et al, if current trends continue.

Loss of Alternatives

Analyzing Figure III-5, we notice that my concern for the possible exit of U.S. and other manufacturers may also very well be shared by the German government. The remaining firms producing general-purpose, small to large-scale systems constitute only 8% of the German market and are mostly foreign (U.S.). These include noteworthy firms such as CDC, NCR, ICL, DEC, Burroughs and several others.



Source: Bureau of International Commerce, Office of International Marketing research report, The Market for Computers and Peripheral Equipment in Germany

Figure III-6. Shown is the German market in 1975 and 1980 for computers and peripheral equipment in millions of U.S. dollars.

Whatever the adverse affect of a strengthened Siemens on HIS or Univac, we can be sure that its impact will be larger on the other U.S. firms involved. If the Siemens/Fujitsu/Amdahl product lines are successful, the German govenrment just may lose the many alternatives it currently has. Indeed, HIS, Univac and DEC may be the only three U.S. firms with enough staying power to survive.

Increasing costs of labor and fear of technological obsolescence may make experience with IBM or IBM-like systems a must for German user professionals. The further introduction of these processors will admittedly benefit German users over the near term in that it will provide them with systems acquisition alternatives which are almost compatible to and competitive with IBM products.

Should the Siemens/Fujitsu/Amdahl plan *not* work out, or not work out well enough or fast enough, IBM may become as essential to the German government as sauerkraut is to knockwurst.

Further to this point, IBM is not unaware of the ride plug-compatible companies take on its years of investment in software and hardware architecture, and it is no doubt planning countermeasures to make life a bit more difficult for them. Rapid-fire product introductions, price cutting, variations of hardware/software/firmware mixes and unbundling of heretofore-bundled system control software (with high prices) could have a severely negative impact on Siemens' plans before they get into full swing.

And with distributed and networked minis increasingly the vogue, IBM may decide to make its competitive stand in Germany against the latter's small systems manufacturers, hoping that, by going this route, it can introduce a newly seeded, incompatible line of machines (although conversion bridges would be provided) that will compel Siemens to support yet other product line migration paths.

Siemens' plans call for the use of its own software to support its new Fujitsu systems, as well as Fujitsu's OS-IV-F4 (equivalent to IBM's MVS), a heroic task at best — MVS today has well over five million lines of code.

With Amdahl running IBM-leased software, Fujitsu running a modified version and Siemens its own, keeping various versions untangled for users as they choose the lower priced Siemens alternatives won't be easy. While the

(Continued from Page 101)

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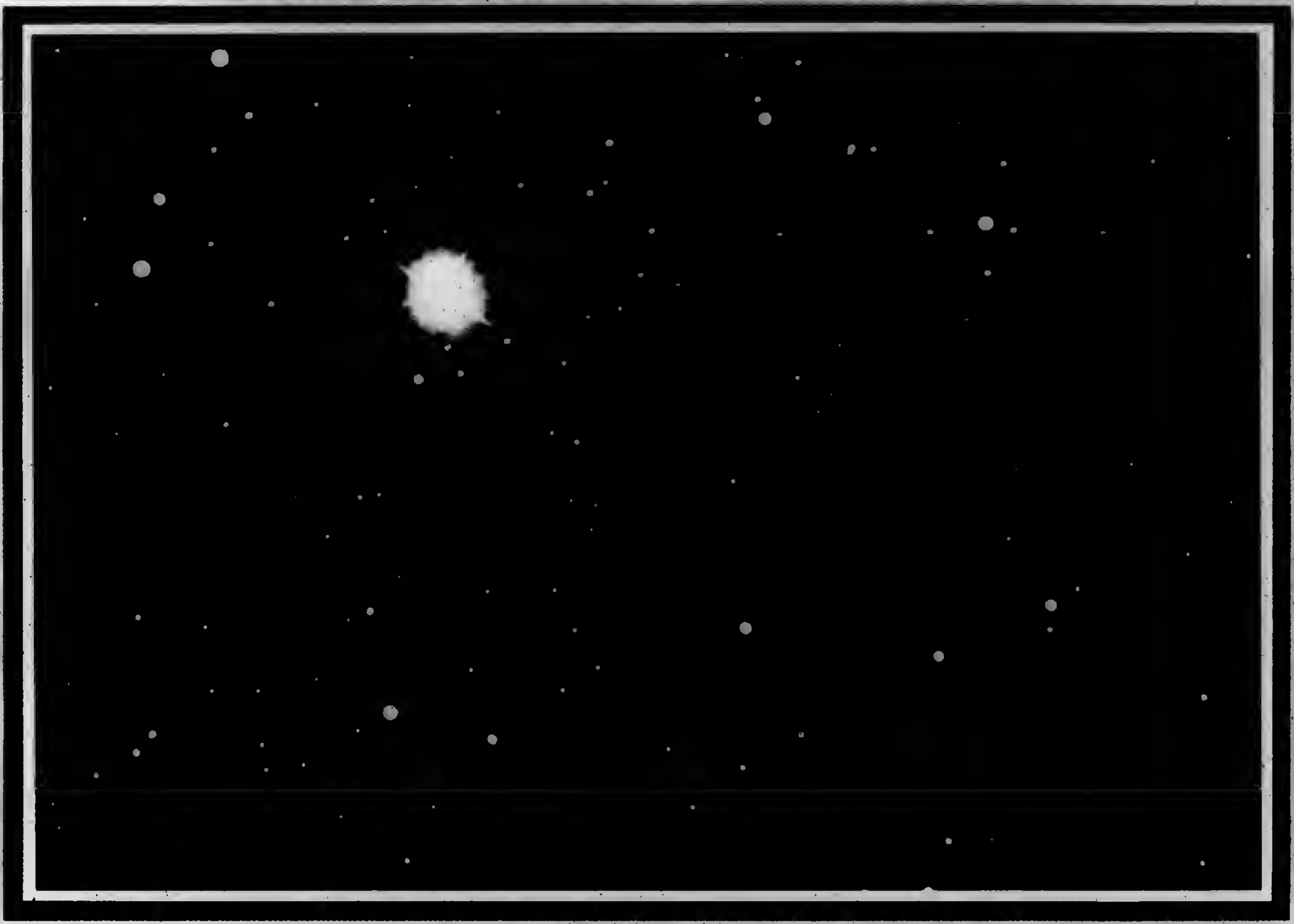

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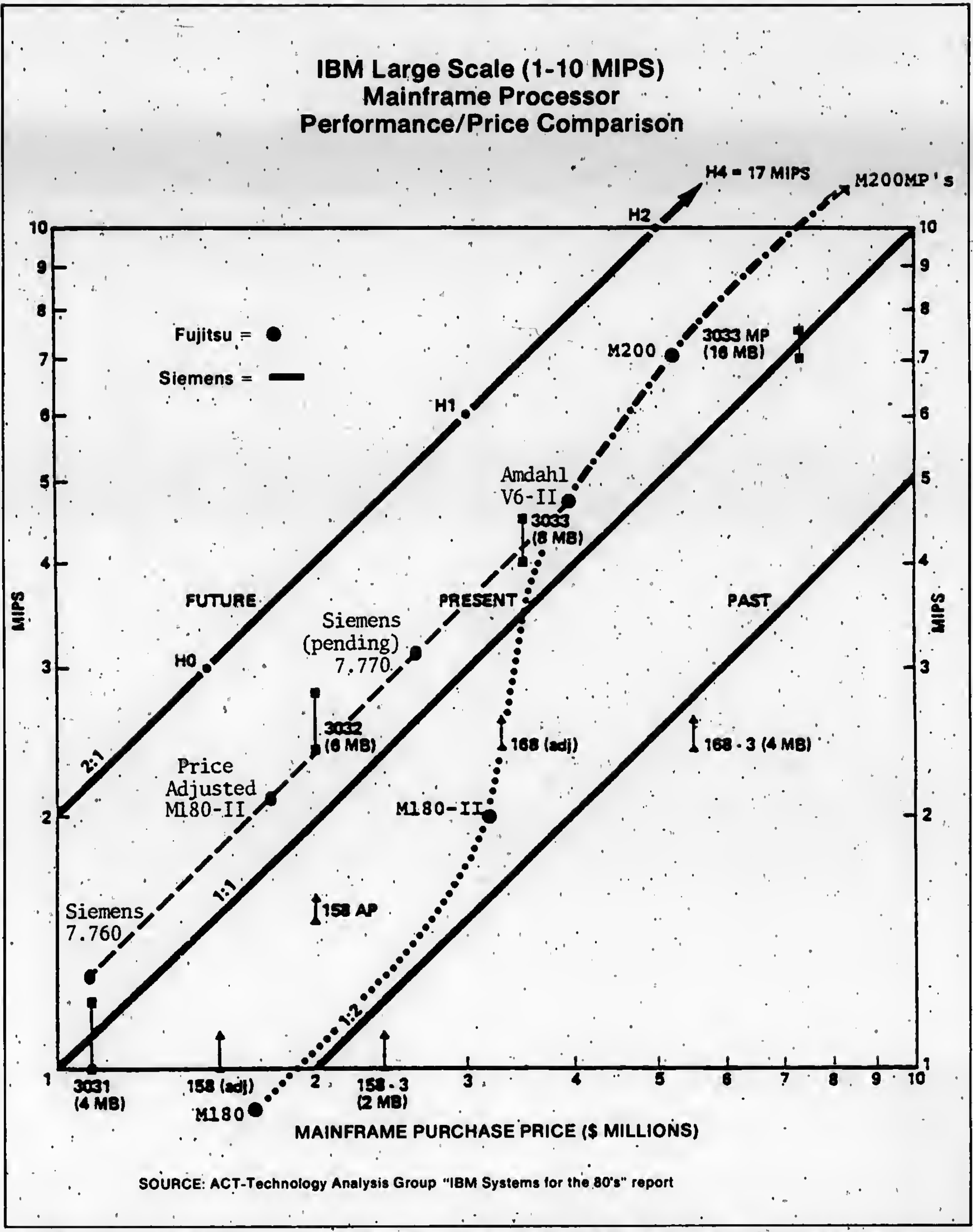

SOURCE: ACT-Technology Analysis Group "IBM Systems for the 80's" report

Figure III-7. Shown are ACT Technology Analysis Group estimates of IBM's past, present and future processor performance and prices vis-a-vis the Siemens 7.760 and pending 7.770, Fujitsu M180-II (with assumed price adjustment to be competitive), the Amdahl 470V/6-II and Fujitsu M-200. The Fujitsu/Amdahl connection would provide a migration growth path for the Siemens Model 7.760, thus enhancing its marketability, while giving the German company a more competitive posture both below (M180-II) and above (Siemens forthcoming Model 7.770) the IBM 3032. In addition, the Amdahl V/6-II would strengthen its position against the IBM 3033, while the Fujitsu M-200 would solidify its ultra large-scale image vs. IBM's 3033MP.

(Continued from Page 99)

Siemens/Fujitsu/Amdahl venture therefore poses the same threat it does to IBM and the other major U.S. manufacturers, its success is no foregone conclusion.

Given IBM's long history of total success and the untested nature of the Siemens/Fujitsu/Amdahl relationship, conflict between the two should by all rights result in a decisive victory for IBM, with the other manufacturers out of the picture and only IBM surviving. However far-fetched this scenario may be, its run-through here dramatizes the dilemma facing the German computer industry as it plans its future.

Warning to U.S.

There is little doubt the U.S.' *entire* economy will be adversely affected if we manage to lose the decisive position of strength and leadership we now hold in computer technology. That our security will also be compromised, as we enter into an era wherein technical sophistication will constitute one of the key factors in a successful national defense, is particularly sad.

Further amplification of these points exist in Chapter II. The message in that part of *Tsunami* was that the U.S. government had better recast its thinking about its computer (and communications) industry, stop dissipating its energies in nonproductive combat with it and take the lead in the creation of a national policy to ensure its health.

For it is my opinion that Germany's computer industry, while late in developing, is growing increasingly strong. And the recent announcement of the Siemens/Fujitsu/Amdahl plan provides us with further reminders that our industries are not as invulnerable as we once thought.

Severe competition from well-engineered products produced by German-owned electronics manufacturers within Germany appears inevitable. Moreover, the introduction of Fujitsu's most advanced large-processor technology to the European continent through as able a partnership as that binding Siemens and the German government suggests it might not be amiss for us to reflect on the implications of such a combination for our national security.

It seems clear that man's record in controlling his aggressiveness compares unfavorably with his achievement in providing the technological means to give it expression. That there is a rather regular pattern of aggressive behavior running through man's conduct of both internal and international affairs certainly cannot have escaped the notice of even the most noncritical of minds.

If we can agree that conspiracy plays a far less prominent role in the eruption of conflict than does a pervasive tendency to ineptitude then our need for national defense takes on a variety of new and different meanings and increased urgency. The common enemy, against whom all national defense is directed, may well be mankind's proven clumsiness in resolving conflict without tragedy.

The implications of this are immense. Included among them are:

- That national defense must encompass preparation for survival in a world where the drawing of distinctions between our enemies and ourselves as foes may be unwarranted, or at least not germane.
- That mankind's record thus far leaves little hope that individuals or nations can live without defense against the forces of ineptitude in the foreseeable future.

The "War to End All Wars" was followed by a larger world war, to which it was clearly impossible to attach so hopeful or glorious an epithet. Since then there has been almost constant incendiary conflict and strife. This suggests to anyone concerned with the issue that there is at best just too much gunpowder around and too many devices designed to facilitate its use.

It is not necessary to be a visiting extraterrestrial to be saddened by the absurd "all or nothing" modalities in

(Continued on Page 104)

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(Continued from Page 101)

which earthlings habitually cast their response to perceived conflicts of interest.

If we wish to take meaningful strides in the elimination of "all or nothing" combat situations, we must stop playing around with *primarily* "all or nothing" alternatives as characterized by current nuclear-based thinking. Electronic technology opens vast vistas in preemptive or retaliatory actions, vistas which do not lead to overkill or unnecessary physical trauma.

Also, arguments that are intended to allay fears of accidental madness grow weaker as the nuclear club grows, especially if we fear ineptitude to be mankind's greatest enemy. A highly developed computer (and communications) technology could provide the community of nations of goodwill with a nervous system to detect growing difficulties, as well as the means to defuse them before explosive measures become necessary.

Arguing the case to establish proper guidelines to control the use of electronic technology, say in the privacy area, is a far preferable occupation to that of figuring out how to prevent an invasion of privacy by a nuclear blast.

Some measure of consolation is offered by the fact that Japan, No. 2 in the line-up of home-owned computer systems manufacturers, and Germany, soon to race France and England for the most all-encompassing degree of self-sufficiency in Europe, are the prime examples of countries fostering a computer industry which lowers the potential of our own in international trade. After all, both are convincing in their expressions of friendship toward the U.S.

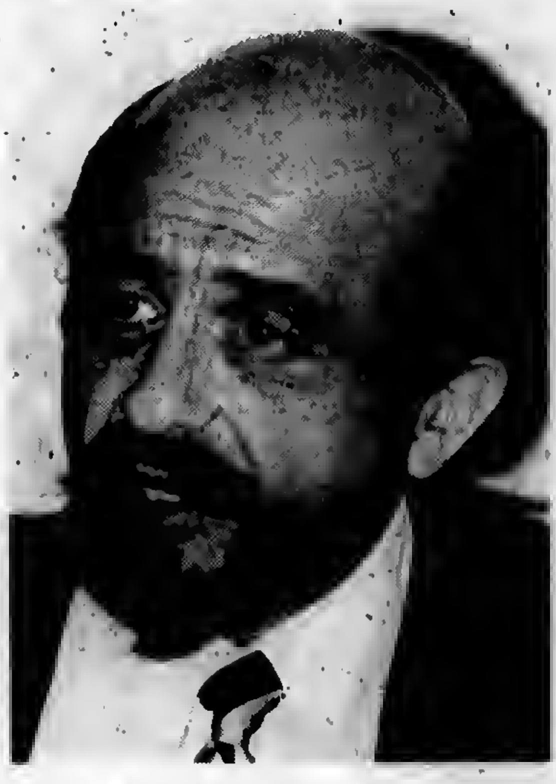
But we would be unwise to assume friendship forever from anyone, however fervently we may hope for it. And even if it were so with our friends, other nations ranging from those allied with our ideas, through the so-called neutrals, to avowed belligerents are growing increasingly capable of nurturing and supporting their own competitive techologies.

Our electronics-based defensive weapon or surveillance alternatives stand to be reduced through the reduction in effectiveness of our computer industry in world commerce. Thus far, our computer industry has been heroic in stemming the flow of U.S.dollars abroad,[9] investing some of these dollars in new technology which flows back into all sectors of endeavor (including the military sector).

It is my opinion that a strong computer/communications-based technology will be needed in the U.S. for the conceivable future to provide its defense establishment with the tools we acknowledge it needs to protect us while we await a global reconciliation.

Needless to say, we cannot reasonably hope — nor should we — to inhibit the progress being made abroad through any other means than our own ingenuity in staying ahead. If we are to maintain our current lead, our government will have to clue us in on its long-range plans for fostering and protecting our computer industry's viability, even while it tests its leader with legal action for having the effrontery to be ahead.

The rumored discussions between Japan's NEC and France's Compagnie Internationale Pour L'Informatique — Honeywell Bull (CII-HB) suggest further Western European competition from Japanese firms as well as a French answer to Siemen's new plan (stated by a CII-HB financial director in a recent *Datamation* article). The Soviet Union and China both stand to benefit by our diminished influence in Western Europe in an area so vital to our defense.



Lecht is the author of five previous books on computer-related matters; The Programmer's Fortran II and IV, The Programmer's Algol, The Programer's PL/I *and* The Management of Computer Programming Projects *and most recently,* The Waves of Change.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science and Data Processing Management Association.

NOTES

[1] The communique was in the form of a translation of an article that appeared recently in the Japanese press; it is reprinted here as edited by the Technology Analysis Group staff.

[2] European Economic Community, or Common Market.

[3] The Fujitsu M180-II is approximately a 2-Mips (millions of instructions per second) machine, compared with the IBM 3032 at about 2.5 to 2.7 Mips. The M180-II is also higher priced, and some downward adjustment is therefore anticipated. The M-200 is a 7- to 8-Mips processor, like IBM's 3033MP, and is competitively priced.

[4] Herbert E. Mayer, "Those Worrisome Technology Experts," *Fortune*, May 22, 1978.

[5] Small business systems, minis and distributed processors are more popular than "big" systems in the FRG today.

[6] See *Waves of Change* by Charles P. Lecht, ACT, 1978.

[7] Now a Siemens subsidiary.

[8] The German government is expected to increase its R&D budget for integrated circuit components in 1978, perhaps stimulated by the significant attention and yen investment committed by the Japanese government to this vital area.

[9] See the *Fortune* article cited earlier.

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Other DVST terminals are also offering enhanced capabilities—from plug-in intelligence to combined refresh and storage.

The state-of-the-art is based on stated needs.

Now we are introducing our 25-inch 4016-1 terminal. Several years in development, it has been built with specific markets in mind: Customers from network modeling, mapping, and IC design and layout let us know the value of increased graphics capacity. Plus 86 lines of 179 alphanumeric characters per line.

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At Tektronix, innovation is a partner with practical application. That means knowing the market—existing customers and new—and knowing how to provide for their individual needs.

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Tektronix has long been a leader in refresh capability. Our first, highly-rated alphanumeric terminal was a pioneer in forms-ruling.

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The 4020 Series offers general business environments an easy evolution to graphics.

Expandable from simple alphanumerics to graphics, this new series makes graphing capability as easy as alphanumeric output has been for years. Yet it's versatile. Rather than fix a few graphing formats in firmware, we designed a complementary English-language, PLOT 10 Easy Graphing software package. Now many non-graphic information systems can easily add graphics capability.

Even more significant may be the introduction of our new color terminal, the 4027.

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This represents the first effort to bring universal order to color graphics.

When we brought out our first storage tube terminal and supporting software years ago, we developed standards and coding systems that are still in use today. The same will be true for color.

We've also made sure that our current customers can make an easy transition from present graphics to color: with compatible software. Multi-color plotter support. Gray-scale hard copy. . . and continued innovation as our customers' color requirements advance.

Tektronix color is designed to facilitate graphical interpretation of statistics in business graphing, and to answer the needs of computer-assisted instruction, laboratory analysis, mapping and network modeling.

Until now, these applications could only imagine the possibility of color graphics. We're making it practical.

Tektronix color will add a new dimension, clarity and convenience to many applications. Sometimes a simple change of color can communicate even more quickly than a graph.

"Easy-to-use stand alone systems can free our customers to do what they do best."

We plan our intelligent products to expand upon many of the same time, cost, and labor saving benefits of graphics: by reducing routine processes, intelligence can keep each customer working at the decision-making level.

Our goal is to make each product as simple and personally manageable as possible. By understanding our customers and answering their applications one by one, we make our intelligent graphics products an extension of the mind.

Personal computing is already improving decision-making information—not only in engineering and scientific environments, but on the desktops of corporate management.

The smartest thing about our personal computer is how well it works with its operator.

The desktop computer user expects an immediate comfort level. He looks for simplicity. An easy-to-use language. A familiar keyboard. And fast answers. So when we built our 4051 graphics system, we made it powerful enough to command a system of peripherals and to operate as an intelligent terminal. But we also designed it to be inherently simple to operate and easy to understand.

It is so consistent that once you've mastered it you don't have to live with a set of manuals.

While designing a nonrestrictive hardware package responsive to the expectations of most personal computer users, we've individualized software to specific users groups. Including utilities for sophisticated programmers. Easy application packages like Modeling & Reporting. A PLOT 50 library that includes statistics, mathematics and electrical engineering. Plus a business planning package that produces bar charts, pie charts and line graphs with little more input than the numbers themselves.

Customer needs are leading graphics intelligence into new territories.

Recognizing some major bottlenecks in the nearly universal engineering technique of finite element analysis, we designed the FEM181, a complete stand-alone applications package that can cut the long, arduous task of finite element modeling by up to two-thirds the time and cost.

You can be sure, too, that with Tektronix' customer orientation these future developments will be done not only with intelligence but with good common sense based on your future needs.

"We saw the need to distribute information. Which is why we now lead the art of putting graphics on paper."

Tektronix digital plotters provide intelligence, precision and multi-color graphics to many applications needing permanent or camera-ready plots.

To the computer builder, graphics is just one more peripheral to his central system. But at Tektronix, we regard all our products as peripheral to the central idea of quality graphics solving customer needs.

...That's why peripherals like our plotters and hard copy are graphics leaders in their own right.

Take plotters. In 1976 we introduced the first smart B-size (11"x17") unit, and led the trend away from analog to digital devices, with the 4662. Its customer base ranges from advanced research environments to office timesharing systems.

The C-size plotter: Not just bigger. More versatile.

Now we are introducing a C-size (17"x22") plotter, the 4663. The thinking behind it, and inside it, is as advanced as it looks.

Although C-size plotters are now rare in printed circuit design, numeric control, civil engineering and drafting environments, much of their work can be done on a C-size work station...cutting time and costs significantly.

Many of our customers have already begun redefining their needs to fit the benefits of the C-size plotter alternative.

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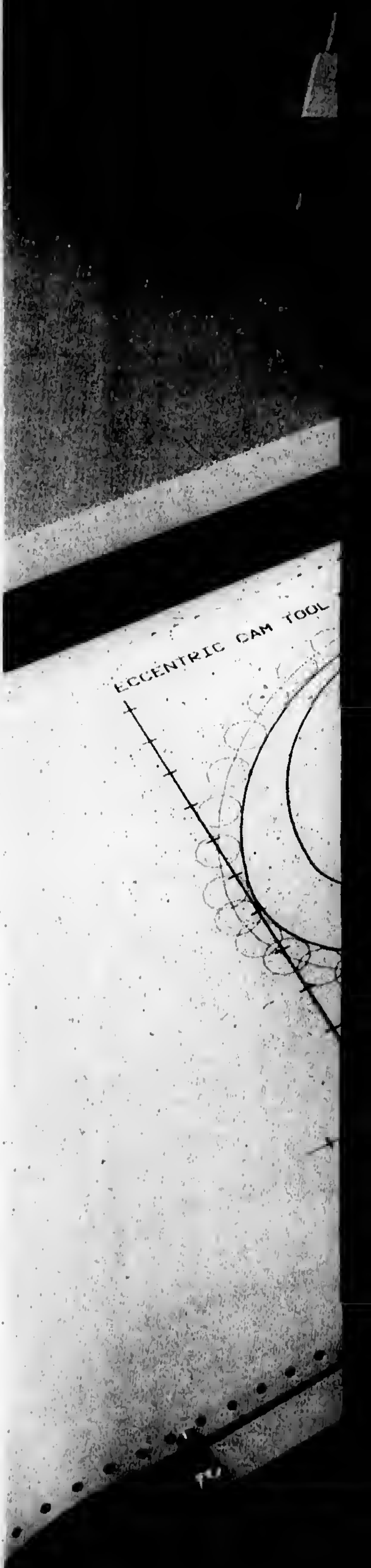
It offers increased character generation capability. Circular interpolation. Automatic paper advance. All in a flexible, easy-to-use package.

In display hard copy, too, we've achieved a quality and simplicity any user would appreciate.

Hard copy from the push of a button: It's a simple operation that hides the advanced technology behind high quality copy. It provides sharp, dry copies directly from the screen in a matter of seconds, with reliability that lives up to Tektronix standards.

Our customers take for granted the fact that hard copy is now personal, quick, and economical. The more people can take us for granted, the better we're doing our job.



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"We sell the same thing to every system builder: a reliable and responsive partnership."

A few years ago, Tektronix committed itself to a separate organization specifically to serve the OEM needs of the system builder.

It was really the only way. Compared to other markets, many OEM needs are as different as night and day.

Or as different as today and tomorrow. Because what the system builder looks for, more than product reliability, are far-sighted technologies and long-term, close working relationships with their manufacturers.

System builders for the publishing market are looking to Tektronix graphics for new capabilities in graphic editing. New dimension in page layout.

Our responsibility to the system builder begins with an introduction to our graphics' concept and potential. It involves helping define needs and prove systems feasibility—often years in advance of actual OEM product purchase.

The GMA display series: our first graphics designed specifically for the systems builder.

Planning often includes our GMA modules: combining refresh and storage capability within the same tube, they bring our customers the high detail and economy of storage display, plus the dynamics of refresh. They are designed around a modular chassis that enables easy threading of system cables and addition of a wide range of optional components.

This modular approach helps many system builders cut costs by ordering custom configurations virtually "off the shelf." At the same time, our engineers and manufacturing people are on-call to further tailor the product to meet individual needs.

Inherent to our OEM concept is upward-expandability. System builders who switch to our new 25-inch display, for example, will be able to do so with no modification to software, timing, or interfaces.

In the OEM market, corporate strength is also a product feature.

Vendor "staying power" is especially important to the OEM. We appeal to people who seek not simply a product, but an extension of their own manufacturing lines.

You'll find too, that we value our OEM customers for many of the same reasons they value us. The benefits are truly reciprocal: it is through other innovators exercising our product concepts that we learn the full potential of our own technologies...and, in the long run, learn to make graphics better and better for the end user. That's what good partnerships are all about.

"We designed PLOT 10 IGL to anticipate the needs and new equipment that come with growing markets."

One of the biggest pitfalls in computation has been around since William Burroughs invented the adding machine 80 years ago. Burroughs had 50 of his first model built before realizing that no customer was ever likely to get the hang of its operation. Hardware builders have been falling into the same pit ever since.

At Tektronix, we make our products' operation as easy as possible, and provide the tools for future expansion. That includes operational software and documentation that is the most thorough in the industry.

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PLOT 10 Software has set a standard for the industry to follow.

Our PLOT 10 Terminal Control System was the industry's first major effort at packaging the building blocks of graphics programming. Today, virtually all other graphics suppliers have made their equipment PLOT 10-compatible.

That's a leadership role we plan to maintain, by continuing to support our customers' specific software needs. Towards this end, our latest software package may be the most versatile ever.

Known as the PLOT 10 Interactive Graphics Library, this latest package is completely I/O and device-independent. It allows a customer to run programs today, for example, on a color graphics terminal, then on a storage terminal tomorrow. He can also update his graphics to new applications by selecting advanced capabilities, like 3-D and line smoothing, one at a time.

Our PLOT 50 library, designed for our personal computer, includes the most comprehensive series of statistics volumes yet developed, plus other powerful applications software. Plot 80, developed for the 4081 Interactive Graphics Terminal, includes wide-ranging operational and graphics software, host-resident support subroutines, utilities and diagnostics.

The power and convenience of these software packages don't accrue only to the sophisticated programmer, but to users of all experience levels as well. Although the sophisticated innovator is usually our first customer, we're concerned with looking ahead to those users who will be starting with graphics tomorrow.

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Data Base Systems: Design, Implementation And Management, Part III

By Ronald G. Ross

The information contained in the following system descriptions was obtained directly from the data base management system (DBMS) vendors. Every effort was made to ensure accuracy.

The system descriptions have been ordered in the manner indicated in Figure 1.

* * *

INFORMATION MANAGEMENT SYSTEM (IMS)

IBM's IMS is a widely implemented data base management system, rivaled in numbers only by Cincom Systems, Inc.'s Total. It ws originally designed in the mid-1960s in conjunction with the Apollo space program.

IMS is actually a generic name for a family of systems, encompassing various levels of compatibility with other IBM systems. Basic data handling under IMS is performed by Data Language 1 (DL/1) and is typically meant to include a telecommunications feature. DL/1 is a data base system in its own right, suitable for batch operations.

The most important current configurations of IMS are the following: IMS/VS under the OS/VS1, SVS or MVS operating systems; IMS-2 (IMS/360) under OS/MFT or OS/MVT; and DL/1 under DOS/VS. The most advanced features are found in IMS/VS, which was first released in February 1974.

IMS offers an integrated data communications feature, IMS/DC, which is priced separately. Interfacing with the Customer Information Control System (CICS) is supported as an alternative to IMS/DC.

An application program interfaces with the IMS data base via a CALL statement, using appropriate arguments. Host languages include Cobol, PL/I and Assembler. Under IMS/DC, a query facility, IQF, is supported.

The data description and manipulation languages of IMS are foreign to Codasyl specifications.

Highly attractive IMS/VS features include:

System	Vendor	Est. Number of Users*
	DBMS Offered by Mainframe Computer Vendors	
IMS	IBM Corporation	600-900
I-D-S/II	Honeywell Information Systems, Inc. (H.I.S.)	425 for I-D-S/I
DMS 1100	Sperry UNIVAC	250
DMS/90	Sperry UNIVAC	40
DBMS-10	Digital Equipment Corp. (DEC)	75
DMS-II	Burroughs Corp.	100
DMS-170	Control Data Corp. (CDC)	(new)
	Independent DBMS for Mainframe Systems	
TOTAL	Cincom Systems, Inc.	1,100
IDMS	Cullinane Corp.	200
ADABAS	Software AG	200
SYSTEM 2000	MRI Systems Corp.	200
DATACOM/DB	Insyte Corp. (formerly C.I.M. Corp.)	75
INQUIRE	Infodata Systems, Inc.	75
Model 204	Computer Corporation of America (C.C.A.)	30
	DBMS Offered for Mini-Computer Systems	
IMAGE/3000	Hewlett-Packard Corp.	200
Varian TOTAL	Sperry UNIVAC (formerly Varian Data Machines)	50
DBMS-11	Digital Equipment Corp. (DEC)	50
Prime DBMS	Prime Computer, Inc.	(new)
INFOS	Data General Corp. (DG)	†
ADMINS/11	ADMINS, Inc.	†
	Representative Systems from the Remote-Computing Industry	
MAGNUM	Tymshare, Inc.	225
NOMAD	National CSS, Inc.	275

* As of January 1978.
†Number of users unavailable.

Figure 1: Data base management systems by vendors and numbers of users.

- A program isolation feature, which prevents concurrent update by multiple programs scheduled against the same data base.
- The ability to handle batch and online processes simultaneously.
- Various security features for monitoring and controlling data access.

Data structuring under IMS is hierarchical (represented schematically by tree structures), with data elements grouped into segments. Access paths, called logical relationships, may be established between physical tree structures, giving a networklike data configuration.

A number of choices in internal pointer types and storage patterns are available; entry point access to data base roots is sequential, randomized or indexed.

The use of Vsam as an internal access method allows support for secondary indexes and variable-length segments; these features help establish IMS' position among a small group of DBMS defining the state of the art in data-structuring capability. However, IMS does not support data independence to the level of individual data items; all access is to records (that is, segments) as they physically reside in the data base.

Search arguments called SSAs are supported for selective segment access; user access to IMS data bases is both controlled and enhanced by a device similar in concept to a subschema, known in IMS as a PSB.

IMS is an extremely powerful data-handling system, but the overhead costs are held to be high. A great deal of administrative support is necessary on a continuing basis, so the system itself tends to consume professional resources.

Some users find the calling conventions cumbersome and difficult to learn. Overall, education and training for effective use of IMS is relatively expensive.

IBM has attempted to make IMS a comprehensive data management facility, but it is not as complete as those of several other vendors. The recovery capabilities in IMS are among the best of any DBMS currently available.

One significant, recent enhancement to IMS is the Multiple Systems Coupling (MSC) facility, announced in mid-1976 for use under IMS/DC. Aimed at distributing data base processing, MSC supports the switching of transactions between relatively independent IMS systems on distinct processors. Segregation of front-end communications support is also possible.

IMS support seems to have a firm commitment by IBM. Ratings of user satisfaction with IMS tend to fall somewhat below those for other systems, but the number of users speaks for itself. Overall, IMS/VS is one of the most advanced DBMS on the market.

(Continued on Page 106)

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INTEGRATED DATA STORE II (IDS/II)

Honeywell Information Systems, Inc.'s IDS/II is the most recent version of a system that was begun in 1961, making it one of the oldest and most respected of all DBMS. Users of IDS/I, which was supplanted by IDS/II in the fourth quarter of 1975, are perhaps the most numerous for any Codasyl system.

Earlier versions of IDS have the additional distinction of having been the prototype for the Coadasyl proposals for standardization of DBMS in the late 1960s. Originally, set concepts were discussed in terms of "master" and "detail" records, as is still the case with Cincom's Total; IDS/I and especially IDS/II, however, represent efforts to stay within the evolution of Codasyl philosophy and terminology.

The most noticeable deficiency of IDS/I in this regard — which is corrected in IDS/II — is the lack of an independent data description language (DDL).

IDS/I, originally written for the General Electric 200, is now operational on the HIS Series 600, Series 6000 and Series 60 Level 66 computers under the Gcos operating system. IDS/II is available on all of these machines except the 600.

On-line processing, which operates under the Gcos Time-Sharing Executive, is extended with the IDS Data Query System and the Management Data Query System (MDQS).

Interaction with the IDS data base is accomplished using Codasyl data manipulation verbs, which under IDS/I must be preceded by an "Enter IDS" statement. Interfaces to languages other than Cobol are planned for IDS/II. Additional data base creation and processing capability is supported under MDQS IV.

Other enhancements included in IDS/II are the following:

- An independent subschema description language.
- A device media control language for increased control of mapping to physical devices.
- Complete Codasyl privacy and security facilities.
- Support for variable-length records.
- Implementation of an indexed-sequential file access method.
- A data dictionary facility.
- Support for secondary indexing to allow partial inversion of network files.
- Interactive IDS/II, using language largely similar to the regular DML.
- A data restructuring utility.
- IDS/II, like IDS/I, offers the full range of storage structuring provided by the Codasyl specifications and makes data networking available as the user requires.

With the release of IDS/II, HIS has addressed many of the deficiencies in IDS/I. A centralization of data management routines and buffer pooling promise to reduce core overhead and to facilitate data access for multiprogramming. A general improvement in performance is to be expected.

Also addressed by IDS/II is the serious compromise of data independence occasioned by lack of an independent schema DDL. In IDS/I, for example, data base description must appear in every application program (usually with a COPY statement); because of this, modifications in the description require extensive program recompilation.

Restriction of user languages to Cobol and MDQS is undesirable but temporary. Given a firm commitment by HIS for seeing IDS/II through its initial installation period in 1976 and 1977, the system has excellent potential for complete data base service.

IDS/I, which has users boasting the longest continuous experience with any DBMS, is a solid product. Many of these users can be expected to migrate to IDS/II, continuing their prosperous association with the IDS software line.

* * *

DATA MANAGEMENT SYSTEM (DMS 1100)

DMS 1100 is Univac's contribution to the data base management field. To date the system itself has not been "unbundled," making its position

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somewhat unique among DBMS.

DMS 1100 is an overlapping subset of the Codasyl data base specifications. In some cases, data-handling features have been added or extended; in others they have been omitted. Several of the most noticeable omissions are the lack of support for privacy locks — an important data security feature — and for the Codasyl subschema facility.

DMS 1100 is available for use on the Univac Series 1100 hardware.

A Transaction Interface Package (TIP) is available as a communications monitor interface. Access to DMS 1100 data bases by time-sharing users is supported by CTS.

Application programming under DMS 1100 is through Cobol source code. Fourteen of 16 data manipulation verbs proposed by Codasyl have been implemented, and several additional verbs have been added to enhance procedural capabilities, especially for recovery, error handling and multiprogramming.

A preprocessor converts all DMS 1100 verbs to CALL statements. Future releases of special data manipulation statements for other languages, such as Fortran and PL/I, are projected.

Attractive DMS 1100 features include:

- A facility for restoration of "quick before" images from temporary disk storage upon system failure, plus selective or complete data base recovery.
- A facility for command roll-back, which restores the data base to its status before the start of the current command, and for run-unit roll-back, which restores the data base to its status before the start of the run unit.
- An interface with the Total Information Management System (Tims), Univac software for building large information systems.

DMS 1100 supports the three Codasyl access methods: randomized, linked and direct. In addition, an indexed-sequential mode of physical access has been implemented.

Complete network capabilities are available, comparable to any of the Codasyl-type DBMS. In addition, set implementation by pointer array is supported, as well as indexing for sets.

Two important features are now available for DMS 1100: a high-level Query Language Processor (QLP 1100) and a report writer, Remote Processing System (RPS 1100). Both systems, announced in March 1975, are oriented toward on-line processing.

DMS 1100 has better than average data base protection features. The departures from strict Codasyl implementation may cloud the picture for future compatibility, but do in fact provide several positive capabilities. Subschema and privacy lock facilities, as well as a reorganization utility, were reported to be under development in 1977.

Univac, which was one of the first to commence development of a Codasyl-type DBMS in 1969, continues to give the system substantial support.

Given continued development and adherence to Codasyl standards, DMS 1100 has strong potentials for future growth and dissemination. Significantly, DMS 1100 appears to have a central role in Univac's marketing strategy for the coming years.

A number of observers group DMS 1100 along with IMS/VS and IDS/II as definitive of the state of the art among currently implemented DBMS.

* * *

DMS/90

DMS/90 is Univac's small computer counterpart to its major DBMS offering, DMS 1100. The system has been available since November 1974.

DMS/90, like DMS 1100, is a Codasyl-type DBMS. In spite of the fact that it is marketed by Univac, DMS/90 is actually more closely related to Cullinane Corp.'s IDMS than DMS 1100 since both DMS/90 and IDMS were fathered by the same development effort at B.F. Goodrich in 1970 and 1971.

DMS/90 is interesting in several respects. As with DMS 1100, the software to date has not been unbundled by Univac. Moreover, Univac's support of both large and small computer DBMS represents an attempt to provide an avenue of evolution for smaller computer users in an area not before

(Continued on Page 108)

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attempted: data base systems following Codasyl standardization.

However, complete compatibility between DMS 1100 and DMS/90 has not yet been achieved, a fact complicated by the distinct hardware boundary between Univac's large and small computer lines.

DMS/90 is available on Univac's Series 90 (90/60, 90/70, 90/80) under VS/9; the Univac Series 70 (formerly RCA) under VS/9; and the Univac 90/30 under OS/3. The 90/60 and 90/70 machines fall approximately into the range of IBM's 370/138 and 370/148.

Application programming is accomplished in Cobol, using a subset of the Codasyl DML verbs. A preprocessor converts DMS/90 code to CALLs.

DMS/90 fails to implement full Codasyl standards in the following areas:

- Only 12 of 16 Codasyl verbs are implemented.
- Privacy provisions, excluding that provided by the subschema facility, are not supported.
- Capability for set mode of pointer arrays and set occurrence selection is not provided.

DMS/90 supports full Codasyl data networking, including the three principal location modes. The DMS 1100 Codasyl enhancement for supporting indexed-sequential access is not implemented.

Utilities currently exist for data base initialization and recovery, backup and storage statistics. DMS/90 has somewhat larger real core requirements than Hewlett-Packard Co.'s Image/3000 (estimated at 131K bytes for the 90/30 and 262K bytes for the 90/60 and 90/70).

Important enhancements were scheduled for 1976: reentrant coding of DBMS modules for multiuser support; on-line recovery features; and implementation of a Device Media Control Language (DMCL).

One especially interesting development area is the integration of IMS/90, an additional Univac data management system. IMS/90 is described as a generalized on-line storage and retrieval system supporting access to direct, sequential and indexed-sequential files.

A number of interesting features are supported: a high-level query/update language (Unique), a communications interface, password security and recovery functions.

The future of DMS/90 is difficult to predict. Development of the system continues at this date and has already corrected a number of early shortcomings. Interesting because it brings mainframe data base management to medium-size users, DMS/90 is caught up in an intense hardware confrontation taking place in that arena. Its future is also clouded by Univac's 1977 acquisition of the Varian hardware line.

DMS/90 is clearly an indicator of important trends in the data base field and should be watched closely in the next several years.

* * *

DATA BASE MANAGEMENT SYSTEM-10 (DBMS-10)

DBMS-10, another of the Codasyl-type DBMS, is marketed by Digital Equipment Corp. The system is also available on the communications network of Rapidata, which was responsible for its design and development. The system was initially available in mid-1973.

DBMS-10 is perhaps not as advanced as some of the other mainframe Codasyl systems, although development continues. One area especially criticized has been its deficiency in supporting concurrent access, a weakness that DEC has moved to correct in the past year or so. A subschema facility is supported, but its scope is relatively limited.

DBMS-10 is implemented for the Decsystem-10 and Decsystem-20.

On-line processing is available through the Decsystem-10 monitor, which is complemented by DBMS-10 reentrant modules.

Application programming against DBMS-10 data bases is accomplished in Cobol or Fortran host languages. Recently released by Rapidata is X2C, a high-level nonprocedural language

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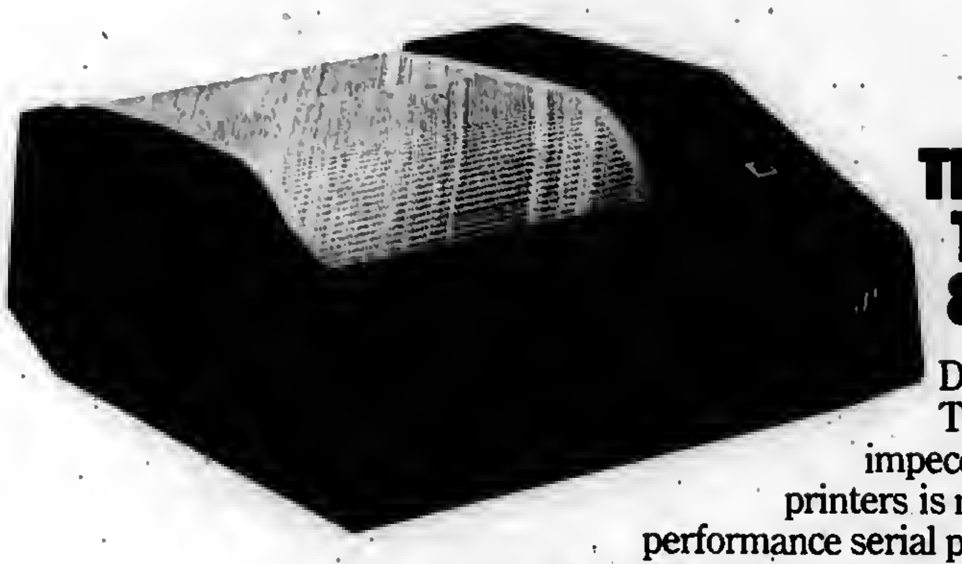

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that has a number of positive features:

- Interface with special dictionary file(s) in which comprehensive structural information is kept on a selected basis.
- Compilation of source code rather than interpretation so that object code may be kept for later execution.
- A powerful report generation feature.
- Computational looping and input/output facilities built into the language.
- A powerful DML syntax that substantially reduces the effort required for application development.
- A data base creation and update capability.

DBMS-10 provides complete data networking, including a facility for sequential access.

Utilities are provided for initialization, print, schema update and statistics. Recovery has been cited as somewhat lacking, and a utility directed at this area is reported to be in the works.

Documentation, at least of the tutorial variety, is excellent, better than for most DBMS. The data dictionary facility to be featured by X2C is especially noteworthy in several respects.

First, it supports all files that comprise the "data base," whether merely sequential or truly structured. Secondly, multiple dictionaries are created, which in the case of DBMS-10 files identify subschema and schema so that different logical views are presented to different sets of X2C users. Finally, data description is enhanced in several ways. X2C should be watched closely, as a significant extension of DBMS-10 usability.

With the release of DBMS-10 for the Decsystem-20 and of DBMS-11, a minicomputer DBMS for the PDP-11, DEC has now established a complete range of data management support, from the larger user on the one hand to the medium-size and smaller user on the other. It is significant that Codasyl DBMS software is the common denominator in the various data management offerings.

DEC is rapidly moving toward a position of growing strength in the computer industry; its offerings should be watched closely for this reason.

In addition, DEC is beginning to shed much of the reputation it once had for lack of interest in software products. This development is, of course, generally true for the mini manufacturers and is indicative of increasing confrontation with the traditional mainframers.

* * *

DATA MANAGEMENT SYSTEM-II (DMS-11)

Burroughs Corp.'s DMS-II is a highly innovative system that is outstanding, by comparison, in operational performance. The system was first announced in October 1974.

DMS-II represents a significant departure from Burroughs' previous DBMS offering, DM6700, in several important ways. Perhaps the outstanding difference is the integration of various data base management routines into the operating system itself, which has a noticeable effect on data retrieval speeds and helps reduce overall core requirements.

DMS-II also represents a departure from Codasyl standards, although there is some overlap in philosophy.

DMS-II runs on Burroughs B6700 and B7700 series computers under the MCP operating system. Newly released is support for the B1700 series.

For large-scale communications networks, DMS-II can be interfaced with the Network Definition Language (NDL) and Message Control System (MCS).

Application programming against DMS-II data bases is supported directly in Cobol, Algol, and PL/I through use of 17 verb commands. No preprocessing of the source code in these languages is required since DMS-II extensions to language compilers are supplied.

Performance-oriented features of DMS-II include:

- Loading of reentrant data set access routines into main memory upon issuance of an INVOKE statement to act as MCP intrinsics.
- Implicit "frees" of data sets after se-

(Continued on Page 111)

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(Continued from Page 109)

lected data base operations.

- Isolation of on-line transaction error to a disk page in order to allow for continued processing with concurrent reconstruction of the page.
- Optional construction of bit vectors, representing data base content under given selection criteria, to improve the speed of data base inquiry.

DMS-II access methods, of which bit vectors are only one, include six others: indexed sequential, indexed random, random (calculated), direct, ordered lists and unordered lists. Basic file organization is supported in four modes: sequential, random, indexed sequential and indexed random.

Conceptually, a DMS-II data base is organized into data sets and sets, which provide significant networking capability. Data sets, which may be either "disjointed" or "embedded," define basic storage patterns by which data are physically organized. Linkage between data sets, in any of five options, provides internal network paths.

External data organization is supported by data inversion, by which "sets" of data are formed. Data access from sets may be improved by formation of "subsets" and by storage of selected data.

DMS-II includes a report-writing feature and a query language, Inquiry. DMS-II is clearly unique among DBMS in several respects. First is the balance that Burroughs has achieved between physically linked structuring ("data sets") and inversion ("sets"); this enables the user to tailor his data base to his needs.

A second unique feature, mentioned earlier, is the merging of selected DBMS routines with the operating system. Also, the capability of source language compilers to process data manipulation verbs directly is notable.

One questionable feature of DMS-II is the extent of programmer control over audit/recovery logging. Some argue that this capability is error-prone and undesirable in terms of data independence.

Security, which is largely borrowed from the operating system, could be improved. One significant deficiency is the lack of a subschema facility.

Overall, DMS-II is complex but nonetheless fast and relatively easy to use. Documentation has been somewhat lacking.

DMS-II users are particularly enthusiastic about Burroughs' data base system. Given its special characteristics, DMS-II is clearly a system to watch in the data base field, especially as its facilities for data structuring become more widely understood.

* * *

DMS-170

Control Data Corp.'s DMS-170 is one of the more innovative systems on the market. It attempts to bring together inverted structures and Codasyl concepts under something of a relational umbrella.

Components of DMS-170 — for example, Query Up-date — have been available for some time; others have been marketed within the last year or so. Particularly significant in this regard is the Cyber Data Base Control System (CDCS). Only a few users currently employ DMS-170 in full form.

DMS-170 is perhaps a prime example of an implementation of the complete data management concept. Many components are thoroughly data base in orientation; others — for example, the Cobol compiler and the Sort-Merge processor — fall outside the traditional definition of a DBMS.

Lower level file processing is supported in DMS-170. The loose packaging of these various components into DMS-170 is designed to give a holistic concept of data management

(Continued on Page 113)

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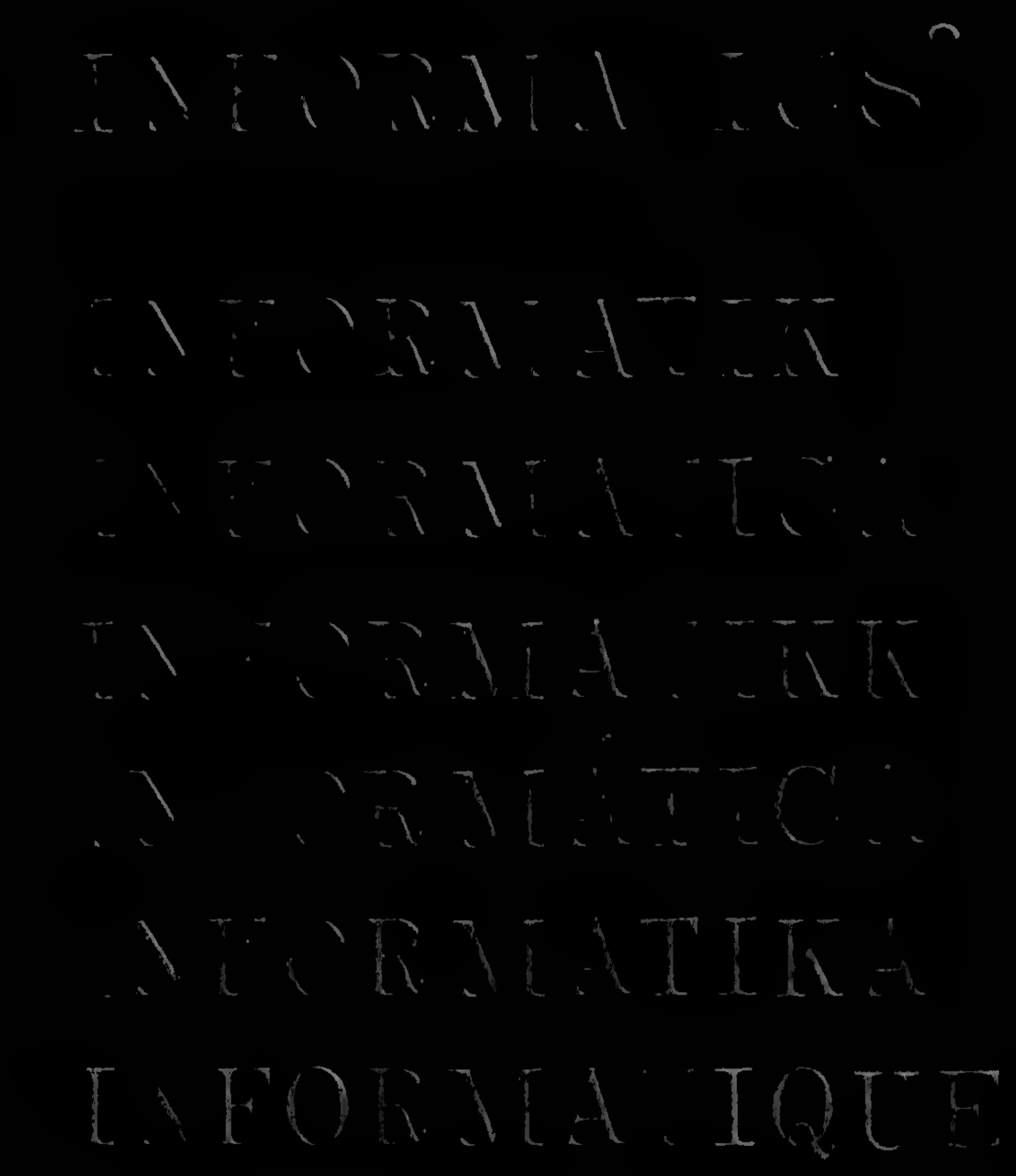

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and of a machine function.

Hardware for DMS-170 includes the CDC Cyber 170 series; Cyber 70 series, Models 72, 73, 74; and the 6000 series, under Scope 3.4 and NOS 1.0.

DMS-170 is used directly in Cobol and via CALLs in other languages. The self-contained user-oriented language, Query Up-date, may be used for DMS-170 interface. The Cobol Data Manipulation Language (DML) is very similar to traditional Cobol I/O commands, but dissimilar to Codasyl specifications.

Basic data structuring in DMS-170 is through inversion. To relate records, a JOIN operator is specified in the DDL (establishing an equivalence between a common data element); and the logical concatenation of record types is given a special relation name.

A user requesting access to this relation name (via a Cobol READ) receives a physical concatenation of records that have been aggregated by the DBCS using index information.

One important feature of DMS-170 is that files involved in data base relationships are concurrently available to processing outside the data base, even for updating. This avoids a lock-in of the data and yields flexibility to the application environment.

Users of IBM's IMS and similar systems have no such capability; in IMS, for example, a file is always an IMS file, even if internally Vsam or Isam. Overall, DMS-170 is geared toward allowing a smoother transition to the data base environment than possible under many DBMS.

DMS-170 is not yet widely known in the market because CDC has not been particularly well known in the past for data management. Its borrowing from both the Codasyl specifications and relational theory has been called flippant by some, imaginative by others.

Although DMS-170 has parallels in other systems — Infodata Systems, Inc.'s Inquire and Software AG's Adabas in particular — it is definitely unique among the DBMS offered by mainframe companies, which have generally not tended as strongly toward inversion. DMS-170 also supports subschemas and data independence to the data item level.

The future of DMS-170 — especially its performance in large data base environments — will be interesting to watch. Like Burroughs' DMS-II, it is likely to become better respected as its facilities become more widely understood.

* * *

TOTAL

In terms of the number of current users, Cincom Systems' Total is IMS' most serious competitor for IBM hardware. Unlike IMS and most other DBMS, however, Total has not been limited to a single hardware line but has been implemented in a number of hardware environments. Total users are the most numerous for any DBMS.

Total consists of several modules of phases, one of which is also called Total. Compared with IMS, data handling under Total is extremely streamlined and direct, with relatively little loss in efficiency, except perhaps for large and less static data bases.

The Total user is restricted to two basic types of records: a single-entry "master" record and a variable number of owned "detail" records. These record types may be interrelated in such ways as to model most types of complex data structures. These data structures or "networks" borrow significantly in concept from early versions of IDS software.

The first version of Total was made available in early 1969. Current versions of Total are available for the machines listed in Figure 2:

On-line processing in the IBM environment is often supported in conjunction with Cincom's Environ/1 or Informatics' Intercomm.

Application data handling uses CALL statements, with appropriate parameters appended. Host languages include Cobol, Fortran, PL/I, RPG-II and Assembler. Total data-handling language has little in common with the current Codasyl specifications.

Data base security features include:

- Dynamic data base logging of before- and after-images.
- With Environ/1, automatic warm or cold restarts in either real-time or on-line modes.
- Utilities for periodic data base dumps.
- A task "hold" facility for the prevention of concurrent update. Under a multitask version of Total, multiple application programs may share the same data base.

Data structuring under Total is somewhat like that of the Codasyl model, although terminology and implementation differ significantly. The Total network does not have the full range of Codasyl capabilities; for example, a record type must always be either an owner (a master record) or a member (a detail record); it cannot be an owner in one set type and a member in another.

This restriction prohibits the direct relationship of master records of different types or detail records of different types. One implication of this is that a hierarchy in Total can never be directly expressed with more than two levels.

An additional restriction is the lack of support for variable-length records. Access to master records is strictly randomized.

Total has been criticized for these and other aspects in data structuring. Nonetheless, certain of these features have positive implications for performance and space economy — one reason why Total has had initial successes in the minicomputer environment.

Compared with IMS, Total's consumption of resources is modest. Unlike IMS, Total supports data independence to the level of individual items, because CALL arguments specify individual items rather than an entire record to be accessed. Subsets of the data base can be formed for a given program in subschema-like fashion.

Manufacturer	Hardware Line	Operating System
Burroughs	2500, 4800	MCPV
CDC	6000/Cyber 70, 170	SCOPE, KRONOS, NOS
	3000L	MASTER
DEC	PDP/11/34, 11/70	RSX, IAS
Harris	S100/S200 Series	VULCAN
Honeywell	200/2000 Series	Mod 1, OS2000
	Level 62	GCOS
	Level 66/6000	GCOS
	Level 6	GCOS
IBM	360/370	DOS, DOS/VS, OS, OS/VS, SVS, MVS
	System/3 Models 8, 10, 12, 15	SCP/CCP
ICL	1900 Series	GEORGE
Interdata	7, 8/32	OS 32
NCR	Century Series	B Series
	Criterion Series	RS1, VRX
RCA/UNIVAC	Series 70	DOS
Siemens	4004	BS-1000
UNIVAC	9400/9700	OS/4
	90/60, 70, 80	VS9
Verien	V70 Series	VORTEX II

Figure 2: Hardware lines and operating systems for Cincom Systems' Total.

Proponents of Total are particularly vocal in their praise of the system and, for many IBM 370 users, Total represents an important alternative to IBM's IMS.

Although in some respects not as advanced as other DBMS, Total is nonetheless impressive in a number of ways: its cross-mainframe implementation, its early successes in the minicomputer field and its accumulation of a sizable user base.

Cincom is one of the most successful vendors of independent software and as such has contributed significantly to the evolution of DBMS software.

* * *

INTEGRATED DATA BASE MANAGEMENT SYSTEM (IDMS)

Cullinane Corp.'s IDMS is one of the most attractive data base packages currently available for IBM hardware. Although only recently marketed (May 1973), the IDMS user base has expanded rapidly.

IDMS was specifically designed to comply with the Codasyl specifications and remains to date the only major DBMS of this type commercially available for IBM hardware. IDMS software, which was designed by B.F. Goodrich in 1970 and 1971, has since been adapted to several other hardware lines, including Univac's Series 90 (where it is known as DMS/90) and DEC's PDP-11 (DBMS-11). In this latter environment, IDMS has the distinction of having been the first mini DBMS of the Codasyl type.

IDMS is available for IBM 360 and 370 systems under DOS, DOS/VS, OS/MFT, OS/MVT and VS. Support is also extended to the Univac Series 70, although Cullinane no longer actively markets in this area.

A Generalized Communications Interface (GCI) allows IDMS coupling to most telecommunications monitors, including CICS and Intercomm. In late 1976, marketing support was announced for a teleprocessing monitor, Shadow II, allowing a more integrated data base/data communications (DB/DC) environment for IDMS users.

IDMS may be used with any host language (for example, Fortran, PL/I, Assembler) that supports a CALL statement. For Cobol, a special set of data manipulation statements is available for data-handling functions.

A special section within the Data Division allows the user to invoke a subschema (a subset of the data base data description) for use by his program. All special functions, such as the above, are supported by a precompiler.

IDMS features several attractive items:

- Privacy locks for greater access control.
- Data base recovery routines, including journal roll-forward and roll-back of data base files.
- A Central Access Monitor Program (Camp) that provides for multitask processing.
- An integrated data dictionary system, including a facility for automatic data description in programmatic form (Cobol).

Data structuring under IDMS follows the Codasyl specifications for networks. Recently announced were significant extensions to previously supported storage techniques, including support for sequential structures, for primary and secondary indexing and for a generic key retrieval capability.

Available with IDMS is an integrated version of Culprit, a powerful report generator. Cullinane has recently begun to emphasize the total data management concept with the packaging of a number of system components into the Cullinane Data Management System (CDMS).

Components of this package include IDMS itself, teleprocessing support, an on-line query facility, a data dictio-

(Continued on Page 115)

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(Continued from Page 113)

nary and various output genrators under Culprit. Cullinane is also pursuing the back-end DBMS concept under DBMS-11, which it calls IDMS-11.

Cullinane is in a solid position of strength as the industry looks increasingly toward the Codasyl specifications and toward new concepts in data management, such as back-end DBMS. IDMS is a popular system and one whose growth continues.

* * *

ADABAS

Adabas is a full-scale data base management system produced by the German-based corporation Software AG. At least one-half of its current users are in North America.

Adabas, which finds its forte among medium-size to large application environments, is comparable in general data-handling capabilities to any of the other major data base systems. Adabas is unique, however, in providing an integrated data compression facility from which significant savings in disk storage, as well as de facto security, may accrue.

Adabas is supported on IBM 360 and 370 systems under DOS, OS and VS.

Teleprocessing interfaces are available for TSO, CICS, Intercomm, Task/-Master and Environ/1. Software AG recently released its own teleprocessing monitor, Complete, signaling a move in the integrated DB/DC direction.

Application program interface is effected through CALL statements within Cobol, Fortran, PL/I or Assembler source languages. A special Adabas query language, Adascript, supports high-level retrieval requests in a stand-alone fashion. There is no overlap with Codasyl specifications.

A relatively new facility receiving increasing emphasis is Adamint, a "macro" software facility that allows the creation of high-level, customized user views of the data base.

Attractive Adabas features include:

- An auto-restart capability that allows the resumption of data base activities immediately following an interruption.
- A restore capability for recovery from hard read errors.
- A restart capability, which restores before-images following abnormal program termination.
- Special security capabilities, including support for 15 gradations of access security and for data ciphering.
- A phonetization utility for improving search results.

Under Adabase data structuring, as with MRI Systems Corp.'s System 2000, all logical data element relationships are given physical expression in a segregated portion of the data base. These inversion techniques result in a considerable reduction of the overhead associated with file reorganization and data base searching.

A record in an Adabas data base is a simple physical hierarchy in which an effective limit of only one or perhaps two levels is possible. The true power of Adabas arises from the indexing of

(Continued on Page 116)

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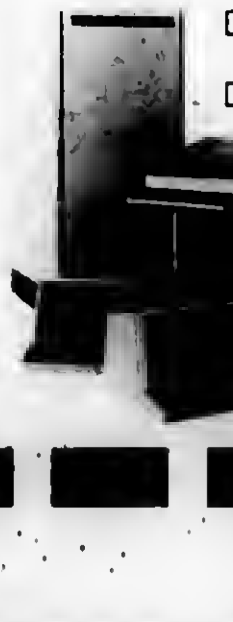

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these records and from the mapping of indexes for elements of the same type (that is, elements taken from the same domain) appearing in different record types. This process, called coupling, results in two matched lists, which represent a bidirectional "linkage" between record types.

Adabas has been praised for its element-level independence, which is possibly as extensive as in any DBMS currently available. Not only is access possible at the element level but, significantly, file reorganization is not necessarily required should a field type be added to a record type.

This allows a flexibility for growth far beyond many other DBMS. An additional level of independence is possible under Adamint.

In these and other respects, some observers feel Adabas approaches a measure of the separation between logical and physical concerns that is envisioned by the relational model.

Development of Adabas facilities continues in a number of areas. An integrated report generator, Adawriter, was released in the second quarter of 1975. Software AG is known to be active in the development of minicomputer systems.

Some critics originally questioned whether German-based Adabas developers could give adequate support to North American installations (Adabas was released in 1970 and was marketed in the U.S. in 1972). The question now seems moot.

Adabas is an attractive system, which overshadows its monolithic competitor IMS/VS in a number of respects. Overall, Adabas is one of the foremost representatives of the class of inverted DBMS.

* * *

SYSTEM 2000

MRI Systems' System 2000 is one of the best-known DBMS in the field, with implementations for Univac and CDC computer lines as well as for the IBM 360 and 370 environments. Estimates of the current number of users falls somewhat below 200.

System 2000 has also had notable success in the remote computing field, where it is offered by some 15 sources and is used by as many as 350 organizations.

In terms of overall system complexity, System 2000 falls somewhere between the extremes presented by IMS and Total. Data base administration, however, is probably less difficult with System 2000 than with either of these systems. System 2000 emphasizes the construction of efficient indexes to data records, based on inversion of individual data fields.

System 2000 is currently implemented on several manufacturers' mainframes: the IBM 360 and 370 series; Univac Series 1100; and CDC 6000 series and Cyber 70 and 170 systems. System 2000, like Total, is noteworthy in this cross-mainframe implementation.

System 2000 is interfaced with teleprocessing monitors such as CICS or TP 2000 (the latter also marketed by MRI). The System 2000/TP 2000 combination is highly rated by many sources. A recent enhancement provides a Tcam interface.

The Immediate Access Feature of System 2000 allows user interface with the data base through a high-level language consisting of English-like commands, System 2000 also has host language support for Cobol, Fortran, PL/I and Assembler.

In Cobol, Fortran and PL/I, special verbs are used to effect data handling. These verb statements are converted to appropriate CALL statements by a System 2000 precompiler. There is no significant overlap with Codasyl specifications.

Attractive features of System 2000 include:

- A multithread feature, which allows multiple application access to the same data base (concurrent update is controlled).
- A facility for an audit trail, which may be used for backup.
- Field- and segment-level security, provided by password options.

System 2000, along with Adabas and perhaps several other DBMS, forms a class of systems distinct from others by its emphasis on data inversion. Unlike many other inverted DBMS, however, System 2000 emphasizes

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hierarchical data structuring, with up to 32 levels in a given tree. Trees are "put together" by tables (called "hierarchical location tables") that are external to the actual data but also separate from field indexes.

Although powerful in a number of respects, some critics have argued that the hierarchical approach of System 2000 does not achieve the data networking possible in other DBMS.

MRI has striven to demonstrate that System 2000 as an inverted DBMS does not necessarily engender more overhead in update processing than physically linked counterparts and that data retrieval and data independence are notably better in the former than in the latter. System 2000, first released in 1970, is one of the oldest independent DMBS and one of the foremost inverted systems.

MRI has recently released a data dictionary system for System 2000, called Control 2000, a step closer to the complete data management concept. Backup facilities have been improved, and a report writer has been available for some time. MRI is also active in minicomputer system development.

System 2000 is notable in its successes in cross-mainframe implementation and in the remote-computing field. It will certainly continue in its role as a major independent DBMS.

* * *

DATACOM/DB

Datacom/DB is an inverted DBMS marketed by the Insyte Corp. (formerly Computer Information Management Co.), which also markets Datacom/DC, a teleprocessing monitor. Taken together, these products are called Datacom.

A major feature of the Datacom system is its integration of data base and communications handling. The DC portion was in fact developed before the DB portion; the latter became available in 1973. Either product, however, is available separately, and a variety of successful configurations are reported by the vendor.

A data base in Datacom terminology includes a control file (containing data base definitions and other information), a single integrated index and up to 240 indexed files.

Datacom/DB runs on IBM hardware, from the 360/30 through the 370/158.

Teleprocessing support is oriented primarily toward Datacom/DC, although Datacom/DB may be interfaced with other monitors, in particular CICS.

Application programming is effected by CALL statements, by which element-oriented parameter lists are passed to the control system. In addition, a query language is supported under Datacom/DC.

Several important facilities in Datacom are the following:

- A multi-DB capability, supporting access by an application program to as many as 240 Datacom data bases.
- A multiuser facility that allows multiple users to access Datacom data bases through a central multithreaded copy of the control system
- Dataquery, a high-level terminal-oriented query language.

Storage structuring in Datacom/DB is based on the concept of inverted lists. Records are added to data files in load sequence; all access to the data is via index entries.

Up to 15 fields per file may be inverted (a given field need not be contiguous); a total of 255 keys per Datacom data base are supported.

Within the index for the data base, all entries from the various files are intermingled, which results in the aggregation of pointers to all like-valued records, regardless of the file which contains them. (The correspondence of inverted fields in different files is established prior to loading).

A given entry associated with an index key value thus contains both a record pointer and file identification; this information allows various combinations of retrieval options for access to related data. Nonindexed "searchable" fields may also be defined.

Datacom/DB is oriented toward performance in on-line environments, in some cases trading optimum space management (for example, reclamation of deleted record space) for speed.

Certain features are available, however, for improving space management, among them a provision for "slack" space in record files and a compression feature for eliminating certain repeating characters.

An additional capability is offered for improving performance for some sequential tasks ("native key" processing in Datacom terminology), whereby buffering techniques speed access to records loaded in sequential order.

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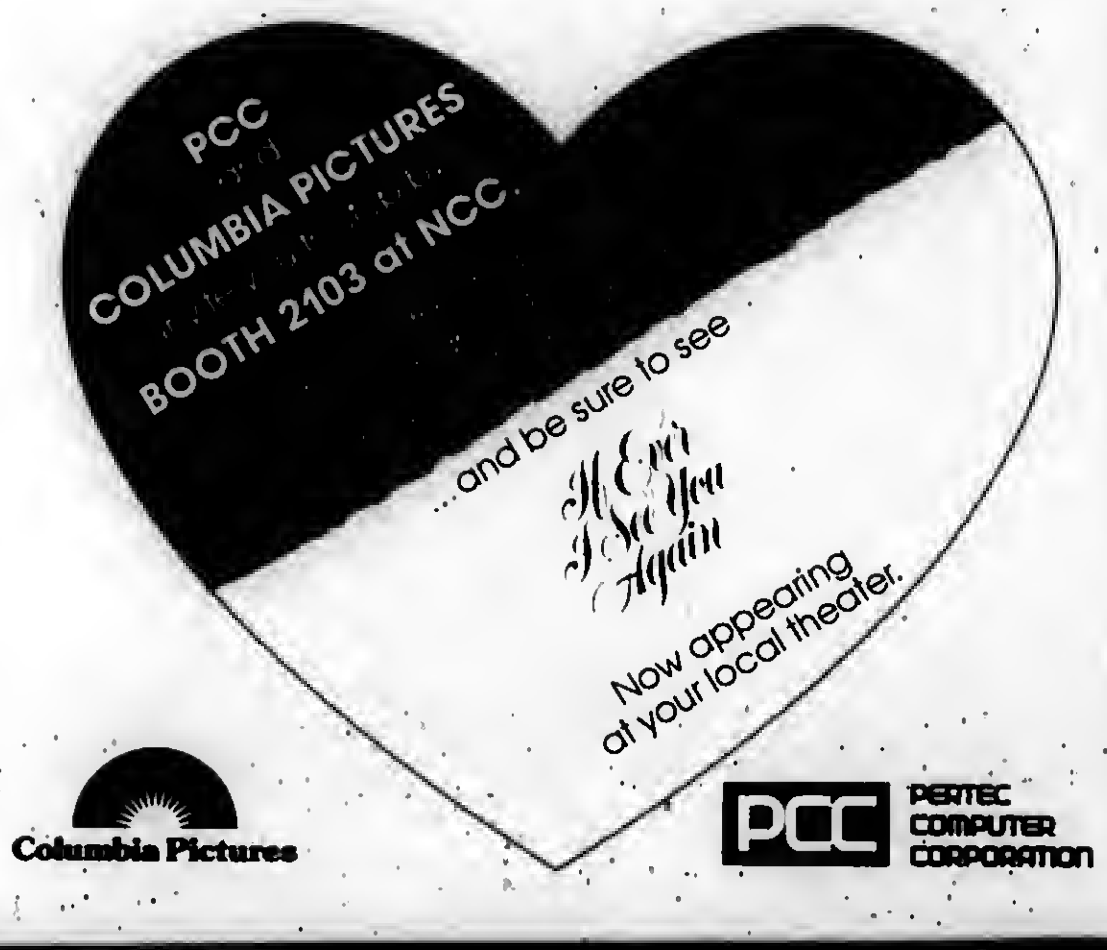

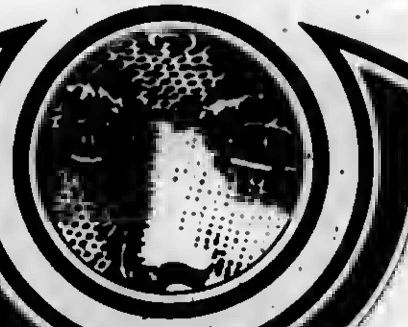

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However, reorganization is occasionally required to maintain this and other desirable features.

Security in Datacom is supported to the data-element level. Insyte has recently taken significant steps to improve Datacom documentation.

The user base for Datacom/DB is among the most rapidly expanding for newer DBMS, and Datacom/DB itself is now considered, along with systems such as System 2000 and Adabas, to be among the top three or four inverted DBMS for IBM hardware.

* * *

INQUIRE

Inquire is an inverted DBMS that exhibits a number of interesting features. It is sold by Infodata Systems, Inc.

Inquire has been on the market for some time (the original release appeared in 1969), but the early version could not be called a full-scale data base management facility. Although Inquire retains something of its original information storage and retrieval flavor, recent upgrades have greatly enhanced its capabilities.

The most important of these are the multiple data base capability (1974), the procedural language interfaces (1975) and the CICS Interface and backup/recovery facilities (1976).

Inquire runs on IBM 360 and 370 systems under the OS and VS operating systems. Support for Inquire under CICS, TSO, IMS/DC or CMS is available.

Application programming is via CALLs in Cobol, PL/I, Fortran or Assembler; a self-contained, free-format command language with query capability is supported in either batch or on-line modes.

Inquire's method of indexing is its own and does not closely resemble that found in Adabas, System 2000, Datacom/DB or other inverted DBMS. Each record in an Inquire data file is represented by a surrogate, which contains indexed values for that record in coded form.

These surrogates, which are located in a search file, are chained together on the basis of like values for given fields. The actual value for the field resides in an index file, which points to the top of the appropriate chain in the search file and includes a count of the number of entries in the chain. This information may be used to optimize searching.

There are no actual linkages between Inquire data files. When a user wishes to relate records in separate files, a CONNECT statement is issued that gives the DBMS sufficient information to map together the indexes of an inverted data element common to the two record types.

Data independence to the data item level is supported, but the lack of a subschema capability is notable. One of Inquire's strongest features is its text-handling capability — an area largely ignored by most current DBMS.

One enhancement in this area was recently developed: a proximity-searching capability for string analysis and document retrieval.

Infodata is pursuing development toward interfaces with word processing systems. At the same time, Inquire has developed in more or less the opposite direction, toward more traditional data base applications, such as payroll and inventory.

Although the system has proven viable in these areas, some critics have argued that Inquire is not as stringent about data integration as other DBMS.

Inquire brings together notable features in a somewhat unique approach to the data management problem.

* * *

MODEL 204

Model 204, marketed by the Computer Corp. of America, is a flexible DBMS, although somewhat less well known than various of its counterparts. Data access under Model 204 is primarily by data inversion, placing it in a class with System 2000, Adabas and others.

Model 204 is supported on IBM 360 and 370 systems under OS and VS. Full-scale teleprocessing may be supported under CICS and Intercomm. For smaller scale user-oriented functions, Model 204 has a set of built-in teleprocessing modules.

Host languages for the batch environment include Cobol, BAL, PL/I and Fortran, using CALL statements. Especially for on-line users, Model 204 offers a completely self-contained language, oriented to easy interactive inquiry, although it may also be used for updating and for batch processing.

Attractive features of Model 204 include the following:

- A multithread option for improvement of throughput.
- Data security to four levels: records, record sets, files and devices.
- Checkpoint/restart facilities using an audit trail.
- Data compaction and free-space chaining, both of which improve storage.
- A field-level option for data encoding.

Storage structuring under Model 204 is accomplished primarily by the inversion of multiple fields so that run-time requests can be satisfied by comparison of index values rather than by search of actual data. Several options, however, are supported for controlling the physical storage of records so that batch processing — including sequential report tasks — can be improved.

Model 204 exhibits flexibility in system configuration, allowing the user to tailor operational support to his needs for on-line and batch processing. The user language is rated highly and is relatively easy to learn.

Model 204 is notable in its attention to search capabilities; it provides a set of powerful relational operators and numeric "range" retrieval. Another unusual feature is the provision of integrated math options.

System overhead is reported not to be

(Continued on Page 121)

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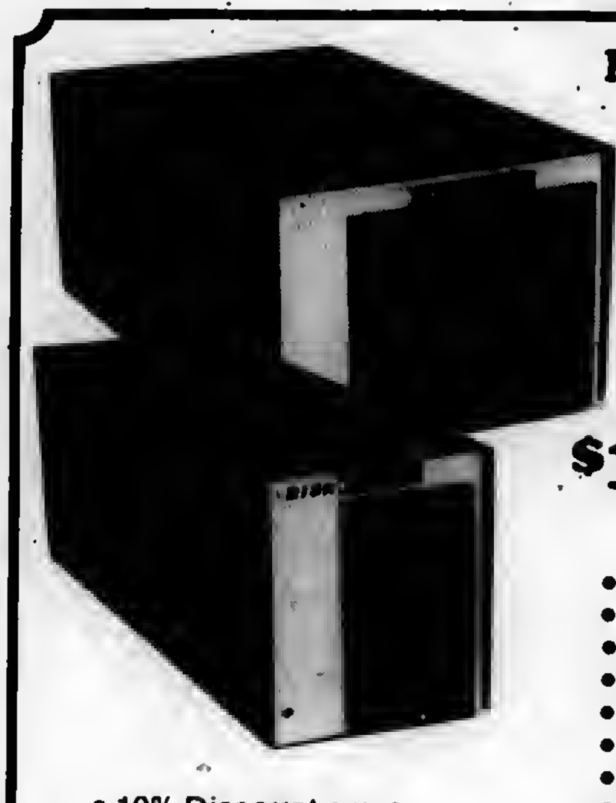

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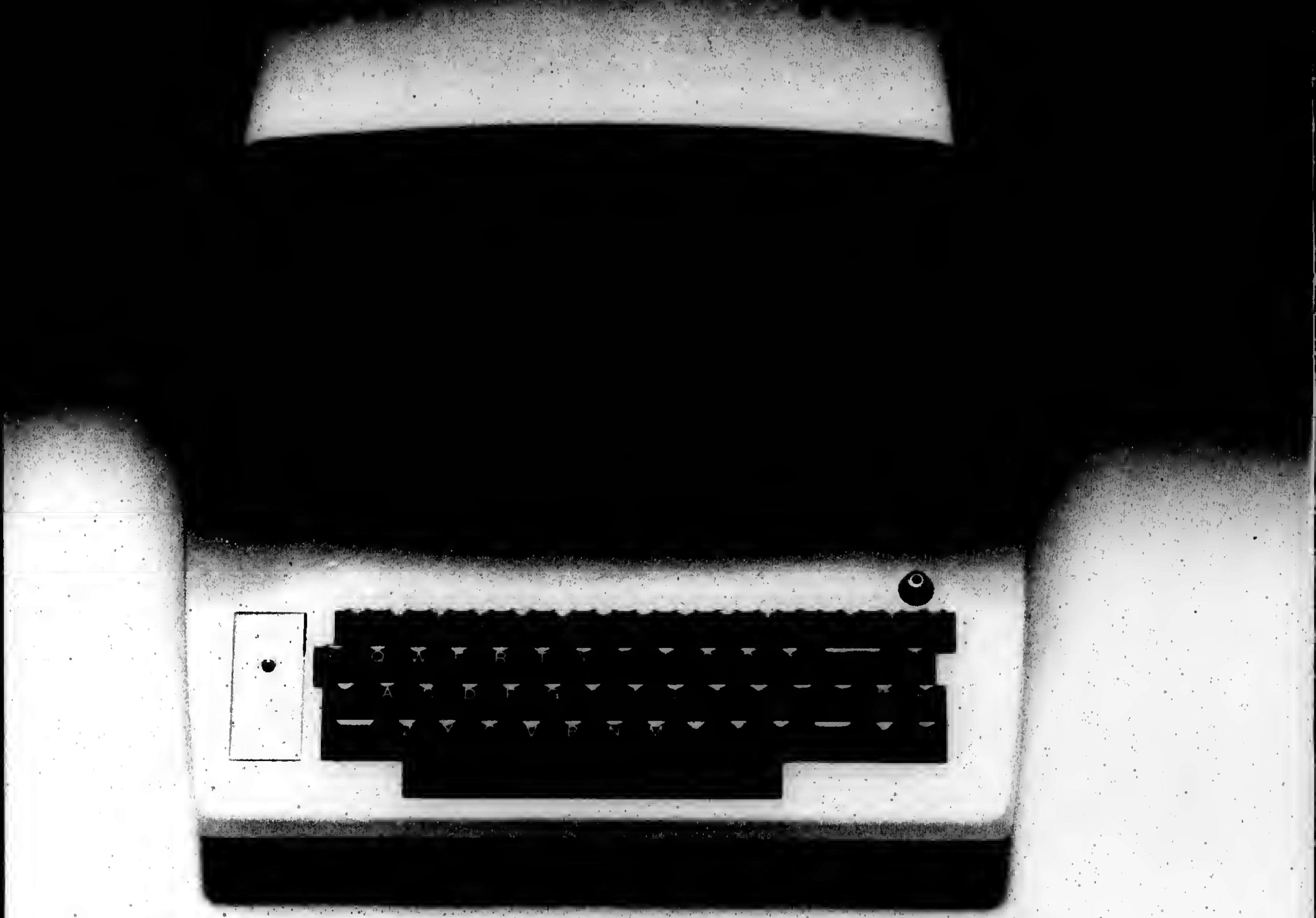

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(Continued from Page 119)

excessive, given cautious inversion. One useful performance-oriented option is the capability to defer index updating, although this may degrade data value in some cases.

Model 204 has not yet been proven, in terms of the number of users, to the same extent as other DBMS. Overall, the system is noted for flexibility and careful design.

* * *

IMAGE/3000

Hewlett-Packard Co.'s Image/3000 is a remarkable system that brings full DBMS services within reach of the users of smaller, less expensive computer systems. At the time of its release in mid-1974, the system was the first mini DBMS to be offered by a major minicomputer manufacturer.

Image/3000 follows the network model and closely resembles Total in a number of respects. The system itself runs on a machine with a minimum 128K bytes of real core. Formerly, a single data base data set (file) could not exceed 47M bytes — the capacity of the HP disks — but this restriction has since been removed.

Image/3000 is capable of handling most medium-size applications, at a software cost of about 20% to 40% of larger DBMS.

Image/3000 runs on HP 3000 computers under the MPE/3000 operating systems. Two smaller versions of Image software are available: Image/2000 for the HP 2100 under DOS-III and Image/1000 for the HP 21MX series under RTE-11 and RTE-111.

Telecommunications are supported by operating system software and are complemented by Image software.

Application programming is accomplished by CALL statements within host languages Cobol, Fortran, Basic, RPG or SPL (HP's high-level system programming language). A high-level interactive user language, Query, is available at a modest additional cost.

Attractive Query/3000 features are the following:

- Complete update capability, including immediate availability of data for retrieval.
- Support for multilevel Image/3000 security features.
- Tutorial aids, such as syntax assistance, and data base structural mapping.
- Extensive search, edit, sort and report capability.
- Ability to store frequently used procedures to be invoked as needed.

Image/3000 uses a method of storage structuring that features master and detail data sets. Each data set is a collection of records, or "data entries," which consist of individual data items.

For detail data sets, one or more data items are defined as "search items." All data entries having identical values for the search items are chained together (using forward and backward pointers).

For master data sets, a single search item is defined whose values are unique. A given master data entry is then linked with similarly valued chains in the detail data set(s). Access to master data entries is normally calculated (randomized), although serial and direct access is possible.

Storage structuring under Image/3000 has the simplicity and directness of Total and provides generally streamlined access. Some limitations exist — for example, no support is provided for variable-length data entries, and there are no direct means of indexed-sequential access — but these do not prevent full data networking.

Utilities are generally good; security, which is multiclassed and extended to the data item level, appears excellent. Support for a query language is noteworthy.

Although many doubts were raised about Image software upon its release in 1974, the system has since proven itself in a variety of applications and has received a number of favorable appraisals. By pioneering mini DBMS technology and marketing, HP has now achieved a position of strength in the mini data management field.

HP offers Image/3000 as a central feature of a highly attractive line of minicomputer hardware and software that is designed for an opening market of smaller data processing applications. On the whole, the system has potential for significant contributions to DBMS evolution.

* * *

VARIAN TOTAL

Varian Total, first released in November 1975, represents the first of a closely timed set of releases of Cincom's successful Total software for the hardware lines of popular mini manufacturers. These manufacturers presently include Harris, DEC and In-

(Continued on Page 122)

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(Continued from Page 121)

terdata, with others likely to follow. Varian itself has since been acquired by Univac — a development of potential significance to mainframe users.

The data base environment envisioned by Varian Total differs little in concept from that in mainframe offerings. The Total network is substantially the same, as are administrative steps in implementing it.

Despite the evident difference in size, there are no theoretical limits on the extent of a Varian Total data base. More than 2,500 master and detail data sets can be defined; practical size limits depend largely on usage and system configurations.

A processor with a minimum of 128K bytes of main memory is required; actual memory sizes in the Varian line have been pushing upward steadily.

One hardware innovation is particularly noteworthy: the use of microcoded firmware to implement the randomization algorithm. An important recent enhancement allows locking for update at the record level.

Varian Total runs on the V70 series under Vortex II. Host languages include any supporting a CALL: Fortran, RPG-II, Cobol and Assembler. No query language is yet available, a deficiency in comparison with Image.

The emergence of a class of systems such as Varian Total is significant in a number of respects. First of all, mini DBMS bring the benefits of data base organization and data independence within the reach of smaller users. While the cost/performance ratio of mini hardware steadily improves, the availability of software is increasingly a factor.

Secondly, the existence of mini DBMS with mainframe counterparts raises the possibility of back-end configurations, from which numerous benefits to larger users can accrue. Such systems bring the day of distributed data bases one step closer.

* * *

DBMS-11

With the release of DBMS-11 in mid-1976, Digital Equipment Corp. extended in Codasyl compliance to its minicomputer line, the popular PDP-11. Although DBMS-11 is actually an adaptation of Cullinane's IDMS software, it nonetheless complements DEC's mainframe Codasyl offering, DBMS-10.

The DBMS-11 implementation is relatively extensive, especially for a system in its initial releases. Support for concurrent usage, subschema definition, recovery and other features is evident.

The DDL and DML syntaxes are in close compliance with Codasyl specifications; network implementation is by physical linkage.

Initial hardware support is for the PDP-11/70 minicomputer under IAS. This machine, like the top of the HP, Varian (Univac), Data General Corp. and other minicomputer lines, is perhaps more accurately described as a midicomputer.

Data base interface is via the Codasyl DML in Cobol and by CALLs in Fortran, Basic and Macro-11 programs. No query facility is initially available.

DEC, not known in the past for software development, was not the first mini manufacturer to arrive at the DBMS market. Since it is the largest, however, and one of the most respected, its move into the data base field is certain to have significant impact.

DBMS-11 is the first Codasyl mini DBMS (another has since been released by Prime Computers) and thus represents an important test of the Codasyl specifications in the mini environment. The Codasyl specifications envision a broader interpretation of network data structures than do either Image or Total.

Finally, DBMS-11 opens significant possibilities in the areas of back-end DBMS and distributed data base systems. The former is already well under development for DBMS-11; the latter represents a long-standing DEC goal.

* * *

PRIME DBMS

Prime Computers Inc. entered the mini DBMS field in early 1977 with the release of Codasyl-compliant Prime DBMS. Prime DBMS is described as consisting of five major components:

1. A DDL translator for data base description.
2. Subschema facilities for Ansi 74 Cobol and Fortran IV.
3. DML support by preprocessors in Cobol and Fortran.
4. A reentrant DML command processor.
5. An on-line, interactive facility for data base administration, including a DMCL capability.

(Continued on Page 125)

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(Continued from Page 122)

Concurrent access and recovery capabilities are supported. Size limitations are practically nonexistent; actual limitations are determined by the amount of disk storage available. Among other features, the subschema capability allows omission and redefinition of data items.

Prime DBMS runs on the Prime 400 and 500 machines, with 768K and 1M bytes respectively.

On-line transaction processing is basically supported by Prime's Forms Management System (Forms), which is compatible with the DBMS. Data base access is via Codasyl DML, supported by a precompiler in Fortran and Cobol.

An important feature of Prime DBMS is that conventional files, created by Prime's Multiple Index Data Access System (Midas), may be used directly by the DBMS. This implies the extensive use of inversion in the Prime DBMS network, although other features are also evident.

Prime Computer has brought together significant concepts in Codasyl compatibility, inverted data structures and new hardware capability in its Prime DBMS. The future of the fledgling system will be interesting to watch.

* * *

INFOS

Data General Corp., the third largest mini manufacturer after DEC and HP offers Infos, a data management facility for its Eclipse line of machines.

Infos supports three lower level access methods — sequential, random and Isam — in addition to the higher level Data Base Access Method (Dbam). Variable-length records are supported in both Isam and Dbam.

Dbam is essentialy a compatible extension of Isam in which indexing on multiple keys is supported. A Dbam index is structured by levels, which correspond to keyed levels in the indexed record. A number of structural and processing options are supported, making Dbam a powerful tool for file access.

Infos, which was released in early 1975, is supported on the Eclipse C/300 under RDOS with a maximum 256K-byte core. A new commercial processor has since been released; the C/330 with 512K bytes.

Interface to Infos is through an extended syntax in Cobol, supported directly by the Ansi-74 DG compiler or by CALLs in Fortran or Assembler.

While Infos satisfies a traditional need in mini machines for efficient record-level filing systems, it does not achieve the data independence that has come to be identified as definitive of data base systems. This deficiency is seen most clearly in the lack of separation between Infos data base creation and application program logic (that is, there is no independent DDL).

Other data base characteristics, such as data integration and subschema support, are also notably lacking.

Infos is certain to evolve (the recent release of an interfacing Idea data entry/access software package is one example) and may at some point give rise to a significant inverted DBMS capability.

* * *

ADMINS/11

The development of independent software has traditionally been relatively more important in the mini environment than on mainframe counterparts. One of the foremost examples of an independent software package is Admins/11, a data management facility from Admins, Inc. for the DEC PDP-11.

Admins/11 and Infos represent opposite extremes in the data management spectrum. Whereas Infos is essentially a powerful file access method, Admins/11 may be considered a complete data management facility. The former is oriented to the user who is capable in the technology; the latter is oriented toward the nonprogramming user, who cares little about the internal workings of the machine.

Some observers have called Admins/11 a data management "black box"; others have termed it "relational" because of its divorce of the logical from the physical.

Admins/11 runs on the DEC PDP-11 under the RSX-11D operating system. Interface with Admins/11 is through a self-contained high-level user language; a Fortran interface is also supported.

The interrelation of data in Admins/11 is largely an execution-time activity. Three basic types of data relation are featured:

- *Composite screens*. Preestablished definitions may be invoked for the online juxtaposition of related records, based on data values contained in the records.
- *Virtual records*. A record type may be defined that consists of data elements from separate files; the elements are aggregated when the record is accessed.
- *Relational products*. Entire files may be related on the basis of common keys (a JOIN-like operation) in order to update one or both or to create an output file.

Inversion is used extensively in support of these operations.

Admins/11, commercially released in January 1975, had its origin in a National Science Foundation-funded research project at MIT. By virtually eliminating the need for application programming and by featuring powerful "relational" operators, Admins/11 approaches new ground in data independence.

* * *

MAGNUM

Tymshare Inc.'s Magnum is one of the best examples of powerful new systems emerging from the remote-computing industry, which as a whole is increasingly emphasizing data management applications.

Magnum's approach to data handling is largely relational in nature. A Magnum data base, called a schema, consists of two basic types of declarations: field definitions and relation definitions.

A relation definition includes a list of previously defined field items, some of which may be keyed. Besides the stored relations, relations can also be defined "locally" within user-written Magnum procedures A local relation is thus one defined in terms of other relations through the operations of the Magnum language.

There are actually two Magnum languages; a command language for simpler reporting and maintenance and a data management language for more complex tasks. The syntax of the latter, which is very much like Algol, emphasizes nested logic for successive operations on local or stored relations.

Magnum, first released in mid-1975, is supported in the Decsystem-10 environment. Host language interfaces for special processing tasks are reportedly being developed.

Tymshare, which also offers a communications network, Tymnet, reports no plans for making Magnum available for in-house purchase.

Tymshare's offering of Magnum is especially oriented toward medium-size to large organizations that require on-line transaction-type systems supporting access to a central data base from multiple locations (that is, geographically dispersed organizations). Tymshare reports current support for one two-billion-character data base.

Magnum is also attractive to smaller companies (less than $50 million of sales) and to individual divisions of large organizations receiving inadequate processing support from an in-house computing facility. Potential competition with mini DBMS in these areas is evident.

Magnum has been recently enhanced to support simulataneous updating; other enhancements are being made to improve security.

Magnum is perhaps one of the best examples of the type of large-scale user-oriented data management systems now within reach of current hardware technology. It demonstrates that the commercial impact of the relational model is beginning and that the elimination of Cobol programming is feasible — even desirable — in many types of applications.

Tymshare is pursuing other areas of development as well: portions of Magnum are being integrated into a proprietary intelligent terminal, using microprocessor technology.

Tymshare's emphasis on Magnum development (Tymshare also offers System 2000 and Focus for use on its IBM hardware) is an indication of the growing importance of data management to the remote computing industry.

* * *

NOMAD

Nomad, a data management facility offered by National CSS, Inc. (NCSS), is comparable to Magnum in a number of respects. It was released in September 1975.

In a Nomad data base, items are grouped into segments, which can be hierarchically positioned into a tree structure, much as in IMS. Unlike IMS, however, segments or trees are not logically related using physical linkage; rather, a run time relational capability is supported, in some ways similar to Magnum.

Also like Magnum, Nomad emphasizes user-oriented interaction with the data base by either of two means: a high-level command language or a

(Continued on Page 126)

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self-contained procedural capability for more complex processing tasks. Unlike Magnum, however, Nomad features a substantial subschema facility. Data independence to the element level is supported.

Nomad runs within the IBM 360 and 370 environments. NCSS, which also offers a communications network VP/CSS, plans to market an in-house OS/VS version in 1978.

Support is being developed for simultaneous updating and for host language interfaces. Also available from NCSS is Mathematica's Ramis.

Both Nomad and Magnum have been criticized in some quarters as dead-end systems, in which the user faces undesirable lock-in to a particular system. The counterargument is that by emphasizing high-level user-oriented languages, advances in hardware technology can be accommodated without impact on existing applications.

Overall, Magnum and Nomad are significant first experiments in large-scale commerical systems under the relational model. Although they are by no means "pure" relational systems, to many observers they are steps in the right direction.

NCSS, second in size only to Tymshare among independent remote computing companies, rates Nomad as one of its most successful products. The future of both Magnum and Nomad — and other systems of their class — is by no means assured, but these systems nonetheless constitute one of the most active sources of innovation in the data base field.

Ronald G. Ross is senior staff consultant for data base systems at Performance Development Corp. in Princeton, N.J. He is the author of many articles and monographs on topics that range from data base administration to trends in data base management systems packages. Typical are "DBMS," An Overview of Data Base Technology from Government Data Systems *and "The Data Base Administrator: What Is His Place?" from the* Journal of Systems Management.

Ross, who is 27, graduated from Rice University with honors and holds an M.S. degree from the Illinois Institute of Technology.

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Portions of this chapter were adapted from an article previously published by the author, entitled "Evaluating Data Base Systems," in the January 1976 Journal of Systems Management.

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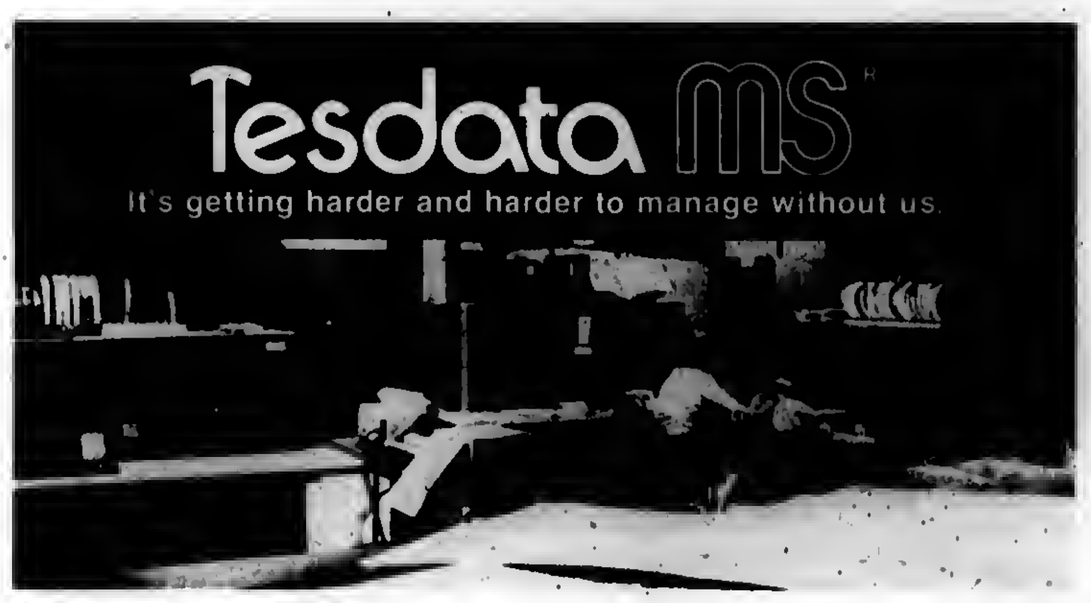

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SAN DIEGO — One of the best buys in computer output microfilm (COM) recorders today is used, previous-generation equipment. And if this equipment is still being manufactured, it's an even better buy, according to Gil Abernathy, manager of technical support for Datagraphix, Inc.

Abernathy, who has maintained four generations of COM equipment for Datagraphix, noted in a recent interview here that used, previous-generation equipment is generally available for delivery in the same 30- to 60-day period as its later counterparts, produces output of the same quality and speed as when new and is priced at about a 25% to 40% discount.

But, he cautioned, not all used recorders are wise investments. Abernathy classifies used COM equipment into three life cycle categories for prospective buyers.

"I can safely recommend that a used but currently manufactured recorder is a smart buy as long as its specifications satisfy the needs of the user. When a recorder is two to four years old, the components should still be in good operating condition and provide reliable service," he suggested.

Although used state-of-the-art recorders are rarely available, previous-generation recorders still being manufactured are frequently available in the marketplace at great savings.

The second category of equipment, Abernathy said, should be approached with a degree of wariness: "Generally, I would not suggest purchasing a machine more than six or seven years old. Although the performance will be up to original specificaitons, users can expect more downtime. As with all other electromechanical devices, components tend to deteriorate with age."

Model 4360 an Exception

One exception, he claimed, is his firm's Model 4360. "More than 100 Model 4360s are still in use six to 11 years after being manufactured. They don't seem to be affected by age and have proved to be very reliable.

"I would have to consider the 4360's to be an exceptional buy for users without requirements for a minicomputer, integral film processing or the newer convenience features," he added.

The third category, according to Abernathy, should be avoided by all but the most experienced COM users. "I would discourage the purchase of recorders whose manufacturers are either out of business or who have stopped servicing the equipment. The users often experience great difficulty in obtaining software support, service or replacement parts, which may have to be custom-made," he said.

As in selecting new equipment, the purchase of a used machine is predicated on its capabilities, Abernathy said. The used unit must meet user needs for film widths, tape formatting, speed and archival quality.

(Continued on Page 130)

Qantas DP Upgrade Risks Koala's Wrath

SYDNEY, Australia — The koala bear that hates Qantas Airlines for flying more and more people to Australia is going to be even more upset. The air carrier is upgrading its DP capabilities, enhancing its passenger and cargo operations and enabling the airline to bring even more people into the koala's homeland.

To keep pace with service to 28 countries and some 1.5 million annual passengers, the DP upgrade now underway involves not only the mainframe, but a host of data storage and communications equipment as well.

Qantas is more than quadrupling the storage capacity of its disk subsystem. This is being achieved with the installation of a Memorex Corp. 3650 disk storage subsystem consisting of 20 spindles with 317.5 M-byte capacities plus four spindles of Memorex 3640 drives with 70M byte replaceable parts. The overall capacity for data base storage is 6.63G bytes.

The spindles will be attached to two Amdahl Corp. 470V/5 CPUs operating under IBM's MVS, which are replacing an IBM 360/65 multiprocessor with an MVT operating system.

"This equipment and operating system upgrade will allow us to cope with an expanding DP function," according to John Colwell, computer planning manager for Qantas. "We are adding a number of on-line applications that have previously been done in batch mode."

The on-line system will provide instant access to inventory status of about a quarter million different part line items valued at $70 million. This inventory is required to support a fleet of 15 Boeing 747s and four Boeing 707s. Qantas is also adding two 747s annually as passenger and cargo volumes grow.

The on-line inventory system now being developed by Qantas will permit more accurate tracking to assure the availability of spare parts throughout the 28 countries served by the airline, Colwell said. It will also be used by the Supplies and Procurement Division, as well as the engineering overhaul staff.

Madder than ever?

Called "Superquic", the system will produce all purchase orders and receiving documents.

"On-line inventory will mean instant stores inquiry. The data base will be more current, and we expect to reduce significantly the time required to get a part from stores to the engineer.

"Also, the system will indicate the availability of parts in repair status and those newly received," Colwell explained.

Pacer is the acronym for Planning and Control of Engineering Resources," a separate inventory system for serial-numbered components. This file contains the air-worthiness records and can be used to trace the reliability effects of engineering changes.

"The IBM 3350-type storage devices were selected because, in our opinion, they are the best performing disks for use in an IMS on-line environment. In our

(Continued on Page 130)

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Qantas Upgrade Risks Increasing Koala's Wrath

(Continued from Page 129)

applications we have need for few replaceable disk packs, Colwell noted.

"This need is satisfied by Memorex 3640 devices and some older 3330-type devices previously used on the IBM 360/65 multiprocessor. Memorex was chosen to supply the drives and controllers because its equipment offered the best price/performance characteristics among the vendors we examined," he added.

Optional Fixed-Head Feature

Also part of the DP changes is the elimination of a 4M-byte IBM 2301 drum memory. The optional fixed-head feature of the Memorex 3650 drives will be used instead to provide 1.14M-byte/spindle with zero seek time.

As a result, more than 22M-bytes of memory will be available for paging purposes and for storing operating system data sets that are heavily used.

The 3650 drives, six of which have already been delivered, and the 3640 drives already installed will be configured in four switchable strings, two with six spindles each and two with four spindles each. A four-channel switchable Memorex 3674 storage control unit will interface each string to the mainframe channels.

The Amdahl systems, like their predecessors, will be used primarily for general DP, including financial, accounting, payroll, parts inventory and market analysis applications. The Qantas facility also includes two other dual-processor CPUs — two IBM 360/65s used for airline reservations, departure information and ticketing systems and two 360/40s, which perform flight planning and on-line engineering applications.

Qantas' reservations system permits users instant access to the data base from Qantas ticket offices, airports and selected Australian travel agents. It indicates seat availability, allows for bookings, handles requests for special services and confirms bookings for Qantas flights in seconds.

Reservations for flights with other carriers are also handled through the system, which links automatically to other airline computers via worldwide, cooperative networks.

Satellite Circuits

Each of the mainframes is accessible via leased satellite circuits from 1,200 on-line remote terminals in 40 cities throughout the world, plus 200 terminals in Australia. Six Honeywell Information Systems, Inc. minicomputers (plans call for replacing these with two triple-processor Interdata 8/32s) perform the front-end message-switching and communications task.

Two Memorex 1270 terminal controlelrs handle transmissions to and from the 360/40s; two Memorex 1380 programmable controllers are to be added to do a similar job for the reservations system.

Eighteeen Memorex 1377 CRTs tied to the Amdahl systems will be used locally for program development.

The Computer Planning Department, which Colwell heads, consists of a staff of eight. Of these, three are engaged in equipment planning.

The department also includes the Computer Installation Section, the Systems Planning Section and a project coordinator for the major upgrade that is now in progress.

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Used COM Units Good Buy

(Continued from Page 129)

Unlike the purchase of new equipment, however, the final decision should include consideration of a few disadvantages inherent in used equipment. For example, customers may not have the option of upgrading as their work volume or needs increase.

Older equipment may not give the same output quality as the newer models. The latest generation of equipment features higher film resolution and brighter CRT tubes, resulting in greater reliability for end users, Abernathy pointed out.

For new in-house COM users, software availability is a must and should be specified in the contract, he added.

Refurbished or 'As Is'?

At times, prospective buyers are offered a choice of acquiring factory-refurbished or "As Is" equipment. If the "as is" unit has consistently been maintained on a preventive basis by the manufacturer and the service contract is to be continued, there is little risk in taking advantage of the additional savings that can be realized over a refurbished model, Abernathy said.

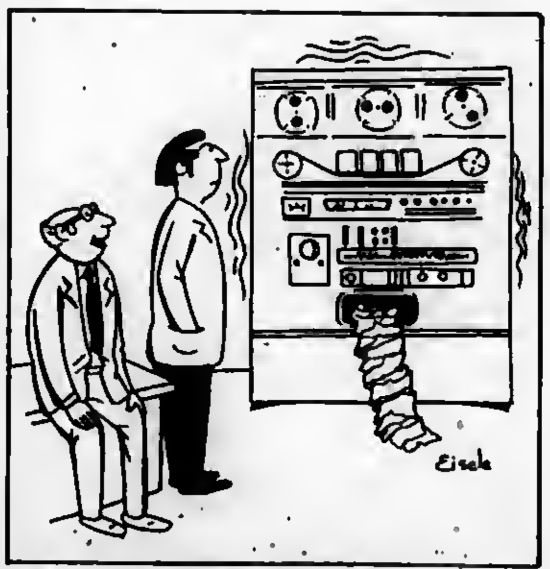
Users can expect an installation charge on "as is" equipment to be added to the purchase price, but included with refurbished or new equipment.

Abernathy emphasized that as equipment ages, the desirability of service contracts increases. He added, however, that many users have maintained their own equipment for years.

Although Abernathy was not aware of any long-term service contracts, he said Datagraphix and other vendors have continued to renew contracts on their equipment on a year-to-year basis. Unlike CPU service contract rates, which often increase incrementally with the machine's age, service prices for COM recorders are usually consistent for all like models.

When comparing the total costs of used with new equipment, users should consider the impact of foregoing the flat 10% investment tax credit allowed to companies on new equipment, Abernathy suggested. The tax credit base on used equipment is limited to $100,000 until 1981 and $50,000 after that.

Abernathy feels the purchase of used COM equipment, particulary currently manufactured models, is often a sensible buy. For machines older than six or seven years, the disadvantages must be closely weighed against the advantages of a low initial purchase price.



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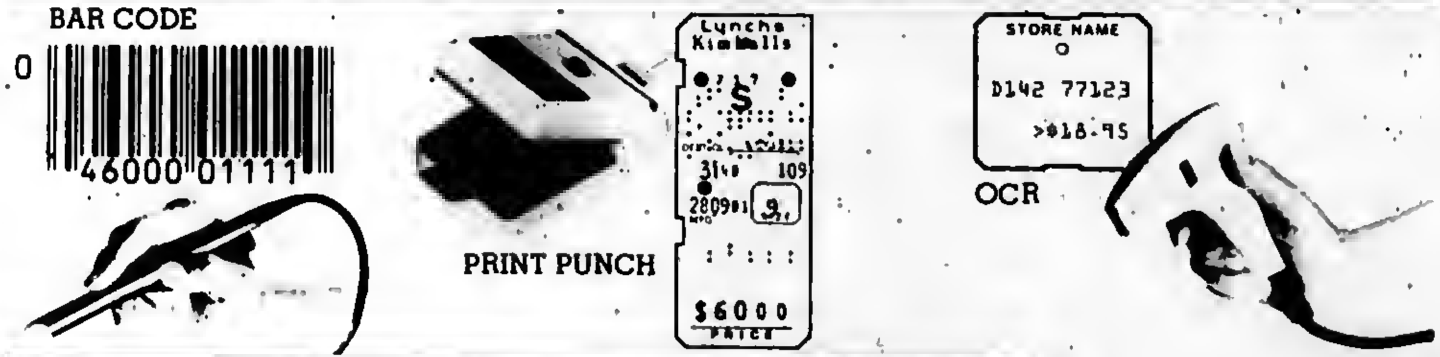

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Key-to-Disk Dishes Up Food Institute Benefits

CHICAGO — Improved member service, more complete information, better management control and a cost reduction of $20,000 are the major benefits that have reportedly resulted from the installation of a key-to-disk data entry system at the Institute of Food Technologists (IFT) here.

IFT is a worldwide professional society for food technologists, food scientists, engineers, executives and educators in food technology or related fields. The society publishes a monthly paid magazine, *Food Technology*, and a bimonthly publication, the *Journal of Food Science*, for its 17,000 members.

Records at IFT are now upated on the day they are received, rather than in the eight to 12 weeks needed by its former service bureau.

Previously, IFT handled DP and data entry through two outside service bureaus. One of the service agencies punched cards; the other performed the DP. Only a keypunch was kept inhouse for corrections.

The cost of these services was reasonable, but growth placed a real pressure upon IFT. Lacking control, IFT had to cönform to existing circulation/-membership and other programs, making it difficult to obtain, for example, more than basic data required for audit of its paid publication by the Audit Bureau of Circulation (ABC), a spokesman explained.

Turnaround was slow, causing delays in circulation/membership operations. Activity had to be cut off during the first part of the month, for example, yet IFT received no resultant output until the end of the month.

Members were requested to provide eight to 12 weeks advance notice for address change, with no assurance that the change would even be made within that time, the spokesman said.

Punched card processing resulted in errors and loss of cards; member dues and subscription payments had to be accounted manually since no programs were available to meet its specific needs on the service bureau systems.

IFT investigated the capabilities of other service bureaus to handle its needs, but found them too far away or demanding $50,000 for tailoring or creating programs.

It was at this time that Univac announced a data base management system for its 1900 key-to-disk system and a management consulting firm pointed out that the unit's capabilities would meet the society's needs. IFT decided to go with the system, and development and training began in early 1977. The system was implemented last August; it now processes all IFT applications, including cash management.

John Lane, IFT director of membership, received a short course in 1900 programming and now also serves as DP director. He supervises a staff consisting of a programmer, three operators, an accounting clerk and a secretary.

"We are now able to provide faster and more accurate service to members," Lane said. "For example, we now update member and subscriber records on a day-received basis vs. an eight- to 12-week turnaround time.

Data Entry Dimensions

"Accuracy is improved because there are much better checks built into the programming and more data is automatically generated, reducing the potential for error," he added.

Reports and analyses are now produced in more complete detail, specifically tailored to meet IFT's informational needs, Lane noted, and "cash management operations are completely automated, eliminating manual accounting.

"Management control is better because all the processing is now inhouse" he pointed out. "There is nothing we can't do through internal programming."

$20,000 Savings

Lane also stated that the system is saving the society approximately $20,000 during the first year. "Equipment rental is the same as the charges

(Continued on Page 134)

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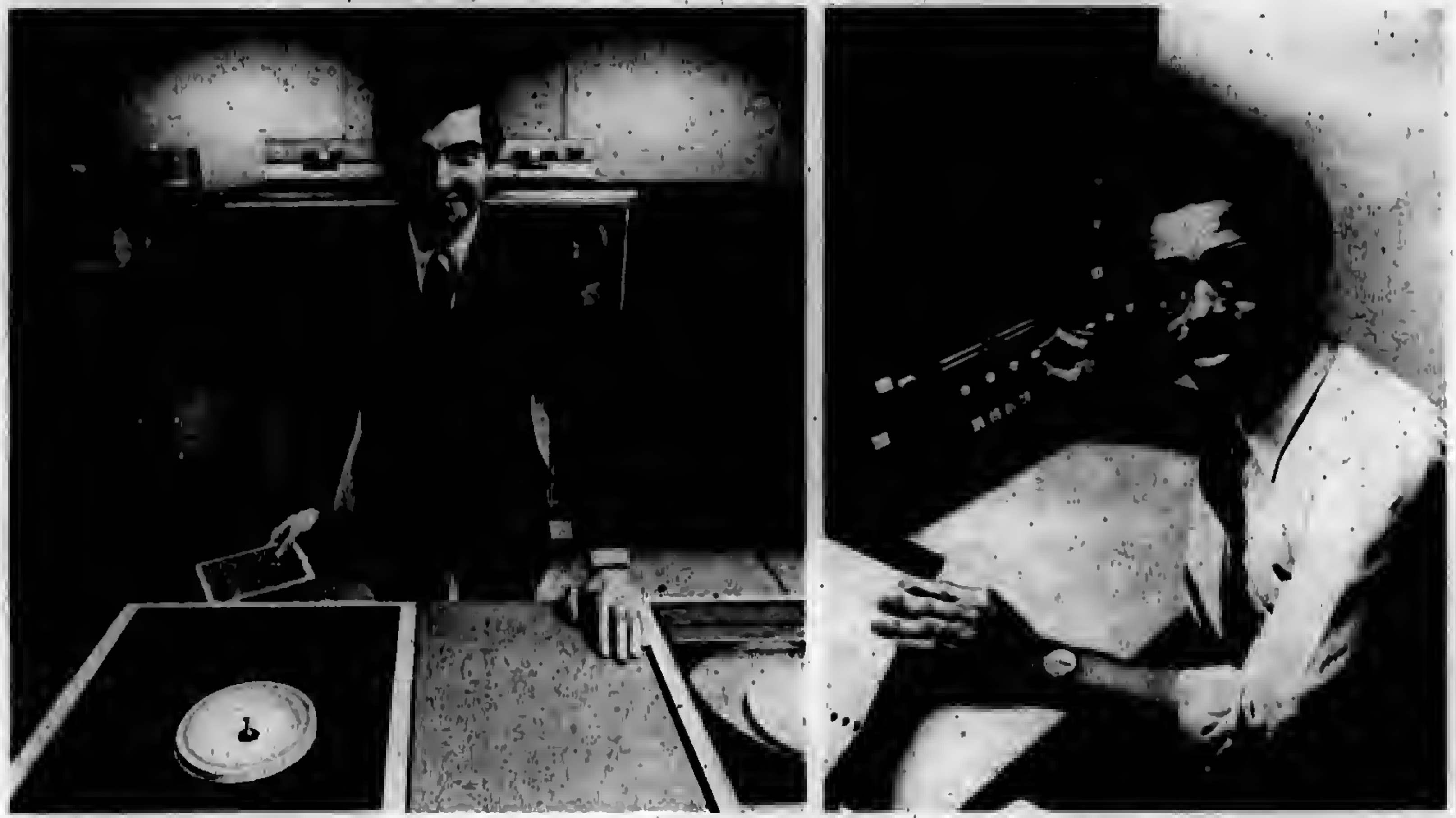

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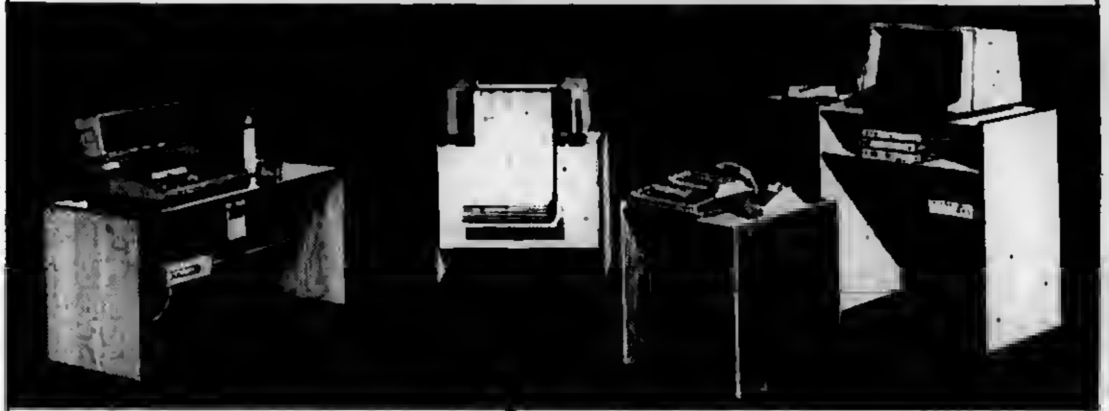

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'Pacers' Helps Indiana

INDIANAPOLIS — A police detective here became suspicious not long ago of a homeowner who reported a burglary. The detective used the resources of a medium-scale, virtual storage mainframe to "shop around" a little.

The detective discovered no other homes in the area had been burglarized recently — although the homeowner had reported several burglaries. Further investigation showed the reports were ficticious, made to collect on insurance policies, according to a police spokesman.

"In a manual system, the detective probably wouldn't have found this out because he wouldn't have had time to do the required clerical work," Chief Eugene Gallagher said. "But our Police Automated Case Entry and Retrieval System [Pacers], which operates on an IBM 370/145, provides accurate information, immediately, cross-indexed, in almost any form.

"And it provides it to the investigator, to the officer on patrol (through the dispatcher) and to management," he added.

"For example, the value to management is incalculable," Gallagher continued. "From the Pacers data, the CPU automatically produces reports and analyses of many kinds, periodically or on request. It analyzes crimes by type, pinpointing where each occurred, down to the individual block if we want.

"It shows radio runs, manpower resource allocation traffic-ticket density, trends and the like. In fact, for virtually everything of an administrative nature, we go to the computer and retrieve exact data on which to base decisions without guessing," the police chief said.

"Recently, we could see that car larcenies were increasing in one section of the city," he explained. "But before committing more manpower, we asked for an additional computer report pinpointing the location of the larcenies. It showed they were occurring primarily in three major parking areas, at specific times. So we were better able to decide how many officers to use, uniformed or plainclothes, and the hours they were to work.

"Similarly, we needed statistics on the number of vehicles towed and the points to and from. The system produced this for us, by month, so we could also see the seasonal aspects. This enables us to give citizens better service regarding the storage of towed vehicles."

"No computer can solve a case — you've got to get out on the street, make contacts and work your tail off," Jack L. Cottey, deputy chief of investigations, pointed out. "But Pacers more than doubles the time a detective can spend on the street because it eliminates a lot of paperwork and speeds information retrieval. He's on the street by 11 a.m., instead of about 2 p.m., and he has better information than he ever had before.

"Consequently, we're giving improved service to the public. And we have better public relations, too, because we're more on top of each case and can determine where it stands if a citizen calls."

"Quick information is increasingly vital for the officer on patrol, too," Gallagher said, "because the courts are taking a dim view of detaining suspects for excessive time. In the past, an officer had to detain a man for 10 to 15 minutes just to check local wanted data. And out-of-state checks often weren't done because they were too slow.

"Now the officer asks for information and the dispatcher makes one inquiry via a terminal. Pacers checks our files, then designs an inquiry for the Indiana Data Acquisition and Communications System [Idacs] and the FBI's National Crime Information Center [NCIC] system. We get the response in seconds.

"It's interesting how street officers both depend on the system and take it for granted today," the chief noted. "We've watched them react to computer systems over the years. And that reaction has gone from a tolerance for 15-minute replies to local inquiries to, now, impatience if it takes more than five seconds to make a national check.

"The complaints we hear if the system goes down show how much the officers depend on it," he added.

400 Daily Reports

The Indianapolis Police Department is responsible for a district covering 90 square miles with more than 500,000 people. It includes 1,125 sworn officers and 204 civilian personnel.

Reports from patrol officers are keyed into the system in an interactive mode.

Police Stamp More of Its Records 'Case Closed'

The City of Indianapolis and surrounding Marion County share a unified government which serves a population of about 800,000. The remaining 310 square miles of the county are patrolled by other municipal police forces and by the 350-man force of the Marion County Sheriff's Department, which also manages the Marion County Jail.

"Currently, we have 64 CRT stations and 14 printers, most of which are used by Pacers for input or retrieval," Lt. Darrell J. Bumen, DP manager, said. "Nearly 400 case reports are keyed in daily, including both originals and supplementals.

"Inquiries average more than 5,000 a day, and come from Dispatch, Central Records and Identification, the Auto Desk, detectives, the Pawn Detail, fire department, airport police, county sheriff, garage, jail, Juvenile, Property Room and Fleet Maintenance, all of which are tied in."

With Pacers, an officer phones in his incident report in a specific sequence to a message recorder beside a CRT operator. The operator plays back the dictation and keys it into the computer in an interactive mode.

As he enters the data, the 370/145 creates three basic files: people — officers, witnesses, suspects, for example; property — of all identifiable items; and vehicles.

The system also automatically compiles numerous cross-indexes for subsequent inquiry and statistical reporting. And it checks each address against stored data on city blocks to make sure the address is valid, then automatically attaches proper coordinates.

The system decides, too, which departments should receive hard copies of the report, based on its content, and transmits the data to printers in those departments automatically and immediately. Some reports go to all departments, some to just a few.

Instant Retrieval

The stored data can be retrieved immediately. The officer on the street, through the dispatcher, has access to information on wanted and missing persons, stolen automobiles and property, histories of incidents at various addresses, motor vehicle and drivers' licenses, statewide wants and stolens and NCIC information.

Investigations Division personnel have access to all the information available to patrolmen and also to data on persons and vehicles mentioned in reports — the witnesses, complainants and physicians, for example.

Before 1970, incident reports were typed from handwritten data in a central teletypewriter facility and transmitted to nine stations within police headquarters. Seven persons coded data from the reports for statistical and management analysis, and up to 12 people in central records typed and maintained at least three 5 by 7 cross-reference cards for each report — on type of incident, location, names of persons involved, and so forth. Homocide, juvenile, traffic accident records and other divisions also kept cross-reference cards.

This approach posed its problems: Central records was not manned on nights and Sundays; creation of the cards fell more than three months behind case reporting; misspellings and different versions of names complicated retrieval; entry of statistical information required keypunching.

"In those days, our investigators had to walk back to a cross-index card file," Cottey said. "Sometimes the data was misfiled, and sometimes they found 10 guys with the same name. But now they can get the information in a few seconds from any of several nearby terminals. It's never out-of-file and it's much more accurate.

"Also, input of information is much more efficient. Some detectives formerly typed their case reports. They weren't supposed to, but if they used the old central dictation system, sometimes the reports didn't get typed and returned for five or six days.

"Now the information they dictate is available immediately by terminal and a 'Detective Supplement Copy' starts coming off a printer within seconds. Each supplement lists action regarding a case since the original incident report made by the uniformed officer."

On-Line for One Month

The full text of each incident report and detective supplement is kept on-line in the system's disks for one month. Then microfiche of the report is filed in the central records room... However, the index entries are kept on-line for 18 months or until the case is closed, whichever is longer.

Pacers' data therefore occupies an average of 400 million characters of disk storage. The 370/145, installed in March 1973, has a 1.5M-byte main memory and a total of 2.8 billion characters on-line in eight 3330 disks and four 3350 disks.

"Our police 370/145 is located in the Marion County Central DP Installation," Bumen said. "Central DP also has a second 370/145 for administrative purposes. All I/O devices can be switched between the two systems. And OS/VS1 enables police and administrative on-line jobs to run simultaneously on either computer."

Other police applications include an on-line traffic violations bureau system for parking ticket citations and other traffic activity; computer-assisted dispatching; a summons system for moving violations and an accident system by types and location of traffic accidents.

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System Serves Several Benefits to Food Group

(Continued from Page 131)

were for outside service bureau processing and the keypunch rental. However, we have reduced clerical time equivalent to one full-time person, making it possible to reassign one of our people to other duties.

"Furthermore, reduction in turnaround time for recording updates has cut the need to send out back issues, giving another substantial savings — about half our professional and student subscribers change addresses every year.

"Overall, we can now do two to three times the processing that could be done previously. We are achieving this increased capability with a first-year savings of $20,000, using a system costing much, much less than what a basic computer would cost, to do the same processing work."

According to Lane, the 1900 system currently consists of 112K bytes of memory, a 17.6M-byte disk, a phase-encoded 800 bit/in. tape drive, 200 line/min printer and three keystations. Daily production includes entry of member subscriptions and cash data against the Cobol program's real-time validation and balancing.

All files are updated during key entry, providing a full transaction-processing level of error detection.

Additions, deletions, changes and reinstatements are processed on a real-time basis, maintaining all files on-line. Inquiries are met with completely updated information, an important feature when 10 to 20 phone calls and as many letters are received each day, Lane noted.

IFT produces more complete monthly circulation membership reports, used to generate the semiannual ABC statements and management information. Going far beyond the ABC requirements, reports provide analyses in terms of renewals, renewal percentages, business classifications and other criteria, he said.

The *World Directory and Guide*, logs of section and division members, membership cards and invoices are also more accurate and efficient, Lane said. Member records are now designed specifically for IFT needs rather than existing program requirements, making it possible to select any time in the record for survey purposes.

'Guess What . . . the Terminal Out Here In Accounting is Down Again.'

Future Plans

In the future, IFT plans to process expense analyses on the system, producing a weekly rather than monthly report. Further accounting functions will be added to provide even better control and accuracy, freeing up a bookkeeper for other duties, Lane said.

Another added application will be registration for the annual IFT convention and exposition, normally attended by 9,000 to 10,000 persons. This involves processing the registrations and hotel assignments, producing a daily listing of attendees by business classification for use by exhibitors through a terminal installed at the convention site. The 1900 system will process the data and produce printed output.

To handle these and other future applications, IFT plans to add 16K bytes of main memory and another 17.6M-byte disk, as well as replace the 200 line/min printer with a 600 line/min device. A fourth keystation, exclusively for system management, will also be added.

"We anticipate that we will be able to reduce our staff even further and reassign people to other duties as we continue to expand DP applications," Lane said. "Basically, we now have control over our own destiny, making it possible to grow and change in the future without a proportional increase in cost."

A state-of-the-art computer like the 303X needs a state-of-the-art impact line printer

Revised to Suit On-Line System

Admitting Form Keeps Hospital's Users Happy

By Robert Brown
And Fred J. Lucky
Special to CW

MERRIAM, Kan. — When we brought in our on-line data communications and processing equipment and programs at Shawnee Mission Medical Center, it also became necessary to revamp our paperwork systems. Since the admitting form is the key to all subsequent recordkeeping in a hospital, that's where we started.

We have developed an admitting form that meets all our objectives — compatibility with the equipment, coping with the demands of personnel and departments and answering the basic information needs of the hospital. Designing this form was a cooperative effort between medical center personnel and a Standard Register Co. representative.

We "walked through" the system, talking to everyone who received or used a copy of the form for whatever purpose. This enabled us to determine the information needed and which copies should have the highest priorities.

Shawnee Mission Medical center was started about 16 years ago as a health center and extended care facility. Shortly thereafter, it began a gradual transition into a complete hospital, owned and operated by the Seventh Day Adventist Church.

Before a recent expansion, it had been using a manual admitting system including pre-admission techniques in use since 1969. This method, acceptable under then existing circumstances, required typing a four-part unit set form containing a duplicating master.

From the master, we ran off 17 copies for laboratory, radiology, switchboard, social services, dietary and other purposes.

The other three copies of the form were for the chart, the business office and the insurance company.

The paper volume and lack of technical sophistication eventually made this system too cumbersome and slow for efficient use. In addition, the duplicating equipment was noisy and messy, and copies were not as clear as the center wanted.

Almost the same number of copies were needed in the new form, but it had to be printed in one run on a terminal receiving information from the central computer. Data is input to the computer at CRT units in the admitting office and in the emergency room. The form's design and construction assumed great importance since the printer has a limitation on the number of copies it can produce legibly.

Limited to Four-Part Form

Following discussions with the people who would be involved with the form, we determined that 16 copies were needed.

Print impact limitations of the terminals, however, limited us to a four-part form for necessary copy legibility. The solution was to design the form so that each part divided into four sections separable along perforations.

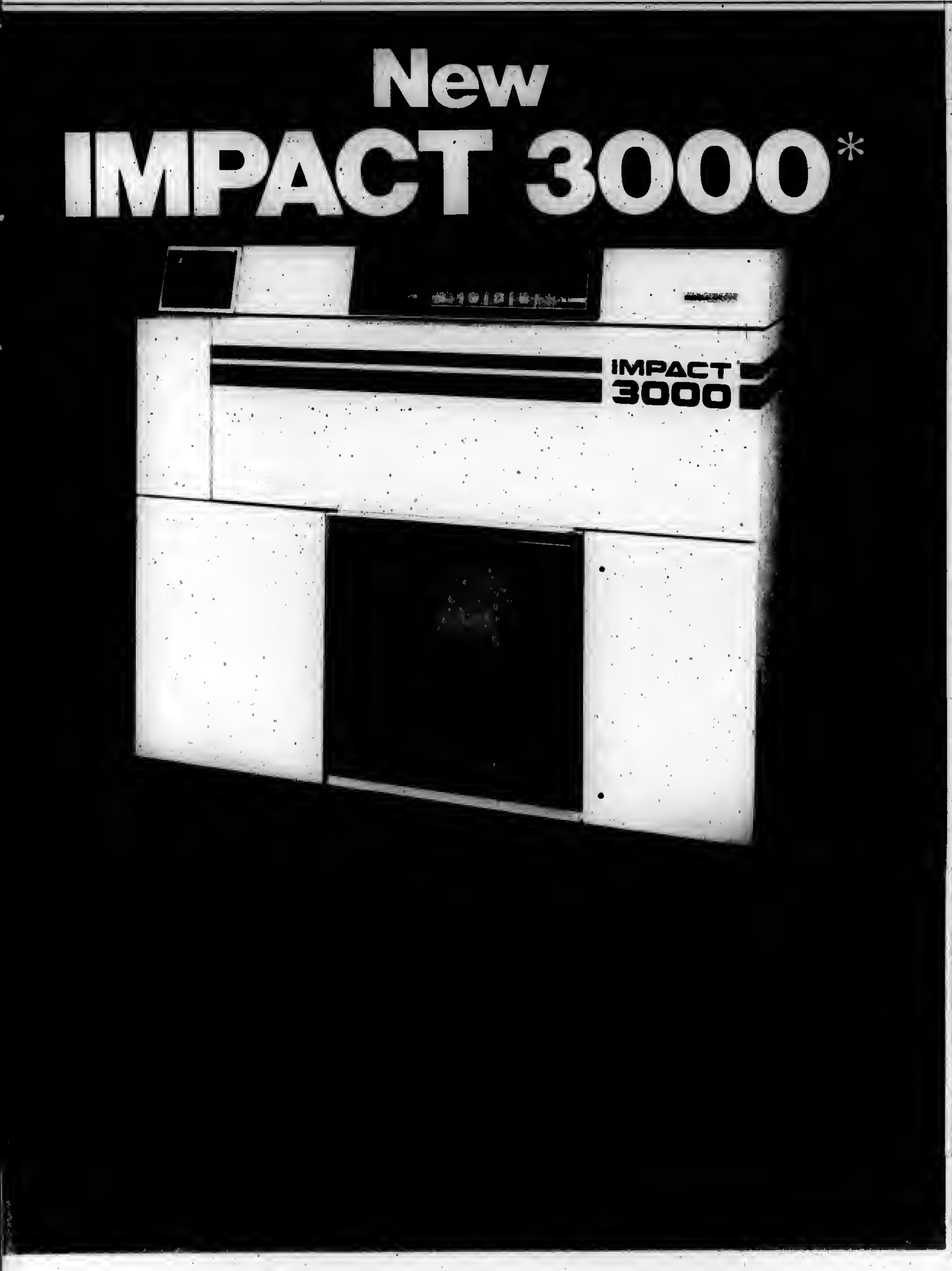
Designing such a form proved to be an exercise of considerable creativity and ingenuity. The result was a four-part, 32-in. long document for regular admissions and a five-part, 17-in. version with a pocket section made by the last two copies for emergency room and out-patient use.

All are printed on chemical carbonless papers. And just in case the equipment is ever down, we are covered with a two-part "Zipset" version for immediate needs.

Each of the four parts of the basic admission form breaks down into four sections from top to bottom, alternating an 11-in. section with a 5-in. section. Entry of basic patient information, from number to doctor name, requires the whole of the 5-in. length copies and the top halves of the longer copies. This data is printed four times so it appears on 16 copies.

The top part of the form provides copies for the chart, pa-

(Continued on Page 136)



Admitting Form Suits Range of Hospital Needs

(Continued from Page 135)

tient reservations department, business office — counselor and medical records department, the first and third being the 11-in. sections.

The bottom half of the chart copy has space for the entry of physicians' notes concerning diagnoses and related information; the bottom half of the business office-counselor copy has space for the entry of insurance and benefits information. The back of the chart copy is used for the "Authorization for and Consent to Surgery or Special Diagnostic or Therapeutic Procedures."

The form's second part has copies for business office-surety information, the consulting physician, a second consulting physician and the development and communications department, which is basically public and patient relations.

The 11-in. business office copy now has preprinted financial terms in place of the physicians notes on the bottom half, but the insurance information at the bottom of the second 11-in. section remains the same. And from this point on, all copies' have the same layout.

Part three has copies for the business office-insurance, the anesthesiologist, the attending physician and the infection control nurse. In the last part are copies for the patient, the dietician and the social services and radiology departments. The last name is used for that department's billing purposes since it is separate from the hospital.

Terminal Printer Specs

The specifications of the terminal printer played a role in determining the final construction of this form. Because there must be a fairly deep allowance for form lead-in, the last section of the form is 5 in. long and the four copies involved are not needed immediately.

Thus, when patient information printing is completed, we remove the last part of the previous document along with the first three parts of the present one. This prevents any forms waste. The form removed is separated and copies are distributed immediately as needed.

The 17-in. long emergency room version has its own format, following in part that of the basic admission form, but differing where necessary to meet requirements. Its five parts divide into two sections each — one 11 in. long and the other five in. long.

The additional inch is a top stub so that after removal from the printer the parts will hold together as needed. Information entry and resultant printout are the same through CRT and terminal.

The top part gives us a copy for the medical records and patient reservations departments; part two covers the emergency room copy and one for the radiologist; part three includes a file copy and an extra copy and part four provides the same.

This last file copy, however, combines with part five to form a pocket to hold documents relating to out-patient charges. The back of the pocket, part five, is printed for the entry of data relative to out-patient charges.

The back of part one is also used to carry information concerning the authorization for medical and/or surgical treatment and for surety arrangements, both requiring signatures.

The top half of the top copy of the emergency room version carries the basic patient information while the lower half is used for the entry of physicians' notes concerning diagnosis, treatment, history and physical and nurses' notes. Should a patient need to be admitted, then the important information is already in the computer files and we can request a printout of the regular admission form when needed.

We have covered ourselves in case of breakdown by designing a two-part "Zipset" admission document.

The hospital is currently using an NCR Corp. Model 8550 for its DP needs. It is also using model 646 and 6440 printers as well as NCR data entry terminals.

Brown is the director of patient services and Lucky is the assistant director for the Shawnee Mission Medical Center.

With Real-Time System

Air Carrier Moves Freight Without Paper

Special to CW

TULSA, Okla. — To meet the competition head-on, American Airlines is dealing with the federal decontrol of cargo in the best way it knows how: by maximizing the profitability of its present resources — mainly its three 747 and nine 707 all-freight airplane carriers.

With 20% of a domestic market of more than $1 billion a year, — American is turning to the task through more effective use of its real-time, computer-based, freight-carrying system. Called Semi-Automated Business Research Environment (Sabre), the system is serving two purposes: It is helping to track containers from shipping point to destination and it is providing profitability analysis on every trip segment flown by the airline.

"We are within a hair's breadth of being a total information system," according to George A. Shipman, American's senior director of freight market plans and administration. "We started out with a system that enabled us to effectively handle freight physically and ended up with one that tells how profitably it was done."

Big Job for CPU

Every plane that flies, whether designated passenger or freight, carries some freight. With 1,000 flights a day connecting 59 different cities, and about 4,000 containers holding 40,000 shipments moving around from place to place, the CPU has a tremendous task, Shipman noted.

Not only must it be able to immediately tell the company where every container is, it must indicate the type: The right container must be in the right city when the customer needs it, or a sale can be lost. With Sabre and its IBM 370/-168 linked to a national network of some 200 remote entry terminals, American tracks each container by serial number.

It then extracts from the computer a summary report which will specify the number of each type of container which is available in selected cities. This is all accomplished without a single piece of paper going with any shipment — "We let the computer 'ship' the paperwork," J.J. O'Neill, vice-president for DP and communications services, pointed out.

But it wasn't always so simple. In the early '60s, all cargo was controlled by individual shipment. Every time a shipment was sent or received, a card was filled out with the airway bill number and other data and the card was filed — to be constantly referred to and updated manually.

A network of telephones connected city to city. As the number of shipments increased, however, the job of keeping the cards current and accurate became impossible.

In 1968, American initiated the concept of keeping track of containers with many different shipments instead of trying to follow, via paperwork, every individual shipment. Progress began with an extremely small data base that enabled the company to create an airbill and transmit it from San Francisco to Dallas.

American went on to build a system designed to mature along with the advancing capabilities of developing hardware. "We did not try to turn on the world at once," Ted Tower, director of freight operations, recalled.

The principle is simple, Tower said. After a shipment is put into a container, a note

(Continued on Page 138)

If your business depends on the flow of information between locations, TI's new Series 700 Distributed Processing Systems can lower your costs and increase your profitability.

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Standby UPS Offers 24 Vdc

AUSTIN, Tex. — Austron, Inc. has introduced a standby power supply designed for use where power must be maintained in the event of extended ac power failure.

The Model 1290A uninterruptible power supply (UPS) is said to provide 24 Vdc at a maximum current of 3A and to have a total capacity of 19 ampere hours with fully charged batteries. The UPS can be configured in parallel with other Model 1290As to provide greater amperage, according to a spokesman.

Although the device can be used anywhere a UPS is required, the spokesman suggested it would be particularly well suited to applications involving frequency control and reference, such as time domain or time division multiplexing functions.

Features of the device include ac interrupt, 10A alarm relay contact, front-panel voltmeter and ammeter and internal batteries of the sealed-cell type, which require no periodic maintenance, the spokesman said.

The units are designed for use with 115V or 230V, 50- to 400 Hz operation.

The Model 1290A sells for $1,850 from the company at 1915 Kramer Lane, Austin, Texas 78758.

Airline Moves No Paper

(Continued from Page 137)

is made on the source document given to the airline by the customer to indicate the container number, the number of pieces and the name of the person who loaded it.

The source document flows to data input, where all the information about the shipment — including the name of the shipper, destination, type of pieces, weight, kind of commodity and special instructions — is captured. Then the container number is identified and batch-filed in the CPU.

As soon as the flight leaves, the record is updated to show that the container is enroute. The CPU takes the flight number and matches it to all the shipments in that container. Thus, any American customer can call any city in the country and find out where his shipment is at any time.

Information Display

After assembling all the data for every shipment on a particular flight, the computer automatically produces the records for everything on that flight. The information is at the destination before the airplane has arrived.

People at the destination airport can see, on hard copy, what is going to be on the plane, what special equipment may be needed to offload it and what must be done with each of the shipments. On some shipments, the customer may have to be notified; if a shipment requires special delivery, a truck can be there.

Most important, manpower and equipment can be matched for what is arriving on each plane, Tower noted.

After containers have been offloaded, the freight is removed and checked against the printout to verify that the goods are on hand. The freight handler can then use the same document to determine which containers should be broken down first and how the shipments should be sorted: to delivery areas for truck pickup or for storage until some later time.

Accounting Functions

Beginning in 1976, all data was captured at a central site because it was no longer necessary to have an accounting office in every city.

The pickup or delivery of the consignment triggers accounting activity at the central computing site. The design of the waybill lets it serve as the invoice to the customer.

The airline's assistant controller, John Weber, said, "we do not have to look at paper for every transaction. We bill from computer-generated records, eliminating the redundancy of key entry.

"We've sped up our billing process because we can go directly from computer output to tape without having to massage it again," he added.

The airline's top management stressed that the ability to avoid moving paper eliminates the probability of lost data. Wherever a piece of paper starts, it stops.

According to Fred H. McCusker, vice-president of freight marketing: "We can provide to the customer accurate billing and accurate and timely information on dispatch and destination of the customer's products."

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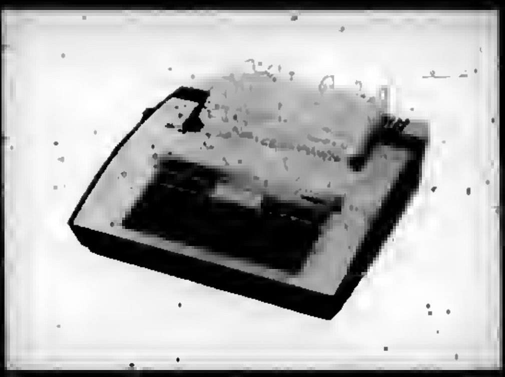

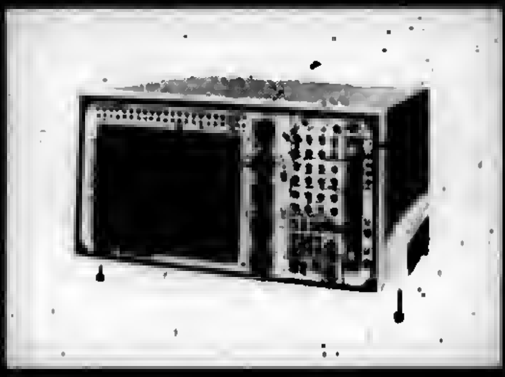

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Line's Power Jumps 26-Fold

HP Adds High-End Minis to 1000 Series

HP 1000 Model 45

By Jeffry Beeler
CW Staff

PALO ALTO, Calif. — Performance as much as 26 times that of rival computers is said to be available with two upper-end additions to the Hewlett-Packard Co. 1000 family of processors.

Dubbed the F-Series, the additions occupy a place somewhere between the middle and high end of the minicomputer product spectrum, an HP official explained.

The F-Series consists of the models 2111F and 2117F processors, which reportedly provide identical arithmetic capabilities and differ only in their main memory and I/O capacities.

Model 2111F stores 64K to 512K bytes on as many as five MOS main memory modules and accommodates nine I/O cards, the HP spokesman said. Model 2117F, meanwhile, holds 128K bytes to 1M byte on up to 10 memory modules and provides 14 I/O slots, he added.

Both 16-bit F-Series processors are said to calculate the sine of a number in 47.6 microsec, compared with an estimated 400 microsec to 500 microsec for previous members of HP's 1000 family. They also reportedly add in 630 nsec and multiply in 1.8 microsec.

HP officials attribute the F-Series' computational speed to five hardware and software features previously unavailable in the company's product line. These features include a Scientific Instruction Set (SIS) that executes transcendental and logarithmic functions in hardware; a separate floating-point processor; an RTE-IV operating system that accommodates data arrays as large as 2M bytes; a set of 15 Fortran-acceleration routines; and main storage consisting of 16K-bit random-access memory (RAM) modules that cycle in 350 nsec, the company official said.

All these features are available separately or together as part of two F-Series systems, the HP source explained. One of these systems, the Model 25, incorporates a 2111F processor and mainly suits dedicated engineering and scientific applications, while the other system — dubbed Model 45 — uses the 2117F computer and performs more generalized technical jobs, he said.

Graphics Software

Model 45 also reportedly comes with a Graphics 1000 graphics software package that can execute the same program — without conversion — with three models of HP display terminals — the 2648A raster-scan unit, the 7254 thermal plotter-printer and the

(Continued on Page 140)

Virtual Storage Family Gets Low-End Extension

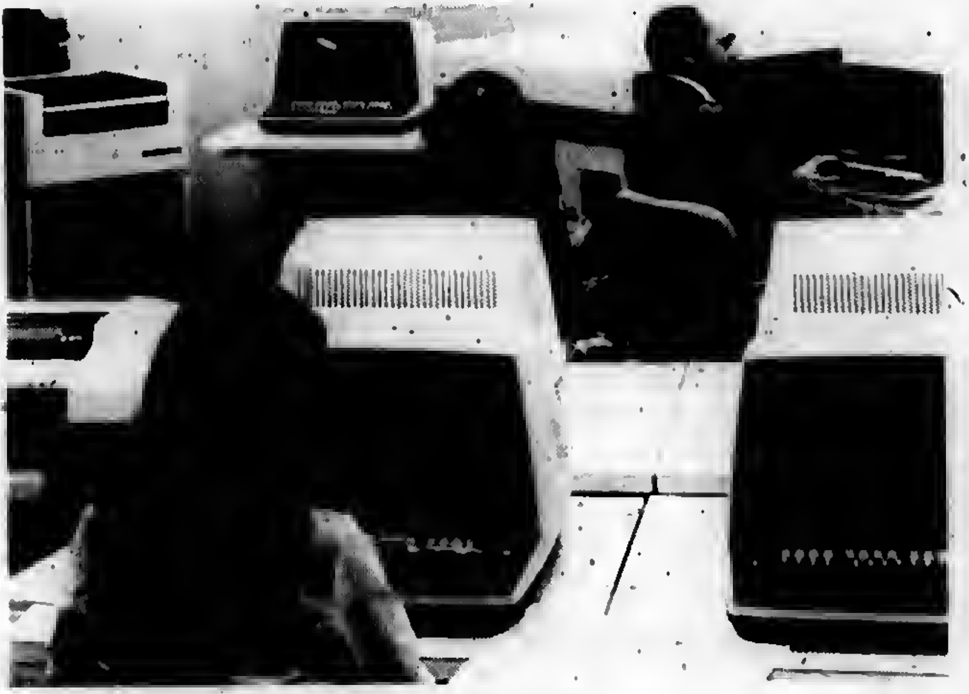
By Jeffry Beeler
CW Staff

LOWELL, Mass. — A system that can reportedly expand from a desktop computer to a supermini — without programming changes — has been added to Wang Laboratores, Inc.'s line of virtual storage systems.

Dubbed the WCS/50, the product reportedly represents a low-end extension of Wang's 2200VS-based small business system family, which also includes the WCS/60 and WCS/80, both introduced last October.

A minimum WCS/50 configuration incorporates a 2200VS-B central processor with 64K bytes of core main memory, an integral 312K-byte diskette drive unit, system console, user terminal,

(Continued on Page 142)



Wang WCS/50

Service Bureau Benefits As Small Systems Vendor

FALMOUTH, Maine — By entering the stand-alone systems business, the owner of a small service bureau has found he can stem the loss of customers to hardware vendors and at the same time double his company's projected revenues during the next two years.

In charting a new corporate course, The Computer Center has joined the small but growing list of time-sharing firms that have supplemented their traditional, on-line services by becoming suppliers of in-house small business systems. Among the names already on that list are two of the nation's largest service companies — Keydata Corp. and National CSS, Inc., both of which recently became hardware vendors in an attempt to combat the increasing economic lure of stand-alone computing.

According to John Marr, who founded The Computer Center 16 years ago, a growing problem at his and other computer service bureaus is simply a case of good business practices: the service bureau's customers outgrow the service and buy their own in-house computer system.

That first system is usually a minicomputer that performs traditional business DP: accounts receivable and payable, inventory control and payroll — exactly the jobs performed by service bureaus.

"A few years ago, the number of service bureaus was diminishing at an alarming rate of about 200 per year," Marr said. "This illustrates how hard it is to make it in this business. But if the serv-

(Continued on Page 143)

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Insurance Rating System Eases Agents' Task

By Ann Dooley
CW Staff

LOS ANGELES — "I don't know beans about how it works. I just know it's doing what it's supposed to," Bob Gerughty, vice-president of Zillgitt & Wright Insurance Agency, said in referring to his firm's Computer-Assisted Insurance Rating (Cair) system.

Since the agency started using the Insurance Systems, Inc. (ISI) system eight months ago to determine the most competitive insurance premium rates for clients, company officials have been able to do in five minutes what it used to take up to two hours to do," Gerughty said. "We've also caught up on the backlog," he added.

In states without "no-fault" insurance systems, many companies offer property/casualty automobile insurance at different rates. An agent's main concern is to match the consumer with the most economical rate for the type of coverage he requires, he said.

The task of comparing even one or two insurance companies' rates is time-consuming and difficult, and comparing more than two is almost impossible, he said.

But with the Cair system, it's possible to find the most economical rate and do the best job for clients, Gerughty said.

Zilligitt & Wright uses the system to learn the rates for as many as 20 insurance companies and then break the figures down into their component charges, he said.

New Tack

The agency previously tried several other computer systems, but they failed primarily because the company's personnel tried to force the computer to conform to their insurance workload. When they installed the current system, however, agency officials took the opposite approach and fit the insurance work to the computer's capabilities, Gerughty noted.

The Cair system uses an Applied Digital Data Systems (Adds) 980-A bisynchronous CRT terminal, which communicates over leased phone lines to a 128K-word Data General Corp. Eclipse C/300 minicomputer located at the ISI office in Irvine, Calif.

When a client explains what coverage he wishes and requests a price quotation, an agent keys into the terminal the insurance companies he represents as well as rate-determining factors like the customer's age, sex, marital status, driving record, occupation, auto type, address and the amount of coverage requested.

The mini then processes the transmitted information and returns the requested data as a Comparative Premium Survey, which is displayed on the CRT terminal. The survey lists the insurance companies' premiums in ascending order and by type of coverage — disability, homeowner's, medical and auto.

Information on which these surveys are based is continually updated to reflect changing insurance rates, Gerughty added.

With the system, agents and customers can also specify monthly, quarterly or annual premium billing. Also included in the survey are assigned risk plan quotations, according to Gerughty. Companies that are contacted but unable to quote a figure because of unacceptable insurance risks indicate their inability to cover the client.

Each company has its own set of coverage rules that were very confusing without an automated system to handle the information, Gerughty explained.

Two High-End Processors Added to HP 1000 Series

(Continued from Page 139)

9872A four-color graphics plotter.

Intended for computer-aided design, simulation and other applications requiring extensive trigonometric and logarithmic calculations, the SIS is said to incorporate nine instructions — sine, cosine, tangent, arctangent, hyperbolic tangent, square root, exponent, logarithm to the base 10 and logarithm to the base e.

In both the F-Series computers, all these instructions are implemented by the discrete floating-point processor, whereas with most other minicomputers they have traditionally been performed with software subroutines, the HP spokesman said.

By computing floating-point numbers in hardware rather than in software, the F-Series processors can simplify applications involving the frequent manipulation of three-dimensional, computer-generated displays, he added.

In addition to executing the SIS, the floating-point processor implements 10 floating-point arithmetic instructions, HP noted. Attached to the 2111F's and 2117's main data bus, the unit uses Schottky logic and provides an accumulator for performing iterative calculations, the company official said.

Speeds Fortran Operations

With the 15 Fortran acceleration routines, the floating-pointprocessor also reportedly speeds by two to 20 times individual Fortran operations like parameter passing between subroutines and array address calculations. As a result, the acceleration routines and the separate hardware processor improve overall program performance by an estimated 50% to 70%, the spokesman said.

Another feature that contributes to the F-Series' processing speed — the RTE-IV operating system — reportedly allows users of Fortran programs to specify 2M-byte data arrays that are transparent to the programmer. Most other 16-bit minicomputers, by contrast, manage data arrays only as large as 64K bytes unless users segment or otherwise modify their programs, the official claimed.

Able to support up to 54K bytes of user program code in each of 64 memory partitions, RTE-IV represents an extension of HP's RTE-III and RTE-M operating systems, the spokesman said.

By itself, the 2111F processor costs $12,250 with 64K bytes of main memory and $33,000 with 512K bytes. A stand-alone 2117F with a 1M-byte main memory sells for $54,500.

An F-Series Model 25 system with RTE-M operating software, a 64K-byte main memory and an HP 2645 console terminal costs $27,500, compared with $85,000 for a Model 45 system with RTE-IV, a 1M-byte memory, an HP 2648A graphics console terminal and a graphics software package.

Deliveries of the processors and systems require 16 weeks from HP at 1501 Page Mill Road, Palo Alto, Calif. 94304.

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CIRCULATION DEPARTMENT

Processing Time Almost Halved

Claims Generator Boosts Adjuster's Accuracy

BUFFALO, N.Y. — One of the largest public insurance adjusters in this state has improved the accuracy of its insurance loss estimates and speeded its processing almost twofold after replacing a paperbound system with a minicomputer-based claims generator.

National Fire Adjustment Co. (NFA) switched to the Prime Computer, Inc. time-sharing system two years ago. Since then, the company has produced estimates 25% to 40% faster than before and has cut typing four-fold.

The time-sharing system has also lowered the firm's clerical error rate and thus reduced the cost of checking, rechecking, retotaling and retyping, a spokesman said.

Most people insure homes and businesses against fire and flood and assume the insurance company will simply hand over a check if disaster strikes, but often an insurance company will disagree with a policyholder's itemized loss claims. To establish the validity of his claim, a policyholder often hires a public insurance adjuster such as NFA to prepare and negotiate a settlement.

Former Inaccuracies

Before it computerized, NFA used manual methods to generate loss estimates. One of NFA's estimators went to a site and made rough notes detailing the damage, and then calculations were made to convert the notes into a dollars-and-cents loss estimate. Each estimator had his own note-taking style, which the person making the calculations had to translate. As a result, errors often occurred.

To speed their work, the employees calculating the figures memorized — often mistakenly — prices for building materials and labor. The whole process proved error-prone, time-consuming and inefficient, NFA president Frank Papa said.

So, several years ago, when NFA received hundreds of insurance claims following a flood in the western part of the state, "we decided to take a critical look at the manual claims handling process NFA had been using for the past 56 years," Papa said.

As part of the reassessment, NFA retained Custom Computerization Service, Inc. (CC$), a local consulting firm, which designed and implemented a computer-based claims generating system tailored to NFA's style of operation.

Under the current system, an estimator at the loss site makes notes on a simplified form designed for computer input. Then a typist enters the data on a terminal — a procedure that reportedly eliminates both intermediate processing and final typing.

Based on thousands of computer-stored building materials and services costs, the system then makes all the necessary calculations and — usually in less than half an hour — outputs the finished estimate with a line printer.

The whole process now routinely takes a few hours, compared with several days using the previous system. As a result, processing backlogs have disappeared, Papa said.

Built around a Prime 400 CPU, the system incorporates a 9-track magnetic tape unit. In addition, it has two data input terminals, a 300 line/min printer and a software development terminal plus a control terminal for system monitoring, interfacing and error messages. Both terminals provide backup for data entry.

Business Expanding

In addition to other benefits, the in-house mini has allowed NFA to expand its business to other cities without sacrificing service quality, Papa said. "Previously, starting an office in another city meant hiring and training a complete staff.

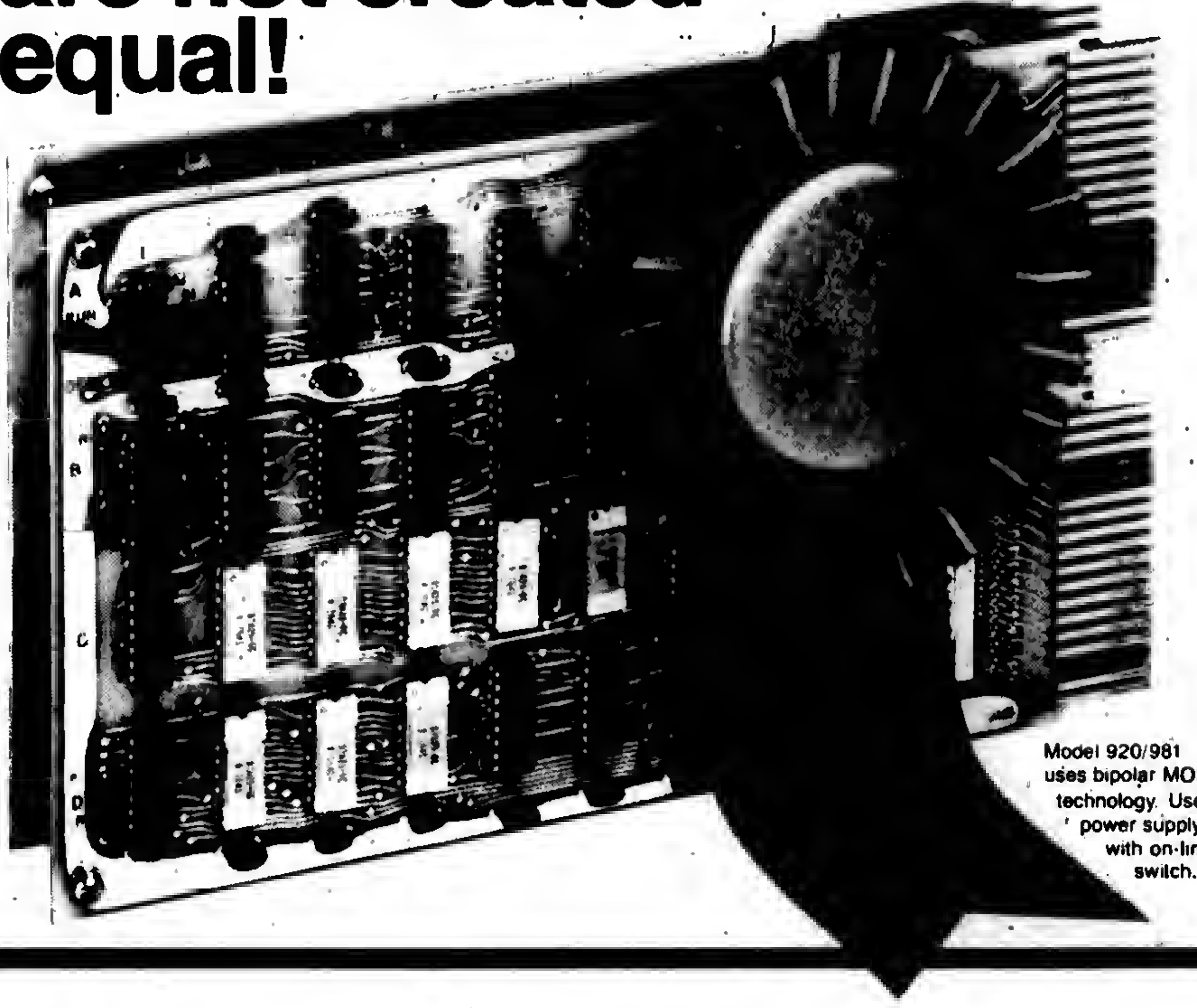
"Now, the only requirements are an estimator and a phone connection to the computer in Buffalo. We've expanded from four offices, all in upstate New York, to seven offices, including two in Pennsylvania."

Software for the system was written in Fortran, and the system initially ran on a commercial time-sharing computer, with input terminals at NFA's local office.

Transition to the computer system created few if any operational hitches, Papa recalled. NFA's estimators needed one three-hour training session to convert to the system, and typists switched after an hour's instruction.

Flexibility represented the most important factor in NFA's decision to choose the Prime system over rival configurations, the company president explained. "Our system's Primos operating software allows up to 63 time-sharing users to use any of several computer languages simultaneously."

All PDP-11 Cache Buffers are not created equal!



Model 920/981 uses bipolar MOS technology. Uses CPU power supply, comes with on-line/off-line switch.

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Fabri-Tek's Model 920/981 Cache Buffer plugs directly into the Unibus of the PDP-11/34, 11/35, 11/40 . . . and most other PDP-11 series computers. Measures just 8.75" x 5.2" x 1". Installs in minutes with no hardware or software modification. Compare that with oversize boards that can't interface directly with the CPU, take extra space and money to install.

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Wang 2200s Get Hard Disks

LOWELL, Mass.— While it was adding the WCS/50 to the low end of its virtual storage systems line, Wang Laboratories, Inc. was also reportedly introducing a family of software-compatible hard disk units.

Designed to operate with Wang's 2200 series of small business systems, the 2260C family consists of four models that permit unhindered expansion from 2.5M- to 20M-bytes, according to spokesmen for the firm.

The 2.5M-byte unit is said to access in 20 msec; the 5M-byte model, in 28 msec; the 10M-byte product, in 40 msec; and the 20M-byte module, in 40 msec.

Available with both fixed and removable media, all four models transfer 312.5k byte/sec, use FM recording technology and store 2,200 bit/in. on disks with 200 track/in., a Wang official said.

The 2.5M-, 5M-, 10M- and 20M-byte units cost $7,000, $9,000, $11,000 and $18,000, respectively. Deliveries, which take six to eight weeks, will begin June 15 from Wang at One Industrial Ave., Lowell, Mass. 01851.

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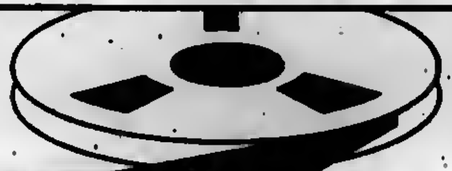

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Three Models Available

Magnetic Tape Units Unveiled by Datapoint

SAN ANTONIO, Texas — Datapoint Corp. has introduced an additional line of magnetic tape systems that are reportedly compatible with the company's existing tape storage modules and with all its computers except the 1500 dispersed processor.

The line of 10.5-in.-reel systems is said to consist of three models that operate at up to 25 in./sec. and store as many as 5.7 million characters.

Model 9556, a 9-track unit, stores 800 bit/in., Datapoint officials said. Model 9558 holds 556 or 800 bit/in. with seven recording tracks, and the 9-track Model 9584 records 1,600 bit/in., the company spokesmen added.

All three models reportedly use .5-in. wide recording tape and provide a nominal interrecord gap of .6 in. They also use dual-gap, read-after-write magnetic head assemblies and VP, LRCC and CRCC for error control, the company explained.

The models' drives and controllers connect to the I/O bus of Datapoint processors without additional interconnection equipment, the officials said.

Models 9556 and 9558 cost $10,500 and lease for $290/mo in a three-year contract, with an $80 monthly maintenance fee. Model 9584, meanwhile, costs $14,400 and leases for $400/mo in a three-year contract, with an additional $115/mo required for maintenance.

All three models are also available in one- and two-year leases and for short-term rental from Datapoint at 9725 Datapoint Drive, San Antonio, Texas 78284.

Virtual Storage Line Extended at Low End

(Continued from Page 139)

120 char./sec Model 2231V-2 printer, optional 200 line/min printer and two input/output processors (IOP).

One of the IOPs, the Model 22V02, controls the system's integral diskette unit and up to three 10M-byte disk drive products, a spokesman said. The other IOP, the Model 22V01, controls a line printer and as many as three 2246P workstations, he added.

The configuration is also said to include a virtual operating system, utilities, Assembly language and a choice of Basic, RPG-II or Cobol.

To this basic hardware/software combination, users can add up to two increments of 64K-byte main storage, 75M-byte disk units and two additional IOPs, the spokesman said. With the expansions, the WCS/50 will accommodate a maximum of 192K bytes of main memory, 150M bytes of disk storage and 11 workstations, he added.

Moreover, Wang said, because of its virtual storage capability, the configuration can reportedly continue expanding until it becomes indistinguishable from the WCS/60, the next most powerful member of the WCS small systems line. When upgraded to its maximum potential, the configuration equals the performance of the Wang family's largest system — the WCS/80, which can incorporate up to 512K bytes of main memory, 2.3G bytes of disk storage and 23 workstations, the company official said.

Thus, starting with a minimum WCS/50 configuration, users can reportedly expand their systems from IBM 5110 to Digital Equipment Corp. PDP-11/70 processing power merely by adding core memory and IOPs.

A minimum WCS/50 configuration costs $38,000. Wang is at One Industrial Ave., Lowell, Mass. 01851.

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Service Bureau Benefits As Small Systems Vendor

(Continued from Page 139)

ice bureaus can think of new ways to approach the business, they usually can hold on."

'Break-Even Point'

Shortly after Marr lost a service bureau customer to a Data General Corp. minicomputer system in late 1976, the bureau president started to become conscious of "the break-even point" at which service bureau costs roughly equal the costs of owning a minicomputer or adding new applications with a mini.

"For most companies, this break-even point comes when their combined service bureau charges and new applications development costs hit the $1,200- to $1,500/mo range," he said. "This means they can own their own computer, with all the additional advantages ownership offers, for less than continuing with the bureau."

The same principle holds true for many departments of large companies tied to mainframes.

More and more of those departments are finding they can enjoy all the advantages of a computer in their department, lessen the burden on the mainframe and reduce overall company costs, Marr added.

Before he started losing customers to minicomputers, Marr knew little about the machines. After working for IBM for seven years, he founded The Computer Center in 1962. When he started losing some large accounts to the small computers, he decided they merited examination.

Four Systems Evaluated

To help evaluate available minicomputers in 1976, Marr contacted a consultant who had considerable computer hardware and software experience. Together, they checked four major vendor's systems.

Although impressed with the DG Nova, Marr postponed buying any minicomputers.

When the CS/40 systems were announced in May 1977, however, he became one of the first to acquire and market the interactive Cobol-based small business systems.

Marr chose the CS/40 systems, he said, because the Interactive Cobol reduces both the cost and complexity of systems development.

"The first system was the hardest to develop, but the development of subsequent systems has proceeded well," the president said.

'DG's CS/40 hits the crux of the business community because most people can fit into the CS/40's range of offerings."

Other Plans

In addition to the CS/40 range, Marr has considered selling packaged DG Eclipse systems as well as the firm's Micronova systems.

"To get the business started," he said, "you must have a person well experienced in systems software, and you must have a good computer system to sell.

"Thus far we have sold six systems. We have as many more on the way, and we also have generated several additional solid prospects.

"It's an expensive proposition, but it will pay off," he added. Marr calculates that the payoff from combined system sales and DP services will boost his total business from its current $600,000 to $1.2 million within two years or less.

"We are finding the overall effect of adding the CS/40 systems has not been to cut into the service business, but to stimulate it," Marr explained. "The current forecast predicts the service business will increase between 15% and 20% this year.

"The addition of the CS/40 has enhanced our problem-solving capability. Now we can sell or service, with the customer's needs dictating the choice."

Floppy Disk Formatter Bows

SANTA ANA, Calif. — Almost any set of operating features and parameters required by large end users and OEMs can reportedly be programmed into a floppy disk drive formatter from Applied Data Communications, Inc. (ADC).

Model 61F-600 permits selection of both single-density FM and double-density MFM or M^2FM modes with both single-sided and double-sided operation, according to ADC officials. Under host computer control, one formatter can accommodate up to eight mixed-density disk drive units with multiple formats, they added.

The unit is said to accept IBM-compatible formats as well as any other industry-standard and non-standard formats. It also accommodates floppy disk drive units from General Systems International, Inc., IBM, Memorex Corp., MFE Corp., Orbis Systems, Inc., Perkin-Elmer Corp., Pertec Computer Corp. and Shugart Associates.

Built around a Signetics 8x300 microprocessor with 256 bytes of storage, the formatter comes with sockets that store 2,048 additional words, the spokesman noted. It is also said to provide an 8x300 extension port for custom drive interfaces or system expansion.

Model 61F-600 costs $850 with quantity discounts available from Applied Data Communications at 1509 E. McFadden Ave., Santa Ana, Calif. 92705.

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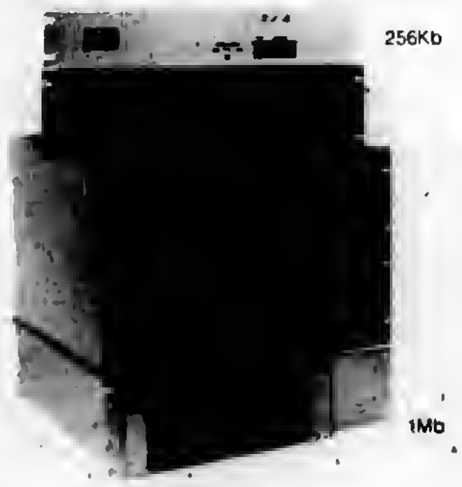

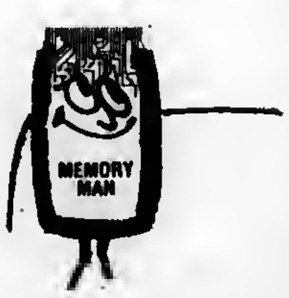

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Unibus Gets Transmission System

PALO ALTO, Calif. — Digital Equipment Corp.'s PDP-11 Unibus can typically be extended 100 meters with a remote transmission system introduced recently by Digital Pathways, Inc., according to spokesmen for the product's developer.

RTS-100 reportedly consists of two cabinets connected by 56 twisted wire pairs corresponding to the 56 Unibus lines. One of the cabinets is situated at the computer and the other at a remote site, Digital Pathways officials explained.

Standard Unibus extension cables connect the transmission system to the computer at one end and to the remote system at the other end, the officials added.

All transmissions between the central and remote sites are said to take place through differential line drivers and receivers.

Digital Pathways recommended the RTS-100 for users who want to secure their storage modules by operating the units and their CPUs from separate locations.

Excluding cable, the transmission system, which incorporates its power supply in the two cabinets, costs $3,300. Digital Pathways is located at 4151 Middlefield Road, Palo Alto, Calif. 94306.

HP Disk Memory Compatible With 3000

PALO ALTO, Calif. — Hewlett-Packard Co. has expanded its family of controller-compatible disk memories with the introduction of a moving-head model that the firm claims seeks in an average of 25 msec and transfers 937.5k byte/sec.

Compatible with HP's 3000 series of computer systems, Model 7925 reportedly stores up to 120M bytes of formatted data and comes with an optional controller and add-on disks.

The controller, which is compatible with its counterpart in HP's earlier Model 7906 and 7920 drives, accommodates as many as eight drives, company officials said. Because of this compatibility, users can add the 7925 to systems using the 7906 and 7920 units or mix the three models in any combination, the spokesman added.

Model 7925 stores data on a removable disk pack, one surface of which carries servo information for the products's track-follower head-actuating mechanism, officials noted.

Standard features are said to include error-correction-code hardware and the ability to operate at between 50°F. and 104°F. Marginally recorded data can reportedly be recovered under program control.

With a controller, Model 7925M costs $21,000, excluding an $89 basic monthly maintenance fee. Add-on disk units, dubbed Model 7925S, sell for $17,000 each with a $62/mo maintenance charge.

HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

Disk Controller Runs on PDP-11

PALO ALTO, Calif. — Automatic hardware-error correction and single-command, multiple-sector transfers of up to 64K words are reportedly available with a single-board disk controller from Minicomputer Technology, Inc.

Model SMC11 occupies one hex-wide slot of a Digital Equipment Corp. PDP-11 and accommodates drives compatible with Minicomputer Technology's Storage Module line of controllers, company officials explained. Drives accepted by the controller include those from Ampex Corp., California Computer Products, Inc., Control Data Corp., Kennedy Co., Memorex Corp., Microdata Corp. and Okidata Corp., the spokesmen noted.

Additional features available with SMC11 are said to include dual-access support, bad-sector flagging and the ability to mix drive capacities.

Software support for the controller reportedly includes a stand-alone diagnostic and formatter program plus RSX-11, RT-11 and RSTS-3 compatible drivers.

With single-drive cabling and one-year warranty, the product costs $3,580 with OEM discounts available. Minicomputer Technology is located at 2470 Embarcadero Way, Palo Alto, Calif. 94303.

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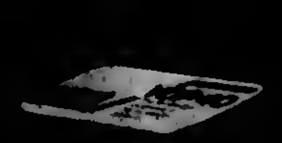

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Mini Makes Air Cargo Firm's Backlog Take Off

By Ann Dooley
CW Staff

CANTON, Ohio — Rapid sales growth was causing a backlog of freight bills, accounting statements and other paperwork for Rapid Air Freight, Inc. (RAF) until the air cargo firm decided to automate its operations with a minicomputer system that promises to yield an annual savings of as much as $50,000.

Before the firm acquired the current system, its backlog of unprocessed bills had so constricted cash flow that billing was running as many as 90 days behind schedule, according to the company's president, Frank Sukosd.

As a result, RAF's clients often received their bills too late to apply to the appropriate month's accounts "and our credibility was being jeopardized," Sukosd recalled.

At first, the air cargo firm tried to process the surplus paperwork by hiring additional clerks, but that attempt proved unsuccessful in meeting the company's growing needs.

'No Way to Run Business'

RAF also faced the problems of finding an improved method of responding to customer inquiries about shipments, Sukosd said. If a customer wanted a shipment traced, the company typically needed 20 minutes to find the appropriate source document and locate the desired information.

"When you average 200 inquiries a day, that is a lot of time wasted — not to mention the frayed nerves," Sukosd said. Moreover, because few callers will wait 20 minutes on the phone, RAF often had to return customers' long distance calls at its own expense.

Recognizing that "this was no way to run a business in this day and age," Sukosd began to consider installing an in-house computer.

At first, he investigated a computerized airline system, but he soon concluded RAF lacked both the financial resources and the physical space to support such a system.

Next, Sukosd evaluated equipment from several manufacturers including Data General Corp., IBM and Honeywell Information Systems, Inc. and finally selected a 64K-byte Univac BC/7 minicomputer.

In the year since its installation, the RAF system has saved an estimated $20,000, and that figure excluded the value of improved customer service and savings in various internal functions, Sukosd said.

When it becomes fully operational, the system could cut the firm's overhead by as much as $50,000 a year, he added.

Another advantage of the system is that it can be modified in-house to meet the firm's changing business needs, Sukosd said.

To generate a shipping document, all relevant information such as date, company, invoice number, destination and airline charges are entered into the system through CRT terminals and stored on disk. Later, the system's 125 line/min printer generates a shipping receipt.

As a result, RAF can collect receivables every 31 days instead of every 105 days, as was the case with the previous billing system, Sukosd noted.

One of the system's main applications is tracking freight bills. After a shipment is completed, RAF enters freight bill information like billing number, airline code number and flight number exactly as it appears on the source document.

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Draws From Own Experience

EPA Outlines Plan for Implementing Minis

WASHINGTON, D.C. — Minicomputer users can best ensure smooth installation and program conversion if they develop a well-conceived implementation plan covering hardware, programming and system integation the Environmental Protection Agency (EPA) advised here recently.

The EPA was speaking from experience, since the agency has just finished converting to a minicomputer system and confronted many of the problems and delays that can occur.

An implementation plan helps control the work flow and leads to better project structuring, planning, estimating and communications among those involved with the conversion project. Such a plan can also help spot problems before they occur and aid in solving or avoiding them, according to the EPA.

Seven Phases

A thorough implementation plan should divide into seven phases which include a converison design phase that outlines methods for changing programs and conducting the conversion; a hardware installation phase that includes site preparation, delivery, installation and acceptance testing of the equipment; and a programming phase that includes recoding and testing of the converted modules.

The remaining phases are the integration and system test phase, which includes thorough software testing; an acceptance test phase that formally signifies the readiness to make the conversion; a conversion phase, which is the physical changeover to the minicomputer; and finally, the operation and maintenance phase, which is the daily use of the system, EPA spokesman noted.

In a written review of its minicomputer installation experiences, the EPA further divided each of the seven main implementation steps into the following substeps:

- Assumptions.
- Work products and major activities.
- Resource requirements and task estimates.
- Task priorities and interdependencies.
- Schedules.
- Budgets.
- Milestones.

The assumptions section of the implementation plan provides a checklist of situations to be considered during the planning and implementation processes, according to the EPA.

It also helps identify unknown factors that could significantly influence an implementation plan.

The "work products and major 'activities" substep provides the basis for identifying implementation tasks, according to the EPA. Once the work products and activities are defined, they can be broken up into smaller and more controllable tasks and goals.

Installations converting several applications should consider each application separately. The applications to be given the highest conversion priority should be those with the highest economic return, the EPA advised.

All resource requirements should be identified and all tasks should be assessed before users create an implementation schedule, the EPA noted.

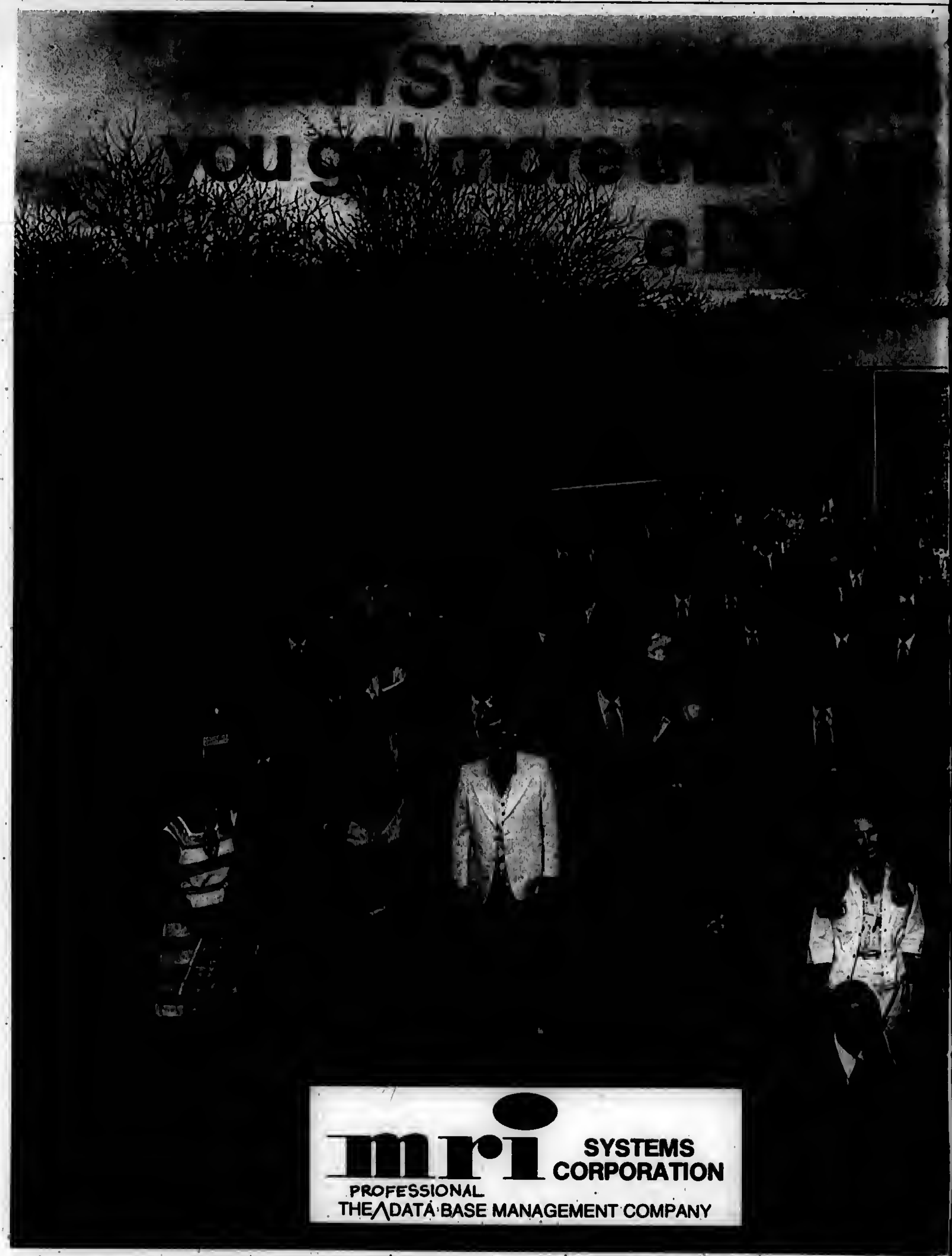
The resources to be identified include personnel; computer equipment; operations software for development and testing; and major expense items such as extra training, travel or special equipment. Once these are identified, the length of time it will take to complete each task must be estimated, according to the EPA.

Next, priorities must be established and interdependencies among tasks must be recognized before a schedule can be plotted, the EPA said. For all but the most complex plans, a list of priorities and interdepenencies is usually enough.

Combine Substeps

The overall project schedule combines the results of the

(Continued on Page 148)



Memory Fits LSI-11, PDP-11

WESTLAKE VILLAGE, Calif. — Users can expand Chrislin Industries, Inc.'s semiconductor memory board from 8K to 32K merely by replacing the product's 4K by 1 dynamic memory devices with their 16K counterparts, according to the unit's developers.

Available with either on-board distributed refresh or external refresh control logic, Model 1103 reportedly comes in 8K, 16K, 24K and 32K memory versions that plug into Digital Equipment Corp.'s LSI-11, LSI-11/2 and PDP-11/03.

Measuring 8.44 in. by 5.187 in., the memory module stores up to 128K words in 2K increments, accesses in 350 nsec, cycles in 525 nsec and consumes less than 7W, Chrislin officials said.

Model 1103 costs $390 in an 8K by 16 version and $995 in a 32K by 16 version. Delivery takes two to three weeks from Chrislin's Computer Products Division at Suite 102, 31312 Via Colinas, Westlake Village, Calif. 91361.

Cartridge Disk Controller Occupies PDP-11 Bus Slot

GARDEN GROVE, Calif. — Cartridge disk units storing 2.4M-to 80M bytes can reportedly be linked to Digital Equipment Corp. PDP-11 systems with a singleboard controller introduced by Distributed Logic Corp.

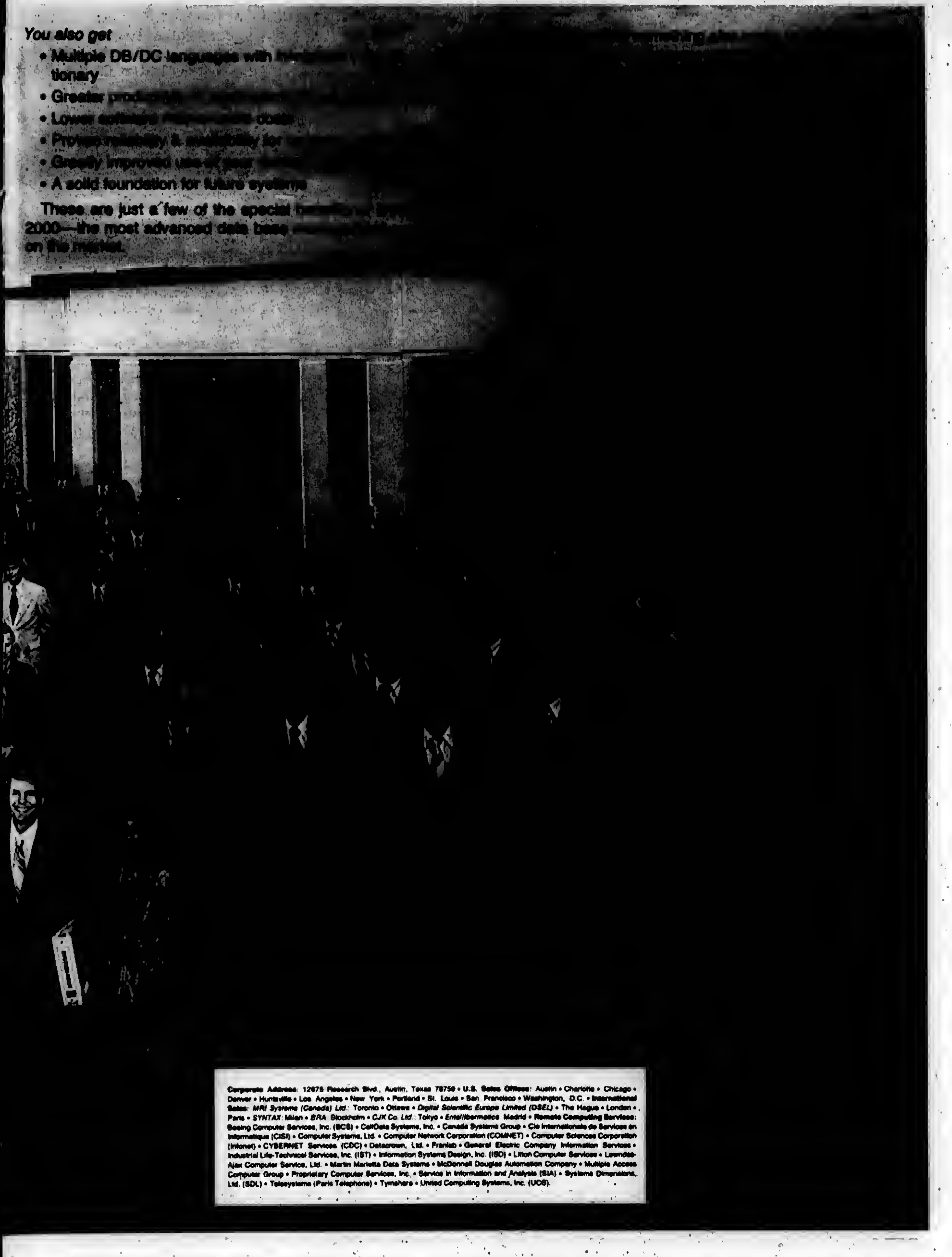
Dilog I occupies one peripheral controller slot in a PDP-11 Unibus, a Distributed Logic spokesman said.

The microprocessor-based product permits automatic self-test diagnostics of disk drive units, the controller itself or CPUs, the spokesman added.

Software-transparent to DEC's RK11 disk systems, the controller is said to operate under RT-11, RSX-11, RSTS, IAS and Mumps operating systems.

Each Dilog I comes either singly or as part of a subsystem with cables and disk drive units, officials reported.

The controller costs $1,995 in quantities of 24 and is available from Distributed Logic at Suite G, 12800 Garden Grove Blvd., Calif. 92643.



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Core Add-On for PDP-8

CRANBURY, N.J. — Addressing capability of the Digital Equipment Corp. PDP-8 can reportedly be expanded from 32K by 12 to 128K by 12 when DEC's KT-8A memory management option is used with Dataram Corp.'s latest core add-on.

Packaged on one DEC hex board, the 32K by 12 memory unit accesses in 330 nsec and cycles in 1.2 microsec, Dataram officials said.

The 32K addition to Dataram's DR-118A core add-on family, which also includes 8K by 12 and 16K by 12 models, operates from +5V, -5V and +20V, the spokesman added.

The 32K DR-118A costs $2,380 from Dataram at Princeton-Hightstown Road, Cranbury, N.J. 08512.

Rolm Floppy Aids Software Work

SANTA CLARA, Calif. — A floppy disk system from Rolm Corp. is said to operate with or replace a moving-head disk unit in the company's programming station packages.

In the storage system, diskettes provide the medium for the firm's operating system, user data and part of the user's application program, Rolm officials explained.

Designed for software development for military applications, the disk system comes with a Model 3300 combination I/O interface that reportedly accommodates a real-time clock and links the programming station packages to two external devices plus a paper-tape reader and a paper-tape punch.

Floppy Disk Subsystem

In addition to the interface, the Model 3383 storage system incorporates an Advanced Electronic Design, Inc. 6200P floppy disk subsystem that includes the formatter and drive electronics for up to four Model 3384 floppy disk drives, Rolm spokesmen said.

Each of the system's diskettes stores about 12,500 lines of code, the equivalent of 313,396 16-bit words organized in the standard Rolm diskette format of 77 tracks, each with 16 256-word sectors, the officials added.

The system accommodates up to four drives, which hold a total of 1.25 million words, enough for about 50,000 lines of code, they said.

A basic Model 3383 costs $6,500, with add-on units selling for an additional $1,700. Rolm is located at 4900 Old Ironsides Drive, Santa Clara, Calif. 95050.

EPA Issues Mini Tips

(Continued from Page 146)

previous substeps. These results must be analyzed before users try to determine how to use schedule-planning resources, the federal agency advised.

The schedule should take into account external responsibilities, availability of resources, vacations, holidays, sick time, personnel turnover and potential interruptions, the EPA said.

Budgets should include both professional services and expenses but estimates should differ depending on whether the implementation is performed in-house or contracted outside.

Milestones are significant points that coincide with the completion of project phases and can be used as checkpoints for control, the EPA noted.

Once the implementation plan is finished and approved, tasks should be assigned according to the schedule and the plan should be monitored closely through progress reports.

The progress report should record completed tasks, point out deviations and problems and provide background data. If problems arise, project leaders should be alerted so they can take corrective action, the EPA noted.

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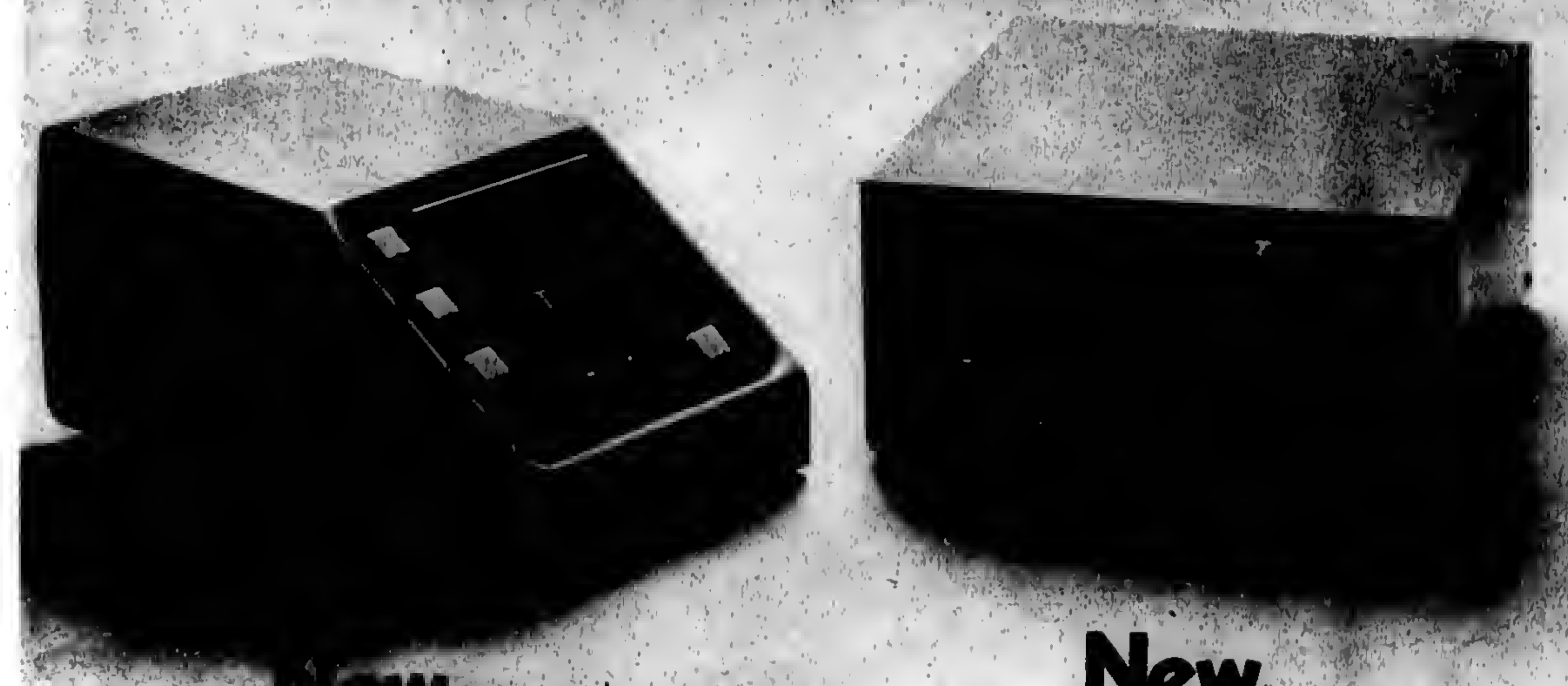

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Control Lighting, Cooling

Micros Perform at Knott's Berry Farm

By Tim Scannell
CW Staff

BUENA PARK, Calif. — Four million people a year reap the harvest of a rather unconventional farm here that uses microcomputer technology to produce a crop of fantasy and amusement.

Knott's Berry Farm, the nation's oldest and third largest theme amusement park, has more than 100 rides and attractions distributed on its 150 acres of land. Three desktop microcomputers located at the park's Construction and Maintenance Division control and operate both the lighting and air conditioning of these activities, as well as scheduling and expediting the many jobs required for their upkeep.

The Mits/Altair 8800 microcomputers, manufactured by the Pertec Computer Corp., were assembled from kits by the division's Electronics Department, whose engineers had recently helped to install such thrill rides as the "Corkscrew" and the 20-story "Sky Parachute Jump."

Two members of Knott's Berry Farm's Construction and Maintenance Division check operations via one of three microcomputers.

Three Systems Supported

The units are used by the park's staff to provide for three central systems: the work-order expediting system, the lighting control system and the air-conditioning system, according to Mike Reafsnyder, director of the Construction and Maintenance Division.

The work-order system schedules the workload of the construction and maintenance crew, based on due dates and priorities that have been assigned to the various jobs. When more than one shop is involved in a particular job, Reafsnyder explained, the computer takes this into consideration and coordinates the different shops that are involved.

A printed listing that shows all jobs in priority order is furnished periodically to the division's various managers.

In the lighting control system, the computer provides centralized control to turn on and off at prespecified times the many groups of lights throughout the farm.

"While we have our regular lighting schedule that remains fairly constant, we can also enter the 'on' and 'off' times for special events that require lighting at unscheduled times, such as in our theatre and 'Wagon Camp' exhibit, for example," according to Ralph Ruffalo, who oversees the operation of the division's computerized systems. "Then, after the special event is over, the times are purged from the memory and the system reverts to its normal schedule."

All of the farm's lighting, except for a few parking lots and other peripheral areas, is under computer control. "While the lighting is currently divided into just 11 sections for control purposes, we do intend to break it down more finely in the future," Ruffalo noted, "the system has the capability of controlling up to 100 separate lighting areas."

Energy Conservation

The primary purpose of the third computer-controlled system is to conserve energy and minimize Knott's Berry Farm's electric utility bills through air-conditioning control. "The system compares actual kilowatts being used by the entire farm at any given moment with the number of kilowatts that has been designated as a standard for that particular day," Ruffalo explained. "Whenever the actual kilowatt amount exceeds the standard, various air-conditioning units will begin to cycle off and on at short intervals — usually every 10 minutes.

"All the air conditioners on the farm are grouped into three different priorities," Ruffalo pointed out, "and the computer automatically searches its memory, finds the air conditioners in the lowest priority group which are running at the time the signal to begin cycling is received and selectively begins to cycle these units.

"If cycling a major portion of the lowest priority units does not return power to standard, the system will begin cycling the next priority group. It will continue this procedure until actual kilowatts return to the standard amount," he said.

One additional feature built into the system guards against excessive peak power usage, which could adversely affect Knott's Berry Farm's utility rate structure. In the event power usage reaches a maximum kilowatt figure, the system would continue to cycle as before, but increase the "off" times by 20%.

"At present, a large part of the farm's air conditioning is on the computerized system, and we are still in the process of adding more air conditioners to it," Ruffalo said. "The present system can handle up to 100 individually controlled units; with about 50 on the system now, we still have a lot of room for expansion."

While each of the Mits/Altair microcomputers is dedicated to a specific application, any one of the systems can be switched as

(Continued on Page 150)

When . . .

. . . is a Turtle not a turtle? For the answer to this reptilian riddle, see Page 151.

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Suggests Contemporary Applications

Consultant Warns Micros Must Do Real Jobs

By Tim Scannell
CW Staff

BOSTON — The average consumer in the American marketplace does not understand the technology behind the microcomputer and would much rather avoid it if at all possible, according to Jerry Wasserman of Arthur D. Little, Inc.

"It is difficult to accept that a world that has been unable to provide enough software engineers to satisfy the needs of industry will suddenly inspire the vast number of nonmathematically oriented people to learn a discipline just to play games or even to educate themselves," Wasserman said at the recent Electro/78.

CW at Electro/78

Wasserman's speech — "The Home Computer in the Next Five Years: Fad or Revolution?" — was one of 36 sessions presented at the three-day electronics show and convention, sponsored by both the Institute of Electrical and Electronics Engineers and the Electronic Representatives Association.

The home computer is currently heralded as "the new market conqueror," Wasserman said, even though nobody knows exactly what its function is, aside from being used to play games and plan menus. The microcomputer is simply another "glamour product," developed to keep the "cookie ovens of the semiconductor industry going," he contended.

"We are no longer a society which is technology-driven," Wasserman said. "To be successful in the emerging markets, particularly in the consumer arena, new products must meet real needs, satisfy actual wants and provide benefits that are easily perceived by the user as well worth paying for."

Wasserman suggested personal computers be geared toward the contemporary needs and problems of the average consumer. Applications that are concerned with energy monitoring, home security and water usage are of greater significance than programs dealing with games and video exercises, he stated.

The industry "should take advantage of the 70 million households that exist in the U.S. and the approximately two million living units that are built every year by offering command and control products that satisfy the present and future needs of household management."

Appliances that incorporate microcomputers to prepare individual meals at preset times and energy control systems that sense humidity and temperature variations in the home would be readily accepted by consumers because they have worthwhile functions, Wasserman said.

Transitory Acceptance

Although he acknowledged that advanced video games and home computers are being met with high enthusiasm and consumer interest, Wasserman believes this initial acceptance is, at best, transitory.

"The long-term viability of the home computer depends upon its ability to meet the underlying consumer needs," he stressed. "If the electronics industry takes the time to understand those market forces that need the capabilities of the home computer, the manufacturers will have success."

However, if manufacturers intend to market the microcomputer as an extension of the video game, "we will have another in our line of business disasters, as we had with the calculator and the electronic watch," he said.

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NCC Sees Report Debut

ANAHEIM, Calif. — Vantage Research is distributing its debut issue of a newsletter about personal computing at the National Computer Conference here this week.

"The Personal Computing Industry Report" covers hardware and software, product reviews, company profiles, technology forecasts and applications case studies, according to a spokesman.

The newsletter is available at an annual subscription price of $195 from Vantage, 770 Welch Road, Palo Alto, Calif. 94304.

Trio Controls Knott's Farm

(Continued from Page 149)

needed to any of the three application areas, Ruffalo noted. Additional hardware includes three Ann Arbor Terminal, Inc. terminals, three Okidata Corp. 110 char./sec. line printers and three disk drives with a total capacity of 300K bytes of floppy disk storage.

The Construction and Maintenance Division plans to add yet another application to the system — inventory management. "This will help us keep better track of the parts that our various shops need," Ruffalo explained. "As shop personnel use up their parts, they'll note this on their daily work cards.

"We'll key this information into the computer, and it will tell us when we're reaching dangerously low inventory levels," he said.

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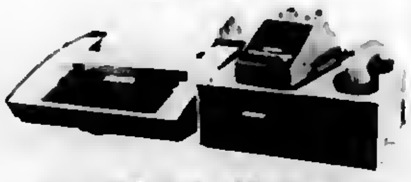

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Micro-Based Turtle Serves As Mapping, Teaching Aid

By Tim Scannell
CW Staff

CAMBRIDGE, Mass. — A senior at MIT here, not to be outdone by Mother Nature, has designed a computerized "turtle" that can be used to map rooms, solve mazes or teach simple geometry and programming concepts.

The Turtle, so named because of its remote physical similarity to the marine reptile, can "walk" on 2-in. radius wheels, "talk" with its two-tone speaker, "blink" using two red lights and "feel" by using its clear plastic dome as a touch sensor, according to William Hillis, the unit's designer. The device connects to an 8080-based microcomputer via a 10-foot cable and a standard parallel interface.

The Turtle, through the microcomputer, can be programmed to perform a variety of tasks, Hillis said. For instance, when placed in a room and activated, the unit will follow the room's contours using its touch-sensitive dome as a guide. The device will "remember" where furniture is placed in the room (backing off when it collides with a table or a chair) and store in the microcomputer's memory a two-dimensional "view" of the area, Hillis said.

Then, upon command, the unit will lower a solenoid-controlled pen and proceed to draw a rough representation of the room — on any scale, Hillis claimed.

Demonstrates Geometric Principles

The Turtle can also be used to demonstrate basic principles of geometry because of its ability to illustrate complex designs and angles. Hillis recently loaned a version of his robot to an elementary school in the Boston area and discovered that students responded better to mathematical problems when they could see the results of their efforts.

Hillis built the device nearly two years ago while working on an educational project for MIT's Artificial Intelligence Laboratory. MIT has, in fact, used various types of turtles in experimental projects, Hillis explained, "but I designed one primarily as a teaching aid for autistic or mentally handicapped children."

Hillis has joined four other students, one of them a former high school classmate, to form Terrapin, Inc., which will promote the Turtle in the computer hobbyist market. In kit form, the device will retail for approximately $300, Hillis said, and it will cost $500 assembled.

The officers of Terrapin already have plans to improve on the original model by adding a longer cable and eventually introducing a cordless Turtle with a "built-in intelligence." Their goals in marketing, however, remain the same, Hillis said. "We want to produce a product we like and which other people will like."

William Hillis, designer of the "Turtle," makes final adjustment on one of his microcomputer-controlled robots.

Alpha Supply Offers Micro Coding Form

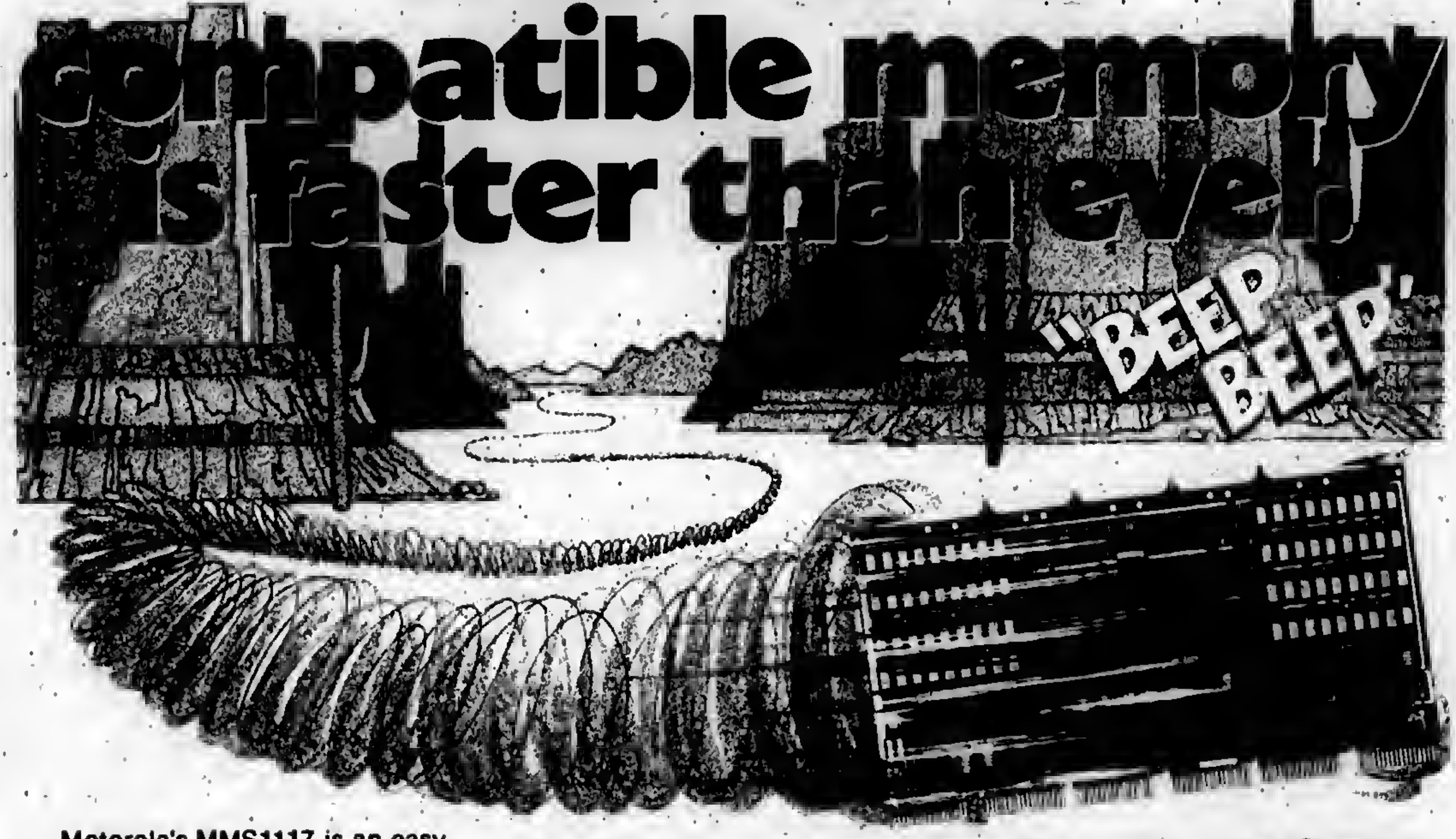
NORTHRIDGE, Calif. — The Alpha Supply Co. has introduced a coding form specifically designed for the microcomputer programmer.

The Micro Coding Form provides space for writing in symbolic language with provision for on-page conversion to hexadecimal or octal for machine entry, the firm said. The form facilitates hand assembly of programs by the programmer or development engineer and is useful as a debugging tool for generating and documenting patches for the MPU.

The forms are printed on 8-1/4-in. by 11-in. bond paper using dropout blue ink and they are bound 50 sheet/-pad, the firm added.

The coding sheets are available as single pads for $1 each or packages of 10 pads for $7.50 from the company at 18350 Blackhawk St., Northridge, Calif. 91326.

This PDP-II*



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128 Kilobyte MMS 1117

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MMS1116L	16K x 16	Add-in for PDP-11/05, 11/10, 11/35 and 11/40 systems with the MF11-L backplane
MMS1118 MMS1118-1 MMS1118-2	16K x 16 12K x 16 8K x 16	Add-in for PDP-11/04, 11/34 systems
MMS3400	32K x 16 or 64K x 9	For 3400N systems
MMS68102 MMS68102-1 MMS68102A MMS68102A-1	16K x 8 8K x 8 16K x 9 8K x 9	Battery backup for M6800 and other synchronous systems; pin-compatible with EXORciser† micromodule
MMS68103 MMS68103-1 MMS68103A MMS68103A-1	16K x 8 8K x 8 16K x 9 8K x 9	Hidden refresh for M6800-based systems
MMS68104	16K x 8	For MEK6800D2 Kit
MMS80810 MMS80810-1	32K x 8 16K x 8	For 8080A-based systems; pin-compatible with SBC 80/10/20

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Assistance is available from your Motorola sales office. Request a copy of the MMS1117 data sheet by writing Motorola Semiconductor Products Inc., P.O. Box 20912, Phoenix, AZ 85036.

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The following is a list of hobby computer clubs compiled during the past year by *Computerworld:*

ARIZONA

Arizona Computer Society, Contact: Jim Schaefer, P.O. Box 14391, Phoenix, Ariz. 85063. Telephone (602) 846-0709.

ARKANSAS

Arkansas Computer Club (ACC). Contact: Elmer Wingfield, 26 Belmont Drive, Little Rock, Ark. 72204. Telephone (501) 562-4260.

CALIFORNIA

North Orange County Computer Club. Contact: Lorin Mohler, P.O. Box 3603, Orange, Calif. 92665. Telephone (714) 998-8080.

Beverly Hills High School Computer Club. Contact: Paul Michalisco, 241 Marino, Beverly Hills, Calif. 90212.

Valley Computer Club, Contact: Al Herndon, P.O. Box 6545, Burbank, Calif. 91510. Telephone (213) 842-0912.

Sacramento Microcomputer Users Group (Smug). Contact: Smug, P.O. Box 161513, Sacramento, Calif. 95816. Telephone (916) 381-0335 (Richard Lerseth, newsletter editor).

CANADA

Niagara Area Computer Club, Contact: John Youngquist, Box 122, Fort Erie, Ontario, Canada.

Toronto Region Amateur Computer Enthusiasts. Contact: Harold G. Melanson, Streetsville Post Office, Missauga, Ontario, Canada.

Club d'Informatique de la Mauricie (Ciam). Contact: S. Brousseau, 3795, Jean-Talon, Trois-Rivieres, Quebec G8Y 2G8. Telephone (819) 375-1019.

CONNECTICUT

Bridgeport Area Society for Involved Computerists (Basic). Contact: Basic, Attn: Al Song, 12 Wildwood Drive, Trumbull, Conn. 06611.

Connecticut Microists. Contact: George Ahmuty, 8711 Wendy Lane, Westport, Conn. 06880. Telephone (302) 227-8534.

DELAWARE

Delaware Users of Microprocessor Systems (Dumps). Contact: David Corbishley, 12 Keith St., Kimberton, Newark, Del. 19713. Telephone (302) 737-3367; in New Jersey, telephone (609) 921-3260.

Clubs wishing to be included in this listing should send their names and addresses, as well as the names, addresses and telephone numbers of their contact persons, to Microcomputing Editor, Computerworld, *797 Washington St., Newton, Mass. 02160.*

FLORIDA

Space Coast Microcomputer Club. Contact: Ray O. Lockwood, 315 Inlet Ave., Merritt Island, Fla. 32952. Telephone (305) 452-2159.

South Florida Computer Group. Contact: Bruce Cameron, P.O. Box 236188, Miami, Fla. 33123. Telphone (305) 324-5572.

IDAHO

Pocatello Microcomputer Club. New Contact: Joseph E. Price, Box 8107 (Physics Department), Idaho State University, Pocatello, Idaho. Telephone (208) 236-2350, 232-4462.

ILLINOIS

Cyborg. Contact: Ralph Bargen, 1362 E. 59th St., Chicago, Ill. 60637.

Packard Personal Computing Club. Contact: Jack Stansbeary, c/o Packard Instrument Co., 2200 Warrensville Rd., Downers Grove, Ill. 60515.

Chicago Area Computer Hobbyist Exchange. Contact: Bill Precht, 1102 South Edison St., Lombard, Ill. 60148.

The Peoria Area Computer Club (Pacc). Contact: Anthony M. Drake, 2019 N. Idaho, Peoria, Ill. 61604. Telephone (309) 682-5894.

INDIANA

Louisville Area Computer Club. Contact: Andy Ehalt, 115 Edgemont Drive, New Albany, Ind. 47150.

Hoosier Amateur Computer & Kluge Society. Contact: Ray Borrill, 111 South College Avenue, Bloomington, Ind. 47401.

Valpo Tech Microcomputer Society. Contact: Arthur Hershman, Valpariso Technical Institute, Valpariso, Ind. 46383.

Calumet Computer Tribe. Contact: Ray Seiden, 6825 Ridgeland Ave., Hammond, Ind. 46324.

Indianapolis Small Systems Group. Contact: Mike Sanderson, 2201 West 79th St., Indianapolis, Ind. 46260.

Summit City Computer Club. Contact: Stuart Brown, 3534 South Barr, Ft. Wayne, Ind. 46806.

Evansville Computer Club. Contact: Robert W. Herdink, c/o National Sharedata Corp., P.O. Box 3895, Evansville, Ind. 47737. Telephone (812) 426-2728.

IOWA

Quad City Computer Club. Contact: Larry Woods, 2632 W. 36th St., Davenport, Iowa 52806. Telephone (319) 391-3125.

LOUISIANA

Northwest Louisiana Computer Group. Contact: Michael Murray, P.O. Box 8843, Shreveport, La. 71108. Telephone (318) 635-4643.

Debach Computer Club. The society is at Rt. 3, Box 110, Dubach, La. 71235.

Crescent City Computer Club. New contact: David Hughes, P.O. Box 1097, University of New Orleans, New Orleans, La. 70122. Telephone (504) 271-5440.

MASSACHUSETTS

Greater Boston Computer Group (GBCG). Contact: Vin Moscaritollo, 59 Bellvu Road, West Roxbury, Mass. 02135. Telephone (617) 325-2155.

MICHIGAN

Mid-Michigan Microcomputer Group. Contact: Joyce M. Church, 4307 Mar Moor Drive, Lansing, Mich. 48917. Telephone (517) 321-1587.

Southeastern Michigan Computer Organization. Contact: Jim Rarus, 15377 Veronica, East Detroit, Mich. 48021.

Lansing Microprocessor Club. Contact: Bill Serviss, 13121 Tucker Drive, DeWitt, Mich. 48820.

Mid-Michigan Computer Club. Contact: Tony Preston, 15151 Ripple Drive, Linden, Mich. 48451. Telephone (313) 735-5279.

MINNESOTA

Southeast Minnesota Amateur Computer Society. Contact: J. Michael Anglin, 6912 N.W. 18th Ave., Rochester, Minn. 55901. Telephone (507) 282-9748.

Minnesota Computer Society. Contact: Jean Rice, Box 35317, Minneapolis, Minn. 55435. Telephone (612) 941-1051.

MONTANA

Flathead Computer Society. Contact: E.G. Brooner, P.O. Box 236, Lakeside, Mont. 59922. Telephone (406) 844-3410.

NEBRASKA

Mid-America Computer Hobbyists. Contact: Thomas F. Smith, P.O. Box 13303, Omaha, Neb. 68113. Telephone (402) 294-2202.

NEW YORK

New York Amateur Computer Club. Contact: John Frederick, Box 106, Church St. Station, New York, N.Y. 10007.

Ithaca Computer Group. Contact: S. Edelman, Box 91, Ithaca, N.Y. 14850. Telephone (607) 273-3271.

Westchester-Fairfield Amateur Computer Society. Contact: C.B. Hensley, R.R. 1, Pound Ridge, N.Y. 10576. Telephone (914) 764-4213.

Long Island Computer Association. Contact: Aileen Harrison, 36 Irene Lane East, Plainview, N.Y. 11803. Telephone (516) 938-6769.

NEW MEXICO

Albuquerque Computer Club. Contact: Gary Tack, P.O. Box 866, Corrales, N.M. 87048.

NEW JERSEY

Amateur Computer Group of New Jersey. Contact: Sol Libes, 995 Chimney Ridge, Sprinfield, N.J. 07081. Telephone (201) 2063.

NEVADA

Northern Nevada Amateur Computer Club. Contact: A. Brady, c/o UNSCC, P.O. Box 9068, Reno, Nev. 89507.

NORTH CAROLINA

Triangle Area Computer Club (Tacc). Contact: Ed Comer, 4818 Ferncrest Drive, Greensboro, N.C. 27410. Telephone Andy Pitts (919) 765-1277.

OHIO

Allian Computer Club. Contact: Gary S. Fix, 3885 Norwood Ave., Allian, Ohio 44601.

(Continued on Page 153)

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Hobby Havens

(Continued from Page 152)

Midwest Affiliation of Computer Clubs (Macc). Contact: Gary Coleman, P.O. Box 83, Cleveland, Ohio 44141. Telephone (216) 732-8458.

Southeast Ohio Computer Society. Contact: Dennis Anderson, P.O. Box 67, Cambridge, Ohio 43725.

Dayton Microcomputer Association. Contact: Dave Lundy, 1404 Long Island Court, Xenia, Ohio 45385.

Amateur Computer Society of Ohio. Contact: Fred Hatfield, 1372 Grandview Ave., Columbus, Ohio 43212.

Cleveland Digital Group. Contact: John Tucky, 4006 East 57th Street, Cleveland, Ohio 44105.

Cincinnati Computer Club. Contact: Mike Shebesta, 1838 Fireside Drive, Cincinnati, Ohio 45230.

Computer Hobbyists Around Toledo. Contact: Bill Gensbechler, 2227 Portsmouth Ave., Toledo, Ohio 43612.

OREGON

Oregon Council for Computer Education. Contact: Dick Ricketts, 1200 Highway 99N., Eugene, Ore. 97402. Telephone (503) 689-6500.

OKLAHOMA

Central Oklahoma Computer Association. Contact: Lee Lilly, P.O. Box 2213, Norman, Okla.73070.

Oklahoma City Computer Club. Contact: Bill Cowden, 2412 S.W. 45th, Oklahoma City, Okla. 73119.

PENNSYLVANIA

Central Pennsylvania Computer Club. Contact: Dave Ciemiewicz, 533 N. Holly St., Elizabethtown, Pa. 17022. Telephone (717) 367-6512.

Centre County Computer Club. Contact: Carl Vesper, 1357 E. College Ave. State College, Pa. 16801. Telephone (814) 238-0048.

Pittsburgh Area Computer Club. Contact: Fred Kitman, 216 Beech St., Pittsburgh, Pa. 15218.

TEXAS

Texas A&M University Microcomputer Club. The society can be reached at P.O. Box M-9, College Station, Texas 77844.

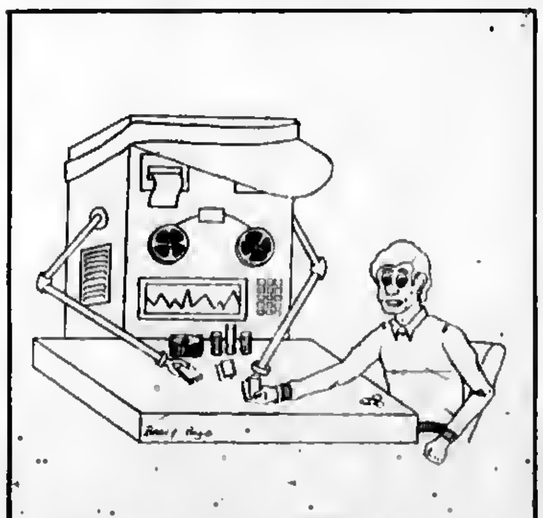
Texas Computer Club. Contact: L.G. Walker, Rt. 1, Box 272, Aledo, Texas 76008.

Panhandle Computer Society. Contact: Tex Everett, 2923 Spring, Amarillo, Texas 79103.

Central Texas Computer Society, Contact: Ray D. McCoy, P.O. Box 17303, Austin, Texas 78760.

Microcomputer Tinkers & Bug Busters. Contact: William Peters, 3845 Le Bleu, Beaumont, Texas 77707.

Lamar University Computer Club. Contact: Tim Magnuson, L.U. Box 10996, Beaumont, Texas 77710.



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El Paso Computer Group. Contact: Jack O. Coates Jr., 213 Argonaut No. 27, El Paso, Texas 79912.

Computer Hobby Group of North Texas. Contact: Bill Fuller, 2377 Dalworth, No. 157, Grand Prairie, Texas 75050.

Houston Amateur Microcomputer Club. Contact: Cliff Carley, 4506 Woodside, Houston, Texas 77023.

South Texas Computer Club. Contact: Ray Atnip, Suite 125, 11246 S. Post Oak, Houston, Texas 77035.

Permian Basin Computer Group. Contact: John Rabenaldt, P.O. Box 3912, Odessa, Texas 79760.

Northside Computer Group. Contact: Jim Aldridge, 2318 Townbreeze, San Antonio, Texas 78238.

San Antonio Computer Group. The society is located at 7517 Jonquill, San Antonio, Texas 78233.

Nasa-JSC Computer Hobby Group. Contact: Marlowe Cassetti, 1011 Davenport, Seabrook, Texas 77586.

UTAH

Utah Computer Association. Contact: Holly Barney, 1928 S. 2600 East, Salt Lake City, Utah 84108. Telephone (801) 485-3476.

Utah Computer Association. Contact: Holly Barney, 4903 Cottonwood Lane, Holladay, Utah 84117.

VIRGINIA

Tidewater Computer Club. Contact: C. Dawson Yeomans, 677 Lord Dunmore Drive, Virginia Beach, Va. 23462. Telephone (804) 420-6379.

WASHINGTON

Northwest Computer Club. Contact: John Marshall, P.O Box 242, Renton, Wash. 98055. Telephone (206) 226-7775.

WEST VIRGINIA

West Virginia Computer Society. Contact: Bill England, 167 Iroquois Trail, Ona, W. Va. 25545.

WISCONSIN

Durant Computer Club. Contact: Jim White, 901 South 12th St., Watertown, Wis. 55094.

Wisconsin Amateur Computer Club. Contact: Don Stevens, Box 159, Sheboygen Falls, Wis. 53085.

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Industry Analysts Say

IBM Divisions May Become Competitors

By E. Drake Lundell Jr.
CW Staff

IBM is moving toward allowing its major computer manufacturing arms – the Data Processing Division (DPD) and the General Systems Division (GSD) – to invade each other's turf, industry analysts agree.

The strategy, which is called the "contention" or "General Motors" plan, foresees the day when both of these divisions will offer a full range of products that will be direct competitors.

And many industry sources believe that the strategy will become apparent with the introduction of the IBM E series later this year or early in 1979 (see story on Page 1).

Until now, the two divisons have clearly stayed out of each other's way – even though there have been some situations in which GSD equipment has competed with and even replaced DPD equipment.

In general, however, GSD has been assigned the low end of the marketplace, specializing in packaged small business systems such as the System 32 and 34 and the System 3. The Atlanta-based division has also so far had the assignment of penetrating the minicomputer iron area with the Series/1.

The White Plains, N.Y.-based DPD, on the other hand, has concentrated on medium-to large-scale systems from the 370/115 through the Series 30 processors.

The two have come into conflict, however, particularly in distributed data processing applications, and field reports indicated that the Series/1 has proved to be a formidable competitor to the DPD-backed 3790 product line in some applications.

IBM's motivations for such a move toward more intercompany competition are varied, according to the analysts, and range from fear of a possible government-ordered breakup as the result of antitrust cases against the firm to just plain marketing strategy.

Harry Edelson, vice-president with Drexel Burnham Lambert, Inc., noted that in the past, DPD salesmen practically refused to

(Continued on Page 157)

E Series Doesn't Worry PCMs

IBM's plug-compatible CPU competitors aren't worried about the possible effects of IBM's expected E series announcement, feeling that the new series will be more competitive with offerings of the megaminicomputer manufacturers (see story on Page 1).

And some plug-compatible manufacturers (PCMs) noted that IBM's expected system was somewhat of a turnaround in the industry in that IBM would be reacting to the independents and trying to catch up with them – not the other way around.

At Magnuson Systems Corp., for example, Joe Hitt, marketing vice-president, stated that "there will be no effect" on Magnuson, because "we anticipated the E series."

At Itel, Richard Whitcomb, vice-president for market planning and development, said "we're planning to be competitive in that market" and that the firm was "anticipating the E series."

At National CSS, which is marketing a plug-compatible mainframe with its own software, officials said "we can't see the E series as competition," particularly since National CSS does not use IBM software on its system.

A further competitor in the plug-compatible CPU business likewise predicted no effect on his firm's order rates, particularly since "there's plenty of business for everybody in the market."

Almost all of these competitors, however, predicted that the E series would compete more with the megaminis.

'Hurting at Low End'

"IBM is clearly hurting at the low end" – the 370/115 and 370/125 market – a marketing man at National Semiconductor noted, adding that the competition from the megaminis was eating into IBM's base at the low end of its line.

Almost all of the market planners contacted felt that IBM would introducer lower end models of the E series before the upper end models, predicting that the first E models would serve as replacements for the 115

(Continued on Page 156)

Probst Hits U.S. for Slowing R&D

By Marcia Blumenthal
CW Staff

BLUE BELL, Pa. – Lambasting the U.S. for taking its capability to innovate for granted and adopting a complacent attitude toward technology, Gerald G. Probst, group executive vice-president of Sperry Rand Corp., urged that national policy make new commitments to research and development.

Probst, the former president of Univac, made these remarks here recenty in an address to members of the computer and scientific press and to high technology industry consultants during a two-day technology review sponsored by Univac.

The program, an overview of key technological trends for designing computer systems, included sessions on bubble memory, very large scale integration (VLSI), semiconductor technology and voice recognition and response systems.

In his remarks, Probst recalled the positive and supportive public attitude toward R&D spurred by aerospace innovation during the '50s and '60s which resulted in tremendous growth in the computer industry.

In 1951, he pointed out, R&D expenditures were 1% of the gross national product (GNP). By 1964, R&D investment reached 3% of GNP, but really had multiplied 15 times because of the enormous economic growth the country experienced during that period.

In 1969, Probst continued, interest in R&D began to fade. Although inflation gave the superficial appearance of growth, actual R&D investment slipped to 2.2% of GNP in 1977. Because of inflation, R&D expenditures have been basically flat since 1969, he noted.

(Continued on Page 158)

F. Bachrach Photo
Gerald G. Probst

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E Series Doesn't Faze PCMs

(Continued from Page 155)

and 125 and that only later would IBM move the series up to the 138 to 148 class where most of the competitors are clustered.

Itel's Whitcomb said he didn't expect the E announcement this year, however, indicating that early 1979 might be the date for the first machines in the series.

At present, he said, Itel is looking at the market in two ways. First, the firm is working on derivatives of the AS/4 and AS/5 machines — rumored in the industry to be called the AS/3 and AS/2 machines. These would be less expensive then Itel's current offerings and would bring it more firmly into competition in the 370/138 and 370/148 marketplace.

And while "Itel does have a plan to take on the E series" at the lower end (the 307/115 and 125 class of machines) it will not use derivatives of the AS architecture for this market, he indicated.

IBM will probably use a 32- or 36-bit bus in its E series, Whitcomb said, in part from the Series/1 architecture. He noted that a similar bus architecture was being explored at Itel for its entry into that market.

However, he emphasized that this was only one of several architectures under consideration, indicating that a cost-reduced system similar to the 370/125 might be an effective competitor in the low-end marketplace.

In addition, he said IBM was probably also exploring that option as well as the bus-type architecture since it seems to have two development efforts under way for the E series.

Magnuson's Hitt indicated that with the firm's "strategic architecture" in its machines, it would be in a good position to handle any expected IBM offerings at the low end.

"We can easily move down if we want," Hitt said, indicating, however, that the firm did not know yet whether it wanted to enter that low-end marketplace.

"We want to see the price" of the E series, he said, but added that "it's not really the market we want to be in for awhile."

Right now, he said, Magnuson is concentrating on getting up and running in its present 138 to 148 marketplace, adding that the backlog is increasing on a daily basis.

With the flexible architecture of the Magnuson system, however, he indicated that the firm might decide to offer systems emulating Honeywell Information Systems, Inc. or Univac machines before going into the low end of the IBM markeplace. In addition, he said the architecture would allow the firm to make 3705- and 3790-type devices to sell to the IBM base if it decided to take that tack.

At present, though, he said no decisions have been made for the firm's next marketing thrust.

National CSS Perspective

At National CSS, company officials were careful to point out that they were not just in the plug-compatible CPu market in that they market a total system with their own operating system, unlike the others which rely on using the IBM operating system.

The firm, which said order rates were running ahead of expectations, said it would be the only firm unaffected if IBM put more of the operating system in firmware since it does not rely on the IBM software.

At National Semiconductor, one marketing man expressed his own opinion that the E might be delayed.

"IBM traditionally likes to announce around Labor Day," he noted, "or at the first of the year. I don't think the machine will be ready for Labor Day, and perhaps not at the first of the year."

He said in any case the firm would probably have extremely long delivery schedules, leaving a lot of the market ripe for the independents.

Telenet Adds Offices

WASHINGTON, D.C. — Telenet Communications Corp. recently expanded its field marketing activities, opening three new district offices and adding 20 marketing representatives and systems engineering support personnel.

The company also established a Federal Government Operations Group in Arlington, Va., which will be headed by Lee Stiehl.

Federal agencies' specialized procurement procedures and wide-ranging equipment and application needs prompted the establishment of the new group, a company spokeswoman said.

Expansion in district office operations, the spokeswoman explained, was spurred by service requests from Telenet's current 200-company customer base and the present inability of sales people to respond to inquiries from prospective customers.

The three new district offices are located in Houston, Detroit and Cherry Hill, N.J.

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IBM Divisions Soon to Compete, Analysts Say

(Continued from Page 155)

cooperate with GSD salesmen and that, even though IBM started offering double commissions — one for the GSD and one for DPD — on joint sales, DPD personnel are "still not happy about cooperating."

Because of this, the GSD people want to be able to move their base of smaller computer users up to larger systems and not have to cooperate with DPD on such moves, he indicated.

At the same time, Edelson said the IBM strategy is to foster competition between the two groups, particularly in the megamini area, because the firm feels such competition will affect IBM less than it will other firms in the business.

At present, Edelson noted that IBM has only about a 5% share of the minicomputer market and he said the firm could grow at a rate of 40% to 50% per year in this area for 10 years without worrying about antitrust implications.

At the same time, analysts note that the megamini manufacturers are moving more and more into IBM's turf with systems that can compete with the low end of the 370 line.

Gideon Gardner, vice-president at Oppenheimer and Co., Inc., agree that IBM's E series announcements will be intentionally made to impact the business of GSD and indicated that the IBM strategy over the next few years will be to make the divisions as autonomous as possible.

Benefit to Stockholders

Both analysts indicated that the move could be under way because of antitrust worries on the part of IBM and noted that IBM could offer to voluntarily break itself up in order to settle the government's case against it.

With both divisions capable of competing across a broad front, they said, the move would be good for the stockholders, who would receive shares in each of the new companies under such a breakup plan.

William Easterbrook, vice-president specializing in computers in Kidder, Peabody and Co.'s research department, agreed, noting that such a divestiture would hurt other firms in the business far more than it would damage IBM.

Backing up this contention, James Peacock, a vice-president at International Data Corp., noted that GSD alone would already be twice the size of Digital Equipment Corp., which is the largest of the separate minicomputer makers.

In total — counting minis and small business systems — he estimated GSD has an annual volume of at least $2 billion world-wide, making it twice as large as DEC.

Peacock placed IBM's present share of the mini market at around 3%, not counting the small business systems market, but predicted that share would grow to around 15% to 20% by 1982 even if IBM does not puruse a contention strategy.

However, he added, he would probably tack on a few percentage points more if IBM did pursue that course.

Robert Fertig, vice-president in charge of the Technology Analysis Group at Advanced Computer Techniques Corp., echoed the others' feelings that such a move might be made for antitrust considerations, but added that it also might be the best way for IBM to achieve growth in the 1980s.

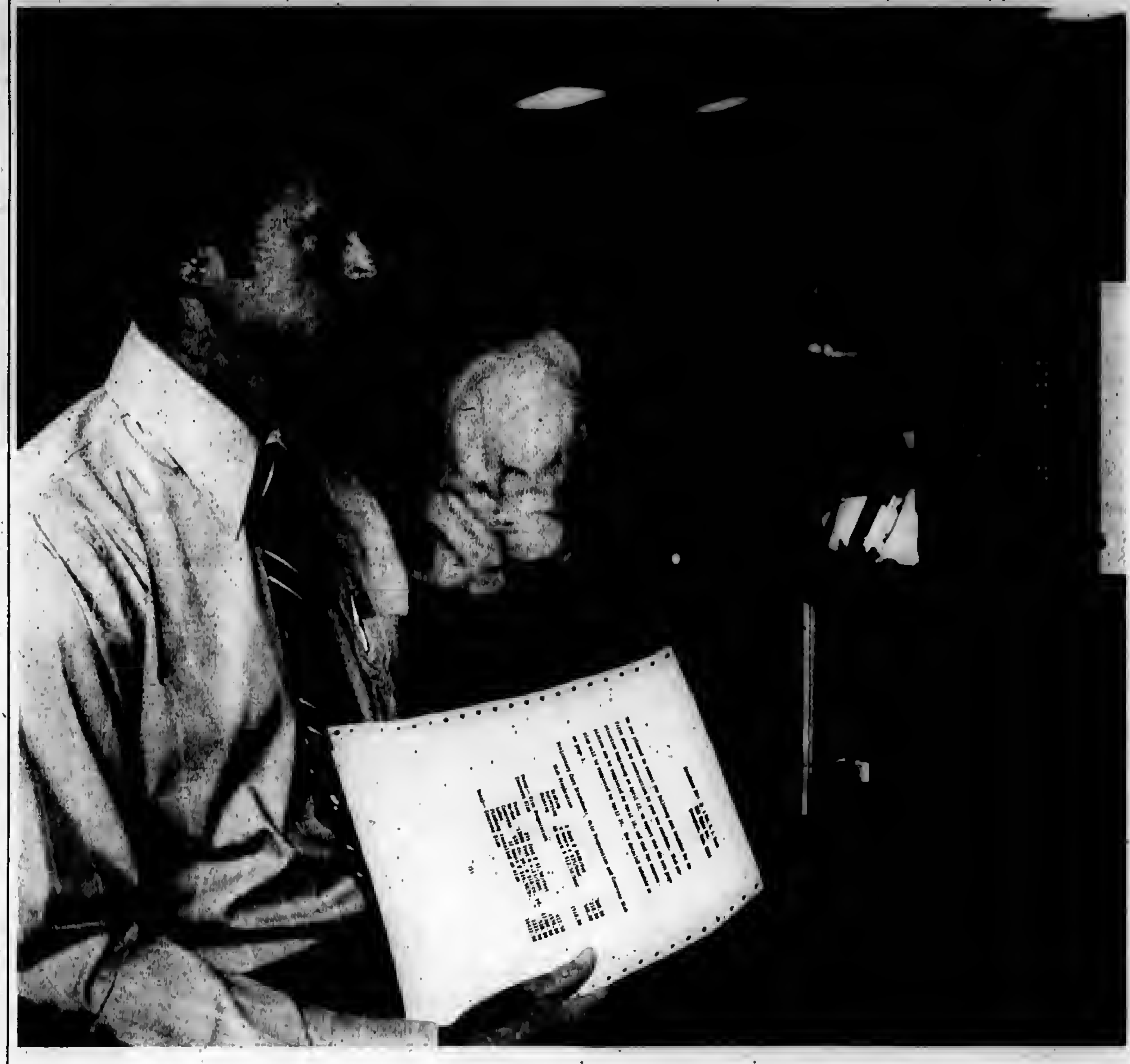
Using the General Motors analogy, he said GM doesn't care whether Chevrolet or Oldsmobile sells the car, just as long as Ford does not.

Open competition between the two groups is a way to help ensure that the business is kept within IBM, he said, and does not fall into competitors' hands.

He also noted that if IBM did decide to voluntarily split itself up for antitrust reasons, it would be in the interests of the shareholders for each divison to have a complete product line to offer its users.

Correction

In "Cross Took ICL Through 'Awe-Inspiring' Years" [CW, May 8], statements indicated that Cross received tax repayments that were illegal and were known to be by International Computers Ltd. and the British Inland Revenue Department. Those statements were untrue. *Computerworld* regrets the error.



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Univac Manager Says

Semi Maker, Computer Firm Line Blurring

BLUE BELL, Pa. — A shakeout in the semiconductor industry is underway, and somewhere down the road there will be no difference between a semiconductor manufacturer and a computer manufacturer, according to Theodore Malanczuk, group manager for semiconductor processing at Univac.

Speaking here during a recent technology review held by Univac, Malanczuk noted that the company opened a semiconductor facility two years ago. Although Univac was one of the last mainframers to incorporate semiconductor capability, the major reason for making the move was to aid in developing large scale and very large scale integrated technology.

Semiconductor vendors have tended to remain static, relying principally on high-volume production, Malanczuk asserted, adding that Univac found that semiconductor makers were not interested in fabricating specialized circuitry. In addition, by simultaneously addressing semiconductor and computer technology, the company could maintain technological superiority and protect proprietary innovation.

Malanczuk is not alone in his observations of this phenomenon. Recently National Semiconductor Corp. announced a new computer and revealed it would sell computer products directly to end users [CW, May 8].

Although National Semi will be competing directly with some of its own customers, Pierre Lamond, the firm's director of technology development, summarized the situation as follows: "The semiconductor devices we are making are no longer components, but systems on a single chip. The dividing line between the component and the system is rapidly disappearing."

Probst Faults Slowdown In U.S. Technology R&D

(Continued from Page 155)

Inflation was only one of several factors Probst blamed for R&D slippage. Government cutbacks in lunar exploration and slashes in R&D expenditures, convenient ways to obtain short-term savings in the national budget, have resulted in detrimental long-range effects, Probst observed.

In addition, the Accounting and Principles Board no longer allows R&D to be carried as a balance sheet item, but it must be expensed in the year spent, Probst said. "The post-Vietnam era," he added, "has shown an upswelling of sentiment against technological innovation."

Probst warned that if the current trend continues, the U.S. may fall behind other countries, particulary Japan with its strong commitment to VLSI systems. Citing recent statistics, Probst noted that the U.S. now has 25 scientists per 10,000 population while Japan is edging up with 22 for every 10,000 and West Germany with 18 for every 10,000.

Asks Policymakers' Aid

Probst called on national policymakers to assist private industry in bringing the R&D commitment back to 3% of GNP by stimulating the investment in high technology.

Special incentives such as investment tax credits for R&D and the elimination of double taxes on dividends are some advantages Probst cited as stimulants for companies to increase R&D expenditures as well as the creation of venture capital for small high technology companies.

During the various sessions, Univac researchers and managers supported Probst's emphasis on the commitment to technology. They predicted that VLSI technology will have a profound impact on the computer industry and indicated that the company was actively developing VLSI to remain competitive with Japanese manufacturers already highly committed to this technology.

The semiconductor industry is one area already impacted by VLSI, according to the group manager of semiconductor processing, who also predicted a major shakeout in the semiconductor industry.

While the end user views lower cost as the major advantage of technology, Dr. Barry Borgerson, director of research and technical planning, pointed to higher reliability and greater security as important technological advances.

However, Borgerson noted that researchers could not confidently predict the advantages of new techniques beyond a five-year period.

But it appears, from what Univac researchers said, that as more sophisticated technologies such as dialogue processing and voice recognition and response are developed and become widely available, nonprogrammers will easily be able to use systems resulting in more applications, and continued industry growth.

"National Semiconductor is crossing the Rubicon.

We are entering the computer market with a range of sophisticated system-level products.

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Charles E. Sporck
President

"I assure you, National Semiconductor did not caper into the computer market on a whim. For the past decade, we've been a leader in creating the technology that makes computers work.

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Three years ago, we introduced IBM 370-compatible add-on memory. Today, National ships more large scale 370 add-ons than anyone except IBM.

National has built add-in memories for some of the most popular minicomputer models as well.

We are now shipping our industry standard Series/80 microcomputers at the rate of 12,000 systems a year.

Two years ago, we unveiled our first IBM-compatible computer. To date, over 100 systems have been installed in ten

McDonnell Douglas Merger at Issue

Canadian Firm Still in the Air Over Data 100

By Marcia Blumenthal
CW Staff

MONTREAL — Northern Telecom Ltd., which owns 31% of Data Corp.'s outstanding common stock, still has not adopted an official position on the proposed merger of Data 100 with McDonnell Douglas Corp.

But Richard W. Wertheim, Northern Telecom's manager of investor relations, told *Computerworld* the proposed merger was discussed at some legnth during Northern Telecom's monthly board meeting here May 25, Many Data 100 shareholders have been seeking Northern Telecom's leadership in the final vote, he said, which is expected to take within 70 to 90 days.

According to Wertheim, there is no need for Northern Telecom to take a position at this time slnce there is only an agreement in principle between Data 100 and McDonnell Douglas.

Northern Telecom's final decision will be affected by whether the company considers McDonnell Douglas' stock or cash offer sufficient and by tax rulings by the Internal Revenue Service (IRS).

Asked if Northern Telecom would make a counteroffer, Wertheim replied, "Until we accept the offer, all things are possible.".

Data 100 accepted McDonnell Douglas' offer because its growth rate outstripped its ability to finance that growth, a company official said. The company said it was a very expensive process to maintain a rental base and still be able to invest in research and development, as it had in the past.

Vicious Circle

By being frequently forced to seek capital in the equity market, Data 100 had to show improved earnings in order to raise more capital. This, according to a company official, created a vicious circle and resulted in reductions in the amount of money that could be used for R&D.

McDonnell Douglas has given Data 100 the commitment to help it grow at the rate Data 100 considers desirable, the official said. The company would be run as a wholly owned subsidiary, and no changes in the current management are expected, he added.

The merger is subject to approvals by the directors and shareholders of both companies and the receipt of a favorable tax ruling by the IRS.

Data 100 said it does not anticipate any difficulty with the finalization of the merger, but noted Northern Telecom could be a threat becanse it has an option to purchase another 400,000 shares of common stock. Such a purchase would bring its holdings to two million shares, or 35% of Data 100's outstanding shares on a fully diluted basis.

Under the terms of the merger agreement, Data 100 common shareholders would be offered a choice of McDonnell Douglas nondividend-paying preferred stock or cash. The preferred stock would be offered on a one-for-one basis, convertible to McDonnell Douglas common stock at a specified rate within 12 to 24 months of the merger.

In any case, no more than 49% of the value of Data 100's common and preferred shares could be purchased by McDonnell Douglas for cash so the securities could be tax-free to shareholders electing the offer of McDonnell Douglas preferred stock.

Foreign Orders & Installations

The Gewerbedasse Bank of Berne, Switzerland, has ordered an NCR Corp. V-8550 and 31 NCR terminals.

A Univac 1100/11 valued at $3 million has been ordered by the Department of Public Health in Canton Aargau, Switzerland.

The Regional Computer Center of Aarhus University, Denmark, has ordered Disspla graphics software systems from Integrated Software Systems Corp. The system will be used for a variety of scientific and statistical programs.

A $4.6 million order for computer equipment has been awarded by the Yugoslav State Bank to Progres, the general agent in Yugoslavia for Honeywell Information Systems Italia.

Norsk Hydro of Norway has acquired three Univac systems valued at approximately $4 million from Saab Univac Norge A/S. The systems consist of an 1100/12, an 1100/11 and a 90/30.

Three French companies have acquired Univac 90/60 systems with a total value of more than $4 million. The companies are Establishments Bragard of Epinal, Metra International of Montrouge and Groupe Sud Ouest, Bordeaux.

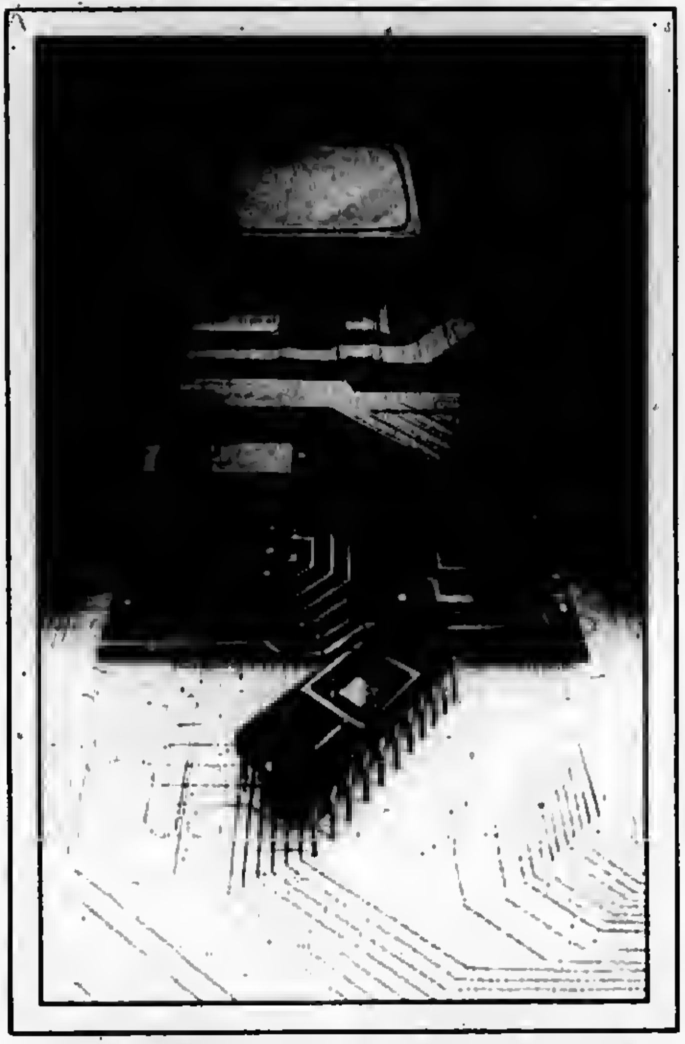
The UK has agreed in principle to acquire a one million word Cray-1 system from Cray Research, Inc. to be installed at the Ministry of Defense during 1979. The value of the system is approximately $9 million.

countries. We are now shipping more IBM-compatible computers than all other competitors combined.

I think this demonstrates that National Semiconductor has quietly, deliberately become a prime mover in computer hardware and systems. Annual computer revenues already put us in the top 15 of all U.S. general purpose computer manufacturers—and we're climbing. Certainly, we haven't come this far without being acutely aware of the market's needs.

A clear, levelheaded look.

If we had not penetrated the systems market of our own accord, technology would have eventually forced the business on us. Our semiconductor components are rapidly becoming total "systems on a chip."



But before jumping into the market altogether, we gave ourselves the luxury of a clear, levelheaded look at the terrain.

Because we have no equity in particular methodology or design, we remain free to appraise the market and develop a product that uniquely solves a problem.

And, by applying current semiconductor technology and production expertise, we deliver better performance at a lower price than other suppliers.

Just another computer?

National Semiconductor is deeply committed to applying its systems technology to real user problems. We are not interested in simply creating another different computer.

By making software-compatible hardware, we protect a customer's investment in standardized software.

At the same time, we consider it our responsibility to supply our customers with the latest in systems technology. So we'll be sparking unique product advances of our own. Particularly where a void exists in the marketplace.

For keeps.

National Semiconductor is in the computer systems business for keeps—as a broadbase supplier able to handle everything from manufacture through distribution, delivery, service and support. That's why we have an active, full-fledged service force of over 250 people set up to respond to customer needs.

We're willing to pinpoint our experience in research and development to further advance systems technology. In fact, over the next several months we'll be taking the wraps off some of the most significant new products in our history. Breakthrough products like the System/400, perhaps our most important advance in systems technology to date.

The System/400 is the first minicomputer designed to perform all the functions of large IBM computers. It means users will be able to run existing industry-standard software on a system at a fraction of the cost of a large computer.

If you'd like to know more about the future of National Semiconductor, Computer Products, or about System/400 specifically, write me personally: Charlie Sporck, President, National Semiconductor Corporation, Drawer 1, 2900 Semiconductor Drive, Santa Clara, California 95051."

Computer Products Group
National Semiconductor Corporation

Auditors Silent On Scan-Data

NORRISTOWN, Pa. — Scan-Data Corp. has reported its auditing firm, Arthur Anderson & Co., is withholding opinion on the company's 1977 financial statements until Scan-Data finalizes its business arrangements with Control Data Corp.

To date, the two corporations have only agreed in principle to enter into certain business arrangements, with CDC making a minority investment in Scan-Data. The final agreement is subject to the resolution of significant contingencies, Scan-Data said.

Scan-Data's losses of $976,000 in 1977 and $1.3 million in 1976, adverse factors affecting the company's financial position and the unsettled business arrangement with CDC were the reasons the auditing firm gave for withholding opinion.

CI Notes

Perkin-Elmer Revamps Its Data Systems Group

TINTON FALLS, N.J. — Perkin-Elmer Corp. has decentralized its Data Systems Group, assigning separate sales and marketing functions to each of the three divisions comprising the group — Interdata, Wangco and terminals.

The arrangement essentially reflects the group's organization prior to Daniel Sinnott's tenure as Data Systems Group general manager. Sinnott, who resigned suddenly May 17, has been succeeded by William W. Chorske, formerly deputy general manager of Perkin-Elmer's Instrument Group.

The centralized sales and marketing operation created what one company official called an "artificial barrier" between the company and its customers.

The company has retained a centralized sales and service division for its international market, he noted.

Siemens Claims 15% Of W. Europe Micros

MUNICH — Siemens Corp. has captured a 15% share of the western European microcomputer market, according to a spokesman.

Siemens does not market its microcomputers in the U.S. because it has licensing agreements or joint ventures with two American companies. It is a primary source for Intel Corp. and has a marketing arrangement with Advanced Micro Devices of Sunnyvale, Calif.

Siemens market researchers projected the worldwide integrated circuit market would nearly double in the next four years from about $38.5 million to about $73.1 million with the microprocessor portion expected to bounce up by more than 200%, accounting for about $9.75 million by 1981.

Customized single-chip computers will also be produced by Siemens to perform control functions in consumer products such as radio and television sets and washing machines.

Nickels & Dimes

The board of directors of **Electronic Memories and Magnetics Corp.** voted to pay a quarterly cash dividend of 25 cents a share, payable June 10, on its $1 cumulative convertible preferred stock.

$ $ $

A 42% increase in **Itel Corp.**'s regular quarterly cash dividend on its common stock was approved by the board of directors. Payable Aug. 18, the quarterly dividend is now 16 cents a share.

$ $ $

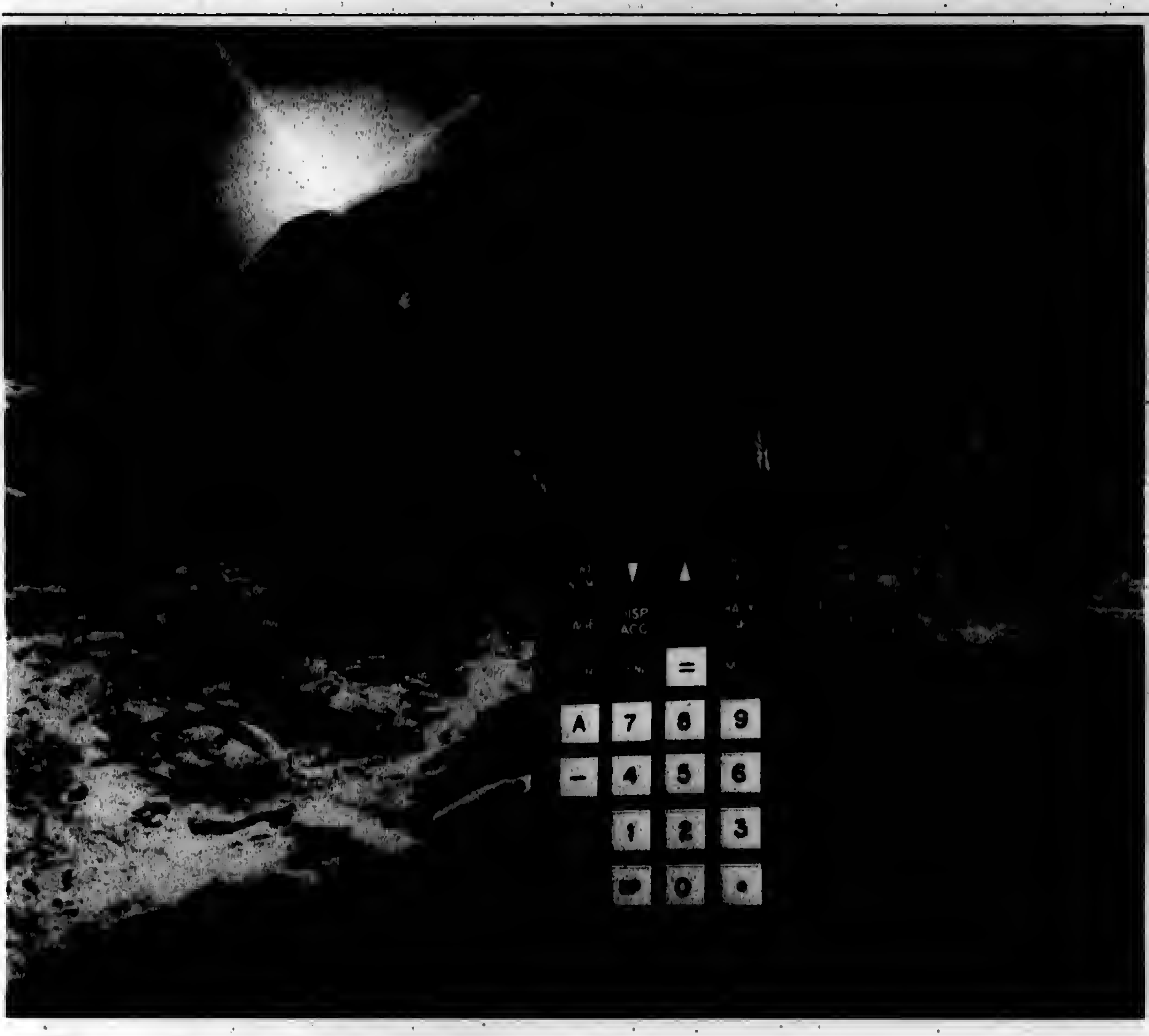
The board of **Automatic Data Processing, Inc.** voted to increase the quarterly dividend from 10 cents to 13 cents a share, payable July 1.

$ $ $

Computer Devices, Inc. has negotiated a new line of credit for up to $8 million, of which $4 million will be available from the New England Merchants National Bank of Boston for lease financing and working capital. The remainder will come from U.S. Portfolio Leasing for computer terminal leasing.

$ $ $

Network Systems Corp. has arranged for the private financing of $1.9 million from a group of venture capital firms and five private investors. The funds will be used to increase working capital and increase production of the company's Hyperchannel product line.



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Process Control Systems Seen Proving Success

WELLESLEY, Mass. — Computerized data acquisition and control systems have been successful in penetrating the process industries and improving plant efficiency, according to a recent survey released here by Venture Development Corp. (VDC).

In the next five years, the total investment in sensor-based data acquisition and control systems will more than double, topping $5 billion compared with the 1977 investment of $2.2 billion, according to VDC senior consultant Maurice Klapfish.

The industry segments with the highest system expenditures in 1977, Klapfish pointed out, were the electric power, chemical processing, pulp and paper and petroleum refining industries, accounting for 63.1% of the total investment.

Enhanced Return

In recent years, the return-on-investment for these systems has been enhanced by the prospect of saving 1% to 2% on energy and raw materials as well as a reduction in scrap, the report noted.

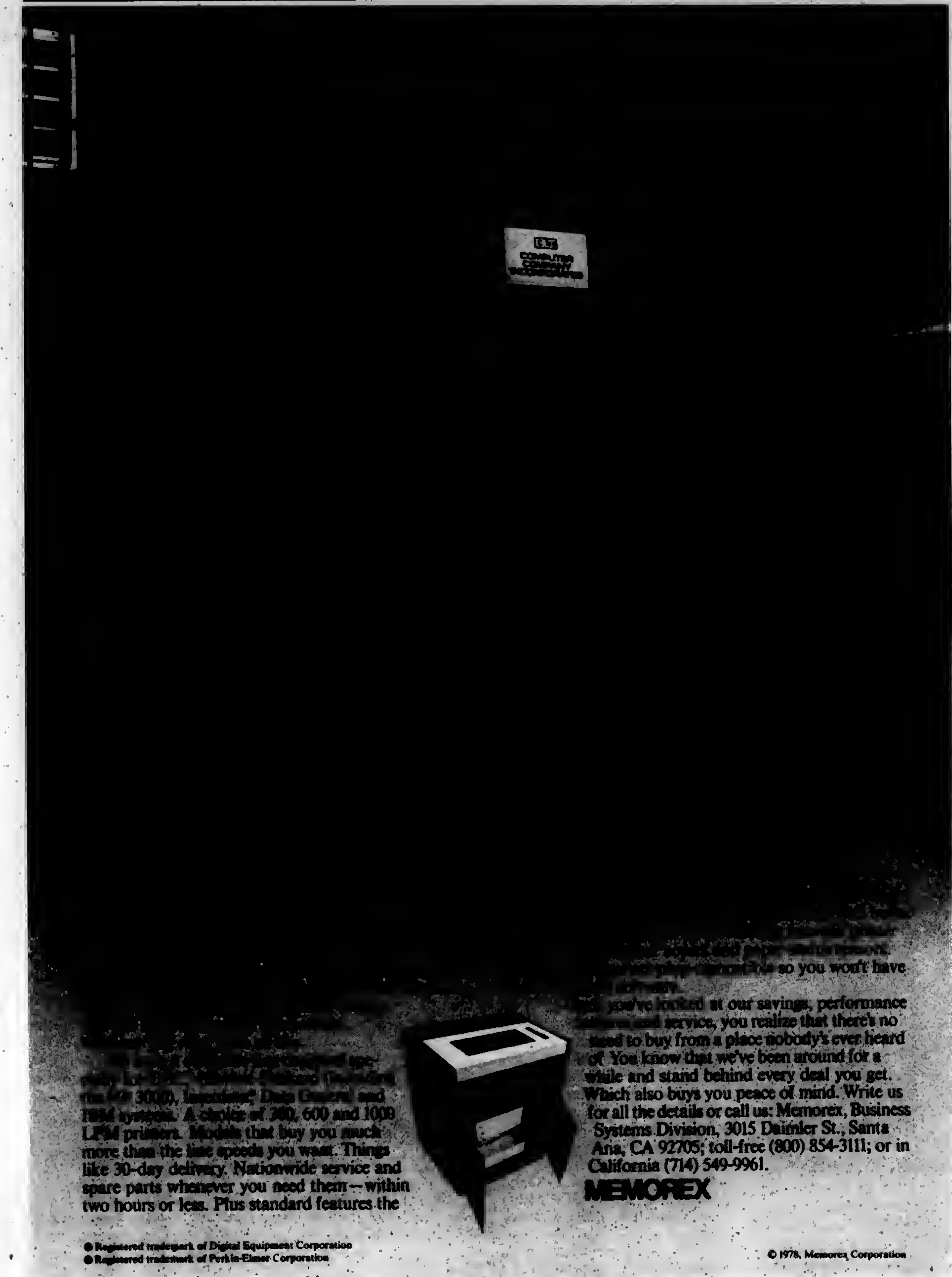
While the cost of data acquisition hardware is declining, the savings is offset by the trend toward production of larger, sophisticated systems with more sensor points and new features such as multicolor CRTs, which, according to the survey, will increase the cost of these systems.

The report, entitled "Sensor-Based Data Acquisition and Control Systems in the Process Industries," provides data on installed base, current consumption and projected installations through 1983 for each of the key process industries.

Part of a three-volume set, the report costs $1,500 and is available from VDC at One Washington Street, Wellesley, Mass. 02181.

Tymshare Affiliate Opens

Tymshare's Inc.'s Japanese affiliate, Kokusai Tymshare, Ltd., began offering services in Tokyo. Tymshare also reported that Bernard Goldstein, senior vice-president and board member, has resigned as of May 18.



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Sees Annual Sales Jumping 35%

PCC: DDP Growing Faster Than Anticipated

SAN FRANCISCO — Distributed data processing (DDP) is growing far faster than industry experts anticipated and by 1988 will eventually represent half of the total hardware dollars spent on DP in the U.S., Allen Lay, senior vice-president of Pertec Computer Corp. (PCC), recently predicted.

Speaking at the American Institute of Industrial Engineers' conference here, Lay said. "companies which are supplying the products for DDP systems are coming from a host of directions, each with a different strength. The minicomputer people stress hardware flexibility. The terminal and remote job entry people stress communications and networking capability. Data entry producers stress system flexibility and operator-oriented turnkey software."

Hardware Expenditures

Expenditures for DDP hardware are expected to increase at the rate of 35% per year, about double the growth rate of the total DP market, Lay observed.

The demand for DDP is coming from users — not manufacturers — and being propelled by advertising and education, the PCC executive noted. The general population is now familiar with the use of computers through reservation systems, bank teller stations and retail point-of-sale equipment.

Growing familiarity with computers and the acceleration of technology which makes such systems more economical and efficient are both contributing to the earlier-than-expected growth of DDP, Lay indicated.

The technologies under development today, assure a steady stream of new hardware offerings in the future. During the next five years, Lay predicted users will seek more variations in terminals and substations and a wider range of compatible products that exhibit more modularity.

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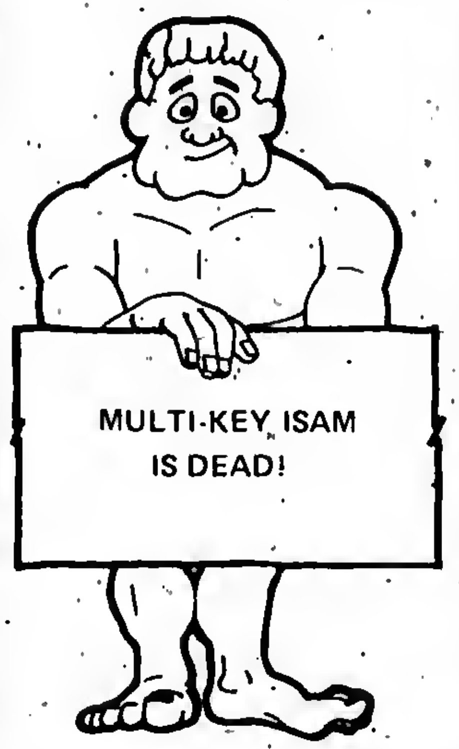

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Contracts

Raytheon Data Systems Co. has been awarded a contract to install more than 200 PTS-100 terminals for the Safeco Insurance Companies. The contract is valued at close to $1 million.

Bunker Ramo Corp. has received a $927,000 contract from the Air Force Electronic Systems Division's Spacetrack System Program Office for equipment to record and store data on all man-made objects orbiting the earth.

Datatrol, Inc. has received orders totalling more than $3,344,000 for two retail point-of-sale terminal systems and six retail credit authorization systems.

General Robotics Corp. has signed a one-year, $1.2 million contract to supply systems to Computerservices Division International of Breda, Holland.

Burroughs Corp. has received an order valued at $18 million for the purchase of 3,500 modular transaction control systems to be installed by the UK's Trustee Savings Bank Computer Services, Ltd.

Integrated Software Systems Corp. has been awarded a contract from the Regional Environmental Assessment Program, Bismarck, N. Dakota, for its Disspla computer graphics software system.

Univac has been awarded a contract for a large-scale system by the headquarters of the National Oceanic and Atmospheric Administration in Rockville, Md. The contract is valued at more than $9 million for the Univac 1100/42 system, which will be enlarged to an 1100/43 in the second year of the contract.

Microdata Corp. has received an order for approximately $3.5 million from Display Data Corp. In addition, Microdata and Display Data have entered into a license agreement for Display Data to manufacture the 1600/30 system in which Microdata will receive royalties over the next several years.

Raytheon Co. has received a $3.5 million Army contract for Patriot antiaircraft missile test facilities.

Computer Sciences Corp. has received a follow-on contract from the Naval Air Development Center, Warminster, Pa., for engineering, analysis and related services support. The one-year, $2.9 million contract contains options for two one-year extensions and is valued at $9.4 million over the full three-year period.

Computer Devices, Inc. has signed a multiyear, 3,000-unit OEM printer contract with National Semiconductor Corp.

Zentec Corp. has received a 500-unit order for its ZMS50 intelligent terminal from Dymo Graphic Systems. These units will be utilized as reporter terminals for newsroom entry of stories.

ATO Systems Management Group has been selected by Honeywell Information Systems, Inc. to create a software system to meet the management information requirements of a major Honeywell client, Fairchild Republic Co. The contract is valued at approximately $2 million.

Orders & Installations

Volume Shoe Corp. has ordered electronic point-of-sale equipment from NCR Corp. valued at approximately $3 million. The equipment includes 600 NCR 2140 electronic cash registers as well as associated communications and computer equipment.

Laker Airways has ordered a System Ten 220 from ICL, Inc. to be installed at Laker's Rego Park, N.Y., Travel Center with terminals at Kennedy and Los Angeles International airports. It will handle ticketing and passenger listings for the airline.

The Beckley Candy Co., a nationwide wholesaler of school supplies, has ordered four Honeywell Information Systems, Inc. Level 6 minicomputers to expedite order entry. The total value of the minicomputers is $120,000.

The Land Bank National Data Processing Center of Omaha, Neb., has installed a Burroughs B4800 system. The system and peripheral equipment is valued at $900,000.

Pepsi-Cola Bottling Co. of Omaha, Neb., has ordered a Univac 90/25 system.

The County of Delaware, Pa., has installed a Burroughs B800 system and a B4800 system in the courthouse, located in Media, Pa.

Neapco, Inc., a Pennsylvania manufacturer of power transmission equipment, has installed a Univac 90/30 system for manufacturing control, order entry and financial applications.

University Computing Co. has expanded its IBM services with the installation of an IBM 370/158 in its Dallas computing center.

ICL, Inc. has won an order for a 2903 system with the Federation of American Societies for Experimental Biology based in Washington, D.C.

First National Bank of San Jose, Calif., has leased an Amdahl Corp. 470 system to Chrysler Corp.'s Parts and Supply Division. The cost of the system was $3,249,000.

McDonald Products of Buffalo, N.Y., has ordered a Univac 90/30 system to expedite the firm's business operations.

Precision Systems, a St. Louis computer service bureau and systems house, has ordered 20 Honeywell Level 6 minicomputers.

The University of Rhode Island at Kingston has installed CLSI's Libs 100 system for automated circulation control in its library.

Pertec Reprimands Tally For 'Unwise Legal Actions'

CHICAGO – The management of Pertec Computer Corp. (PCC) has suggested that Tally Corp.'s board of directors and management focus their attention on day-to-day operations rather than on what it termed "unwise and unfounded legal actions."

Speaking at Tally's annual shareholders meeting here recently, PCC's senior vice-president, B. Allen Lay, said the Tally board probably overreacted in initiating a lawsuit alleging security violations after PCC, which holds about 16% of Tally's common stock, submitted an offer to combine the two companies in exchange for common stock.

The Tally suit resulted in ACP, Inc., a wholly owned subsidiary of PCC, filing a claim for damages and a derivative action in the Federal District Court of Seattle, Wash.

ACP's suit charges Tally failed to disclose that a 10 cents a share extraordinary dividend declared March 17 jeopardized its working capital position, necessitating borrowing and incurring interest which would not have been required if the dividend had not been approved.

As a result of PCC's concern for the financial performance of Tally, Dann V. Angeloff, a Los Angeles-based financial advisor previously nominated by ACP, was elected during the annual meeting to serve on Tally's board.

Lay called on Tally to reconsider the dividend and added, "It is clear at this time that PCC will not reinstate its recent offer for the balance of the Tally shares."

Financial News

Printronix Milestone

Mel Posin (left), senior vice-president for marketing, and Robert Kleist, president of Printronix, Inc., congratulate each other as the 5,000th Printronix printer rolls off the assembly line at the Irvine, Calif. plant. The company, which manufactures 150- and 300 line/min raster matrix impact printers, plans to introduce a 600 line/min model at the National Computer Conference this week.

Revenues Grow 28% at Data 100

MINNEAPOLIS – Data 100 Corp. reported revenues of $36.9 million for the first quarter, a 28% increase over the $28.9 million reported in the same period a year ago.

Earnings reached $1.4 million or 22 cents a share compared with $1.2 million or 27 cents a share in the year-ago quarter.

The reduced earnings per share for the first quarter reflected an increase of three million shares in the number of common shares outstanding, the firm said.

Edward D. Orenstein, president of Data 100, noted rental revenues increased by 12% and service revenues climbed 39% compared with the same period a year ago.

First-quarter expenses reflected a 40% increase in research and development expenditures.

Modcomp Posts Tripled Earnings

FORT LAUDERDALE, Fla. – Modular Computer Systems, Inc. (Modcomp) tripled its net income for the first quarter.

Earnings topped $1.1 million or 32 cents a share on revenues of $14.7 million compared with year-ago first-quarter earnings of $343,000 or 11 cents a share on revenues of $12.2 million.

Commenting on the tripled earnings, A.W. Giles Jr., senior vice-president of finance, pointed to several strategies the firm instituted to improve profits, including raising prices; screening customer orders more closely; reorganizing and streamlining the management structure; reducing the costs of manufacturing; and terminating Modcomp Business Systems, a money-losing subsidiary.

Output today.... Outgrown tomorrow!

The technology of computer output equipment is changing — and fast. Where there were once only punched cards and paper, there are now a wide range of devices designed to expedite the output process. *Computerworld* will be taking a close look at these and other related topics in our June 26th Supplement entitled: *Computer Output Equipment*.

Edited by Tim Scannell, *Computer Output Equipment* will be focusing on ways to cut output costs, with tutorial and applications stories on the latest equipment and systems, including:

- Off line printers
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Burroughs Corp. technicians work with machine that enables them to deposit a layer of conductive metal .00004 in. thick on a wafer of silicon. Used on Burroughs' B6800 computers, these memory circuits, no bigger than an aspirin tablet, contain 100 times more components than the circuitry in a television set..

Executive Corner

- Robert Freischlag has been appointed to the newly created position of vice-president, marketing, at Fujitsu America, Inc.
- Geno P. Tolari has been named vice-president, government operations, for Informatics, Inc.'s PMI Western division.
- Roy C. Wood has been promoted to vice-president of education and documentation for Software AG of North America.
- Augustus R. Wagner has been appointed to the post of assistant vice-president of systems for Electronic Tabulating Corp.
- Robert H. Raquet has been elected vice-president, operations, at Decision Data Computer Corp.
- Joseph G. Degen has been elected secretary by the board of Datapoint Corp. Degen is senior vice-president, finance. Also at Datapoint, Thomas J. Howard has been named to the corporate staff position of director, corporate development.
- Donald D. Pagan has been promoted to the new position of vice-president and general manager, customer services division, at Microdata Corp.
- Peter S. Linder has been elected president and a director of newly formed American Interactive, Inc.
- Frederick P. Schmidt has been named a division vice-president at Fairchild Camera and Instrument Corp.
- Gerald F. Olsen has been named vice-president, finance, for Switchcraft, Inc. of Chicago.
- Lee W. Spitler has been elected an executive vice-president of Charter New York Corp.
- Richard A. Malsbary has been appointed manager of micrographics products for Datagraphix, Inc.
- Gary M. Cowles has been appointed staff vice-president and marketing director of General Dynamics Communications Co.
- Dr. Paul V. Daverio has been appointed vice-president, management information systems, at Owens-Corning Fiberglass Corp.
- Steve Frankel has been promoted to vice-president of engineering at Computer Transmission Corp.
- Henry Arnold III has been named vice-president of engineering and manufacturing by Warrex Computer Corp. of Dallas.
- J.C. Matlock Jr. has been promoted to senior vice-president of Data Processing Security, Inc. of Hurst, Texas.
- Richard H. Ericson has been promoted to the new position of vice-president, supplies group, at Dataproducts Corp.
- Richard B. Smith has joined American Satellite Corp. as vice-president for specialized network sales.
- John Clark has been promoted to president of Itel Corp.'s data products group and elected a vice-president of the parent corporation.
- Thomas Allen has been appointed vice-president, sales, for Xerox Computer Services.
- Eugene Feather has joined Vector Development, Inc. as vice-president, computer systems.
- Charles von Urff has been appointed vice-president and general manager of the newly formed data communications division of Western Digital Corp.
- Norman W. Paurus has been named vice-president of resource operations for the engineering services organization of Control Data Corp.
- Frank McEntee has been appointed vice-president of manufacturing at Diva, Inc.
- Samuel L. Shanaman has been appointed vice-president and controller at Nixdorf Computer Corp.
- Anthony J. Comazzi, Michael D. Radice and Jules M. Seshens have been appointed to newly created vice-presidential positions at Comshare.
- Rudolph R. Menna has been named senior vice-president and group executive of Data Dimensions, Inc.'s equipment group. Kenneth E. Wortz succeeds Menna as president of the division. Named controller was Gary L. Leeds.

Now Computerworld can take you down under

As of July, the world will have a new *Computerworld*. *Australasian Computerworld* will become the newsweekly for the computer communities of Australia, New Zealand, New Guinea, Phillipines, Thailand, Indonesia, Singapore and other Pacific Ocean countries.

Taken together, these countries comprise a large and growing EDP market, ranking approximately 9th in the world in value of general purpose computer systems, according to figures from International Data Corporation — the world's leading EDP market research firm. And they are major importers of US-made computer products. Australia alone, according to US Commerce Department figures, will be spending over $400 million on US computer equipment by 1980.

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We invite you to become a charter advertiser in *Australasian Computerworld*, and we'll be glad to give you more details. Just give us a call or send in the coupon. And don't forget our other international sister publications. We'll be happy to give you information on any of them, as well. Here's the list of all our computer publications.

COUNTRY	WORLD RANK (by value of computers)	PUBLICATION[S]
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JAPAN	2	*Shukan Computer*
GERMANY	3	*Computerwoche*
UNITED KINGDOM	4	*Computer Management*
FRANCE	5	*Zero-Un Informatique*
ITALY	8	*EDP Notizie* *Sistemi E Automazione*
AUSTRALIA	9	*Australasian Computerworld*
BRAZIL	17	*Data News*

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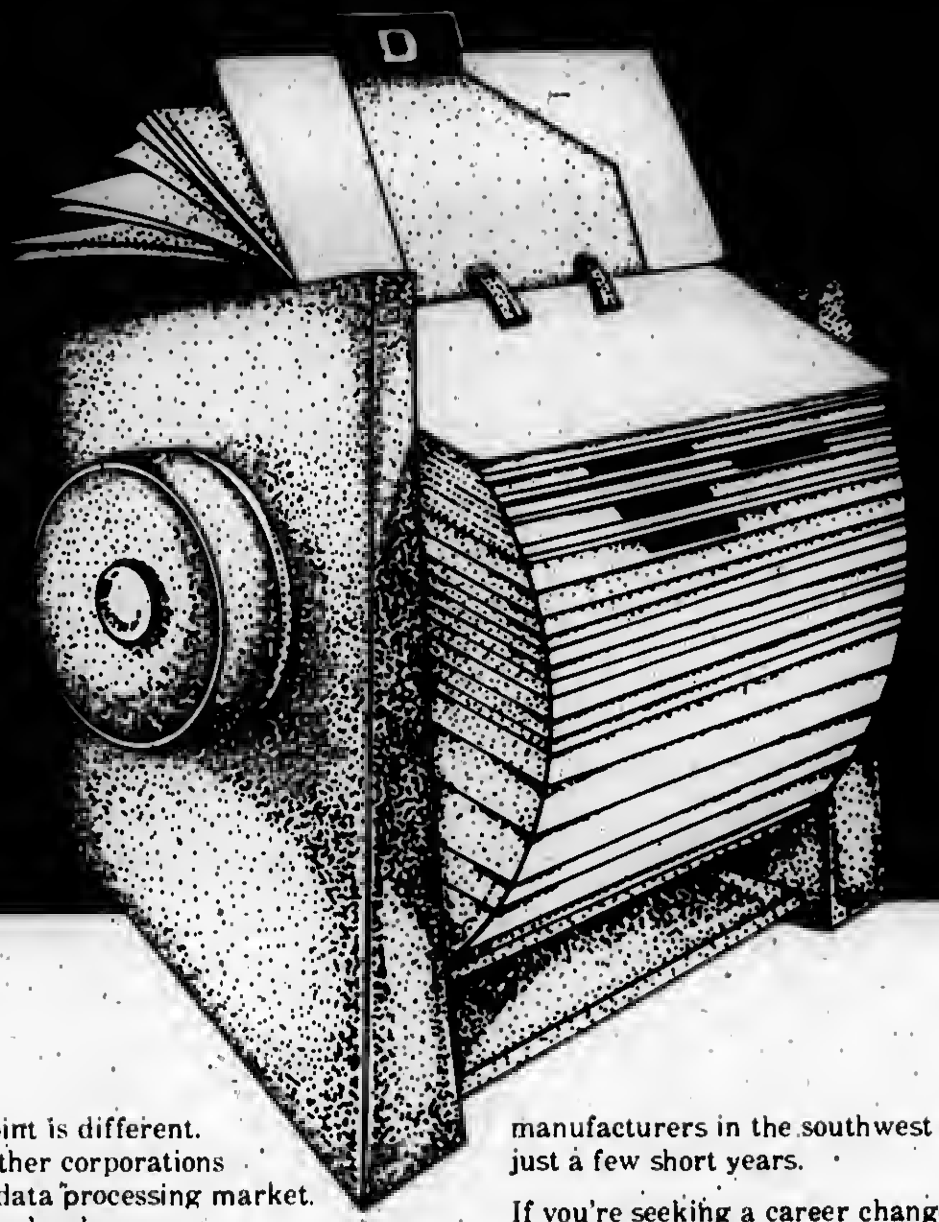

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Amdahl Corporation
5454 Wisconsin Ave., Suite 825
Washington, D.C. 20015
Or call collect
301/657-8200

We are an equal opportunity employer.

FIELD SYSTEMS PROGRAMMERS

We seek Systems Analysts, Systems Programmers or Program Support Representatives to be responsible for maintaining Amdahl's excellent reputation in supporting our customers' complex software control systems.

You will be the Amdahl interface to 470V system customers in all software-related functions. You have MVS internals experience and, preferably, additional experience with one of the following:

- **IMS**
- **JES2 or JES3**
- **TSO/TCAM/VTAM**
- **VM**

In addition, you have the ability to read dumps and write code to resolve system problems. Please indicate 820-E on your response.

FIELD ENGINEERS

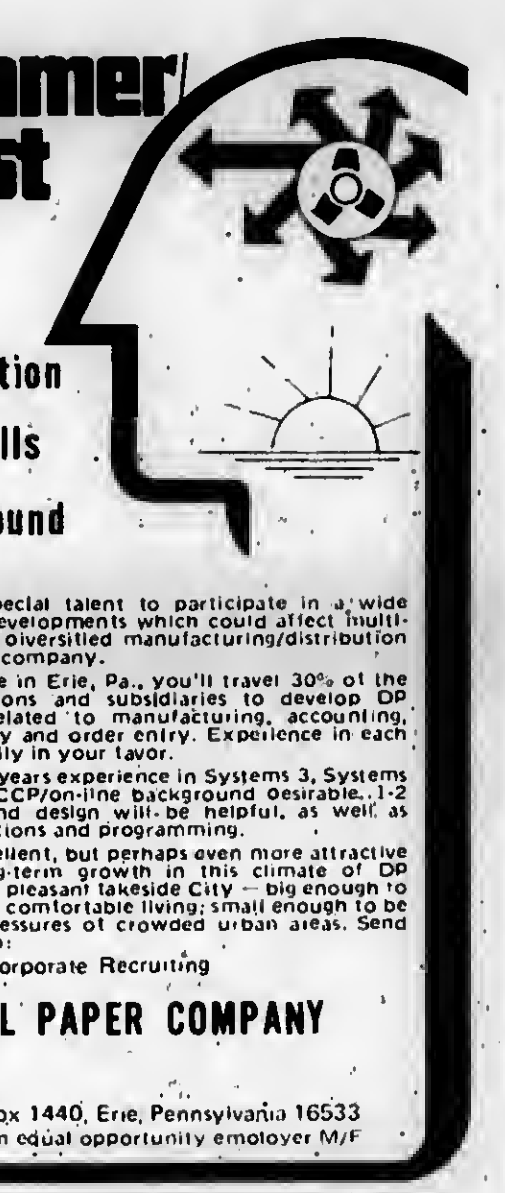
You will carry the Amdahl philosophy of customer service as well as your expertise into the field to aid the customer in restoring computer center operations regardless of the origin of the failure. You will have the opportunity to utilize your initiative and talents in the following areas:

- **Installation Planning & Implementation**
- **Problem Determination & Resolution**
- **Preventive/Periodic Maintenance**
- **Engineering Change/Update**
- **Account Management**

You have large systems hardware experience, preferably on compatible equipment. Please indicate 820-E on your response.

amdahl

Programmer/ Analyst



use your imagination
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Unique opportunity for special talent to participate in a wide variety of applications and developments which could affect multiple EDP facilities in national diversified manufacturing/distribution operations of this progressive company.

From our headquarters base in Erie, Pa., you'll travel 30% of the time through various divisions and subsidiaries to develop DP procedures and software related to manufacturing, accounting, production control, inventory and order entry. Experience in each of these areas will weigh heavily in your favor.

Overall, you must have 3-5 years experience in Systems 3, Systems 32 and RPG programming. CCP/on-line background desirable. 1-2 years in systems analysis and design will be helpful, as well as familiarity with 3790 applications and programming.

Salary and benefits are excellent, but perhaps even more attractive is the opportunity for long-term growth in this climate of DP expansion. We're located in a pleasant lakeside City — big enough to have everything important to comfortable living; small enough to be free of the pollution and pressures of crowded urban areas. Send your resume in confidence, to:

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MAIN

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has immediate openings in the Data Processing Department. Our environment is a mixture of Engineering/Scientific and Business applications. Hardware is an IBM 370/148. Software support includes VM/370-CMS, OS/VS1, CICS/VS, Panvalet Batch/Online and various other software packages.

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SENIOR SYSTEMS SOFTWARE PROGRAMMER

This position requires hands on knowledge and prior responsibility with large scale equipment. Minimum of 3 years experience.

SYSTEMS PROGRAMMER

This position requires system software programmer with minimum of 2 years experience.

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Responsible for performing systems analysis and programming assignments with minimum technical direction. Requires 2 to 4 years experience in information systems and analysis techniques.

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Variety of business applications. Must have a minimum of 2 years experience using Cobol.

You will earn an excellent salary and participate in a wide range of employer-paid benefits.

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A benefit plan comparable to the best and a salary commensurate with qualifications and experience can be expected. Their objective is to expand present staff with people qualified to excel in an environment which includes the following features:

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- **360/40 DOS 384K**
- Power/VS with RJE
- **CICS/VS**
- **SPM II**
- **Assembler, VS COBOL, RPG II**

Opportunity sufficient to challenge your skills

Experienced (insurance a plus) Systems Programmers, Systems Analysts and Software Specialists are invited to send resume, including salary history, in confidence to:

Charles Carter
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Kansas City, MO 64142
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(anticipated vacancy
for Fall 1978)
INSTRUCTOR OR
ASSISTANT PROFESSOR

Must have at least five years business programming and/or teaching experience. Knowledge of DS/JCL, COBOL and BAL. (PL/1 and FORTRAN a plus). Minimum of Masters Degree.

Reply to:
Prof. Donald Davidson
LaGuardia Community College
31-10 Thomson Avenue
Long Island City, N.Y. 11101

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$15,000-$17,000. Requires three years of programming experience with knowledge of COBOL, IBM DOS and assembly language.

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Requires TTL and/or ECL experience.

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5 years experience in digital communications design and development.

POWER DESIGN ENGINEERS
Experience in design of power supplies and power controls for digital computer systems. Familiarity with state-of-the-art switching, regulator and converter designs.

CIRCUIT DESIGN ENGINEERS
Design of digital and analog circuits or RF design.

TEST EQUIPMENT DESIGN ENGINEERS
BSEE with test equipment design experience. BTTE/ATTE.

MANUFACTURING ENGINEERS
Experience in process development and control for high volume production. Emphasis in printed circuit board fabrication.

MICROCODERS
Minimum 1 year experience in digital logic design.

STANDARDS ENGINEERS
Experience in electrical standards and safety.

CHEMISTS/CHEMICAL ENGINEERS
Experience in chemical plating processes for precision printed circuit boards.

SYSTEMS PROGRAMMERS
Experience in peripheral devices, operating systems, net working and redundant systems, communications systems and language development.

FIRMWARE ENGINEERS
BSEE or Computer Science for product definition for terminal equipment. Experience necessary in hardware and software related to on-line terminal systems.

Call our Employment Department at 1-800-453-4534.
If not convenient to call, please send your resume to:
Employment Department,

SPERRY UNIVAC

General Systems Division
322 North 2200 West, Salt Lake City, Utah 84116

SPERRY UNIVAC
Roseville, Minnesota

Sperry Univac's Roseville operations is the focal point for the design, development and manufacture of Univac's large scale general purpose computer systems. We compete successfully in the world market and have enjoyed a consistent 15% annual growth rate for the past several years.

The acceptance of our recently announced 90/80 and 1100/80 systems is far exceeding expectations. And further establishes without question, our position as an international leader in data processing systems. Our latest processors rival the 3033 and the V7 in speed. We are deeply involved in some sub-nanosecond logic and VLSI technology. Software efforts include the design of advance 1100 series operating systems, language processors, and the new peripheral sub-systems.

ELECTRICAL ENGINEERS
System and component clock design for the next generation systems. Experience in circuit design, escalator, clock systems. Will work with CAD mechanical design and logic design groups.
Plan, supervise and coordinate LSI design projects. Bipolar and MOS experience highly desirable.

LOGICIANS
Microcode design at algorithm (definition) level. Refine micro-instruction set, micro-sequence, micro-store size, and word length. Experience in definition and design of a unit implementing micro-coded architecture.
I/O Logic Design, plus simulation and check out of prototype. Background in logic design either at I/O channel or control unit is desirable.

AUTOMATED DESIGN ENGINEERS
Develop techniques and install design aids to reduce design time and improve quality of LSI efforts.
Define, develop and test CAD software as applied to layout and test of hardware.
Study and recommend hardware design features to enhance test ability and fault isolation.
Design and implement test programs.
Definition and logic design implementation and engineering tests of CPU components such as instruction processors, I/O units and high speed buffers. Knowledge of hardware/software organization, SSI/MSI/LSI implementation and micro-programming.

COMPONENT ENGINEER
Interfaces with TC vendors and design groups regarding component development and applications. Selects and tests components, advising on circuits, applications, failure modes, reliability and costs.

ELECTRICAL ENGINEER
Definition, design and development of large scale memory sub-systems. Experience with large, high performance semiconductor main memory systems.

SYSTEMS PROGRAMMER
Design, develop and test advanced 1100 series operating systems for current and unannouced products. Background in executive development desirable, preferably on large scale general purpose mainframes.

If you are unable to attend the Conference,
please send your resume to:
Employment Department, MS 4973.

SPERRY UNIVAC

Development and Manufacturing
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MINI-COMPUTER OPERATIONS
Irvine, California

Sperry Univac has immediate professional positions available for select individuals directly involved with mini-computer development. A position with Sperry Univac offers not only technical responsibility, but the opportunity to grow with it.

COMPUTER DEVELOPMENT
Design high performance micro-programmed mini-computers; design high performance arithmetic processors; participate in the development of advanced computer architectures; design and check out intelligent I/O processors.

DATA COMMUNICATIONS
Develop intelligent data communications processors; develop advanced data communications controllers for new systems; design hardware for asynchronous and synchronous protocols (BSC, SDLC, UDLC, HDLC).

PERIPHERIAL CONTROLLER
Design and test high performance low cost micro-programmed controllers, microprocessors and floppy disc development; evaluate and select low cost and secondary storage peripherals; define advanced I/O architectures.

DESIGN
Software and hardware design engineers with BSEE or equivalent and 5 years experience in logic design; assignments will be to both new and existing product lines.

QUALITY
Degree in electronics or computer science or 2-5 years quality experience in computer program development and/or software development. Qualified candidates must be able to perform effectively in at least one of the following areas: computer software quality assurance, product evaluation/reliability, or vendor support/electronic components.

TEST
At least 3 years experience in data processing industry, with one or more of the following: preparing test plans and procedures, working experience with hardware and programming, design and development of automated test equipment, or technician training. Knowledgeable in new product and hardware design, competence in new product design test capability. BSEE preferred, not mandatory.

DATA COMMUNICATIONS DEVELOPMENT ANALYSTS AND PRE-SALES SUPPORT
Design software and be responsible for the implementation of asynchronous and synchronous protocols. Design transaction oriented systems, Distributive Communications Architecture, and front-end processors. Project Manager opportunities. Direct assembly and language experience required. Estimate time and cost of Data Communications software for customers. Evaluate customer software RFQ/ RFP's, design creative solutions for customer's needs, and provide state-of-the-art technical leadership.

HIGH LEVEL LANGUAGE
Pascal or Algol programming; Fortran compiler development; data base access/Query; project management.

DIAGNOSTICS
Individuals will be members of hardware/software design team involved in mini-computer test systems development. Positions will include project responsibility for all phases of assembly language and microprogramming language implemented programs and development of system level testing and fault-isolation software.

SPECIAL SOFTWARE
Provide real-time systems programming, special interfaces/device drivers, diagnostic hardware/software, project control, cost estimates and assembler languages.

CUSTOM APPLICATIONS
Position responsibilities include industrial automation, distributed processing networks, assembly and high level language, on-line transaction systems, Data Base Management Systems, proposal writing, specifications design and project management.

OPERATING SYSTEMS
Design and development of data communications software for operating systems development, DBMS design/implementation, use of DBMS in distributed environments, on-line teleprocessing and line and network protocols.

If you are unable to attend the Conference, please submit your resume to Employment:

SPERRY UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive, Irvine, California 92713

Each of the above divisions will be represented at the National Computer Conference. Visit us at the Rip Van Winkle Inn, 301 W. Katella, Anaheim, or call 714/776-6210 and leave a message where you may be reached.

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NCC Attendees

There's room at the top.

Digital is looking for ambitious computer pros who want to move up fast. Because we're a billion and a half dollar company that's growing bigger all the time, you'll get the chance to move up faster than you would anywhere else. And because we're growing all over the country, chances are you'll be able to move up anywhere you want.

Compare your company's growth and potential with Digital's. You'll see there's a lot more room at the top with us.

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As a sales rep at Digital, your career can move up into management, or senior levels of selling. Or into marketing. Manufacturing. Product development. Anything. What you need is sales experience or a computer/technical background in hardware or software and the drive to succeed.

Field Engineers

If you've gone as far as you can with your present company and are looking for more room to grow, Digital is the company for you. We're looking for pros with experience in preventive and corrective maintainance with any digital processor and peripheral system, and a solid electronics background.

Software Specialists

Digital is looking for the best software people in the country. If you're one of them you'll also need experience in at least one of these areas: real time; event-driven applications; operating system design and modifications; business application design; RSX-11, RSTS/E, Tops 10, Assembly, or Fortran.

If you're going to the N.C.C. in Anaheim call one of the numbers below to arrange a meeting with us at the Digital Suite in the Disneyland Hotel. You'll find out why our customers aren't the only ones that get the best deal.

Call **(800) 225-9228** (in Mass. call (617) 493-2721). Between June 3 and June 8 call **(714) 778-6600 at the** Disneyland Hotel.

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Join a dynamic department with an established program in which 115 majors are currently enrolled. Two positions open for persons qualified in appropriate software areas: Applications welcomed from computer science doctoral candidates who wish to conduct a doctoral research project on the job. Salary from $13,000 to $21,000 for 9 months depending on qualifications and rank. Send resume or phone (218-236-2603) to Martin Hololen, Chairman of Search Committee, Moorhead State University, Moorhead, Minnesota 56560. Moorhead State University is an equal opportunity/affirmative action employer and is in compliance with Title IX of the education amendments of 1972.

UNIVERSITY OF WISCONSIN RIVER FALLS

FACULTY POSITION SYSTEMS PROGRAMMER

Assistent Professor: Beginning September. Applicants should have strong interest and capability to teach full and lower level mathematics courses and assist in implementation of a new major in Applied Computer Systems. Ph.D. in computer science or closely related field required. Preference given to experience in business data processing or computer hardware.

Systems Programmer: Responsible for systems programming and development of major applications systems. Provide assistance for faculty and students. BS in Computer Science or related field and experience with statistics and SPSS. Knowledge of BASIC, FORTRAN, COBOL and operations experience desirable.

Send resumes and inquiries to:

Dr. David L. Feinstein
Department of Mathematics/
Computer Science

University of Wisconsin-River Falls
River Falls, Wisconsin 54022

Deadline for applications is June. 14.

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Professional Career Development, Inc.

Data Processing Division

PROGRAMMERS

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Immediate opening for an instructor with experience in at least two of the following areas: business systems analysis, programming languages (COBOL or Fortran or RPG), basic computer introductory courses, and computer math. Minimum requirements prefer B.S. in Computer Science or related field but would consider experienced person. Salary open.

Deadline for applications June 8, 1978.

Submit current vita and confidential folder to:

North Central
Technical College
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Mansfield, Ohio 44901.
Attn: Joe Bademy

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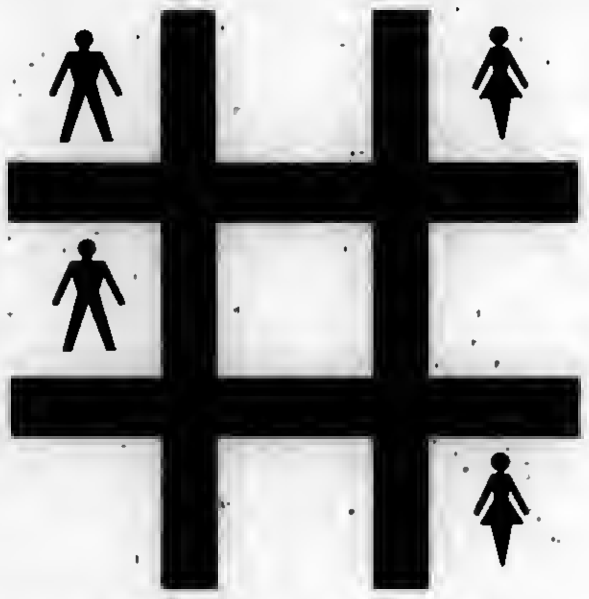

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WHO ARE WE?

Ford Aerospace & Communications Corporation, Western Development Laboratories Division, is one of the San Francisco Bay Area's fastest growing software systems developers. In response to this growth, WDL established a Software Engineering Directorate, reporting to the General Manager of WDL, with laboratory-wide responsibility to:

- ★ establish software policies, standards and procedures
- ★ develop long-range software technology, tools, and programming aids for general use
- ★ establish and enforce a software inspection and quality control system
- ★ establish a system of design and proposal reviews for software-intensive programs
- ★ provide software support to other WDL operations

The new Software Engineering Directorate complements our software efforts based in the Communications Products, Data Systems, Satellite Communications and Special Programs Organizations.

WHAT IS OUR TECHNOLOGY?

We're meeting our objectives through a strong program that blends IR&D, contracts, and internal projects. Our current high-technology contracts include:

- ★ secure minicomputer operating systems development
- ★ distributed data-base studies
- ★ computer network architecture studies

What technology is important to WDL? Here are the areas to which we are committing significant resources:

UNIX-based software engineering
- —PWB/UNIX
- —Development support systems
- —Software development tools
- —Specification languages

Reliable systems technology
- —Formal specification and program verification
- —Secure computer systems
- —Test and validation

Distributed systems technology
- —Data base management systems
- —Real-time data collection/synthesis
- —Local network architectures
- —Network protocols (NCP—TCP, EtherNet)
- —1 to 200 MBPS bandwidth

Operating systems architecture
- —Capability-based systems
- —Network systems (micro, mini, midi, maxi)

WHAT JOBS DO WE HAVE?

Systems Development Programmer
As part of a development team, you will be responsible for implementing a secure mini-computer based operating system from mathematically proven formal specifications. The programming language will be EUCLID running in a PWB/UNIX environment.

Operating Systems Designer
You will draw upon your experience with several operating systems, your academic training, and your ability to conceptualize and communicate in order to design and specify a new class of operating system. You will learn to express your design in a formal specification language and to subject your specifications to rigorous analysis.

Software Test Specialist
You will break new ground in design of test methods for provably secure systems. Using your familiarity with modern software testing methodologies, you will interact with the systems design team. As a result, you will become familiar with formal mathematical specification techniques.

Software Toolsmith
You will work in a PWB/UNIX environment to create tools to make the software development process more exact and less error-prone. An excellent position for growth in software technology.

Network Systems Specialist
You will be involved in development of high-bandwidth local computer networks. This effort will require you to apply your knowledge of current experience and research in network protocols, network architecture, and hardware.

Software QA Specialists
You will use your knowledge of MIL-S-52779 and modern software QA systems to develop and apply WDL-wide software QA methodologies. Knowledge of modern systems development practices and high level systems programming languages is also required.

The Problem Solver
If you're one of those especially talented individuals who relishes the challenge of solving complex problems at the forefront of the computer technology areas we discuss in this ad, we would like to discuss your interests with you. We always have openings for EXCEPTIONAL people.

Special Projects
We are seeking all levels of software experience in the design and development of large scale real-time communications systems. In our operation, you may apply and expand your skills in real-time operating systems, distributed processing, signal processing, data base management, operator-machine interface and hardware control. You will use your knowledge of state-of-the-art technology to solve challenging classified problems.

If you have a BS, MS, PhD or equivalent related experience in one or more of the technology areas we've discussed, and if you qualify for the WDL software team, you will receive the professional recognition you deserve, excellent compensation, and one of the best fringe benefits packages in the industry.

WHAT CAN YOU DO TO JOIN OUR TEAM?

If you are attending the NCC and would like a personal interview with one of our Software Managers, please call collect (415) 494-7400, Ext. 6601, 6602, 6603, 4016.

If unable to call, please send resume with salary history/requirements to
Professional Employment, Department PF-55.

Ford Ford Aerospace & Communications Corporation
Western Development Laboratories Division
3939 Fabian Way, Palo Alto, California 94303
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CAREER OPPORTUNITIES AVAILABLE

We are an established package software company located in northern Indiana, 90 minutes from Chicago. Our rapid growth has created several attractive career opportunities for the right people. We offer a friendly small town lifestyle with outstanding recreational facilities available for tennis, golf, fishing, boating and numerous winter sports. We are a progressive, people-oriented organization. The positions offer excellent salaries, good benefits, flexible working hours, and exceptional advancement opportunities. Openings currently exist in:

Programming - We have several openings at varying levels. Requirements range from 0-6 years experience. Knowledge of PDP-11's, RSTS/E, BASIC-PLUS and/or accounting applications desirable. Degree a plus.

For immediate consideration, please send your resume, with salary history, references and requirements to Mr. Al Chesser, PLYCOM Services, Inc., P.O. Box 160, Plymouth, IN 46563.

Plycom services, inc.

SYSTEMS ANALYST 11

Supervises, maintains, develops and implements a unified and cohesive automated library system. Current components include a monographic catalog resulting in COM fiche, an on-line process file, and map and serial subsystems. Programming and design policy is structured with modular components. Aids in decision process for equipment and systems development.

Qualifications:

Masters degree in Computer Science with emphasis in data base management and character processing or Bachelors degree in mathematics or science and two — three years experience in the computer field dealing with problem-oriented systems.

Knowledge of COBOL or other high level character and file oriented language, computer hardware and interactive relationships of components of large machine, and of data base management and character processing.

Supervisory experience desirable. Minimum salary $15,000. Send resume to

Personnel Office
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of Technology
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Austin is where Texas Instruments is making big news in micro/minicomputer technology.

You know about Magnetic Bubble Memory. Did you know that TI is making the world's first commercial applications of MBM in its new 763/765 portable terminals?

TI is using its world leadership in semiconductor technology to pioneer distributed computing networks.

You don't get backwatered here. You're in the mainstream of micro/minicomputer technology. It's one of the three major thrusts of the entire corporation.

Career-wise, you won't find a better place than Texas Instruments.

Any-other-wise, you won't find a better place than Austin, Texas.

Everybody wants to live in Austin. No wonder.

Austin is one of the 14 "most pleasant" cities in the United States—or one of the 12 "most livable"—depending on which national magazine you read.

Austin also is generally acknowledged to be the most cosmopolitan of all the state capitals and the most beautiful city in the Southwest.

Austin's biggest school—the University of Texas—is ranked academically as one of the top three universities in the South. (Its MBA program is ranked among the top 10 in the nation.)

The city's cost of living is lower than that of any other city surveyed by the Bureau of Labor Statistics. (Believe it or not, Austin's city and school taxes went *down* in 1977.) And in Texas, you pay no state income tax.

People all over are trying to dream up excuses for moving to Austin. Lucky you. You're a minicomputer specialist. *Austin is looking for you.*

We want to hear from people qualified for the following positions:

Software Technical Writers
TI has several new openings for both entry level and experienced software technical writers. Candidates will join an expanding publications team preparing software documentation for minicomputer systems, distributed processing systems, intelligent terminals and other state-of-the-art products now under development. Applicants should have a Computer Science or related degree and 1-5 years' experience in preparing user documentation for computer programs. Entry level candidates with strong data processing backgrounds will be considered.

Software Support Programmer
Duties will require maintenance of existing software packages and assist in our nationwide field operation.

Systems Development Programmer
Opportunities on a new project of multi-microprocessor products using the latest memory architecture. Opportunities also include design of new operating systems for follow-on products.

Applications Programmer
Project member for commercial, industrial or business systems departments having direct contact with customers doing software product development.

Diagnostics Programmer
Design/development of intensive unit/systems level diagnostic software for 990 computers in a stand-alone and real-time environment.

Business Programmer
Design new systems with COBOL to satisfy the needs of a small business computer user.

Marketing Analyst
Responsibilities through marketing for software products including research, competitive analysis, and coordination with software development. Must have a CS degree.

Communication Systems Analyst
Opportunities exist for persons experienced in design and development of communication systems. Experience will be required in computer communications, package switching, distributed processing or computer networking.

● Applicants for the above programming positions must possess a background in one or more of the following areas: microprocessors, operating systems, distributive processing networks, assembly and higher level languages. Requirements also include ability to communicate effectively, desire to work with customers, and a BS in CS, EE or Math.

Immediate Openings in Southfield, Michigan
Texas Instruments, Industrial Automation Center, in Southfield, north of Detroit, has immediate openings for qualified systems programmers to work on varied computer based automation requirements. These opportunities are also a part of the Digital Systems Division in Austin, Texas. These positions entail generating unique applications programs in response to customer specifications and hardware configuration for manufacturing automation. BS in EE, Physics, Math or Computer Science and related experience in minicomputer applications required.

Please send your resume (for confidential handling) to: Lee Cooke/Staffing Manager/P.O. Box 2909, M.S. 2106/Austin, TX 78769.

TEXAS INSTRUMENTS
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We can give you 3 good reasons to call Robert Half for data processing positions:

1. Robert Half has been in business for about 30 years. Can you name an EDP personnel service that's been around longer?

2. Robert Half specializes. We've been an integral part of the data processing community through all its generations.

3. Robert Half's offices are staffed by experts in the EDP field.

and if 3 reasons aren't enough, we can give you 55 more:

55 offices. Robert Half is a network throughout the U.S., Canada and Great Britain. One call and you've searched the local market ... or the world.

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ADR is the #1 software products company in the world. Founded in 1959, we have software installed at over 8,000 computer sites, more than any other independent software company. We are large enough to be stable and respected, small enough to be informal, with lots of room for recognition and advancement. We currently employ over 280 people and our annual sales exceed $20,000,000. ADR has 8 branch offices in the United States and is represented in 35 foreign countries.

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Applicants should have the following qualifications:

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In addition, Field Auditor applicants should have:

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We offer salaries commensurate with background and experience. The successful applicant can look forward to comprehensive benefits and long-term career opportunities with Exxon.

Please send resume and salary history in confidence to: MCS Division Manager, ESSO Inter-America, Inc., 396 Alhambra Circle, Coral Gables, FL. 33134.

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data processing

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The desire we hear you express most often is to have hands-on involvement with systems and the technical freedom to keep right on improving and developing your technical skills.

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Qualified candidates are invited to direct their response to Phil Beckhelm, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086. Or call him collect at 408/746-6165. We are an equal opportunity employer.

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We seek Systems Analysts, Systems Programmers or Program Support Representatives to be responsible for maintaining Amdahl's excellent reputation in supporting our customers' complex software control systems.

You will be the Amdahl interface to 470V system customers in all software-related functions. You have MVS internals experience and, preferably, additional experience with one of the following:

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In addition, you have the ability to read dumps and write code to resolve system problems. Please indicate 820-E on your response.

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Successful individuals will have background in distributed microprocessor, architecture, realtime software, digital processor, and digital bus interfaces. Should possess good experience in signal processing and signal analysis; and computer system design.

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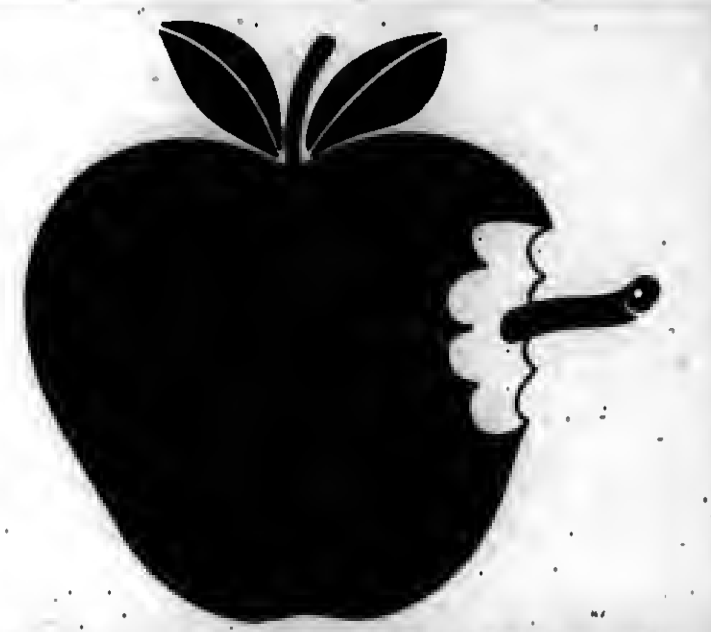

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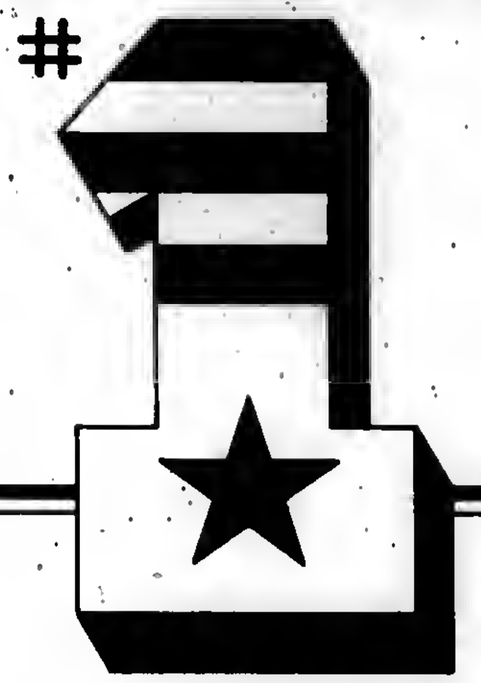

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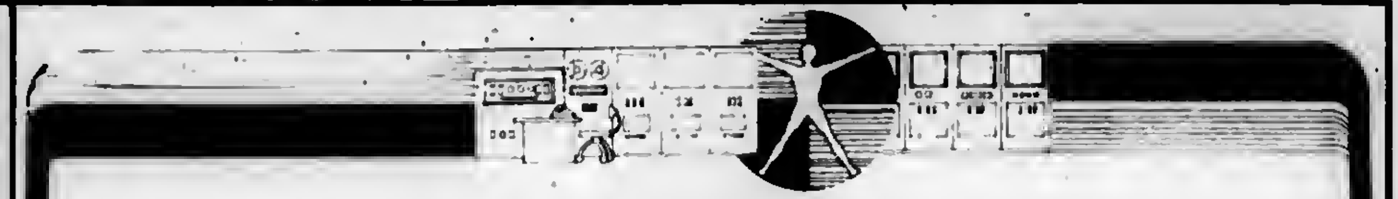

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Working in health administration and claims processing, you'll be involved in support systems design for health care; on-site customer support at management levels; and interface with OSI's technical staff. Required is a degree in Computer Science or equivalent experience, including 3 years' in programming and 3 years' as an analyst, with heavy COBOL and IBM 360/370 experience. Health care experience is desirable.

PROGRAMMER/ANALYSTS

Several opportunities are available here involving many diverse activities, some of which include designing and coding structured - COBOL programs, walk-throughs, testing and systems analysis, and other duties related to health care/claims processing. We have openings for the following experience levels:

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SYSTEMS ANALYSTS

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- 3-5 years in large complex data processing environments. Heavy file design experience is required.
- 2 years as a programmer/analyst, preferably with experience in health claims processing.
- 4 years data processing experience, and 1-2 years' in systems analysis/customer interface. Health care experience is desirable.

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You'll develop and implement an optimum work flow system and assist in staffing all levels of personnel for health care clients. You must be familiar with work flow systems and procedures and man-motion studies. An Industrial Engineering degree is required and a background in health insurance claims processing/clerical functions preferred.

SYSTEMS ENGINEER

You'll provide customer support in the area, converting and installing systems on the OSI large scale IBM computers. Required is a B.A. or B.S. and 5 years related experience in systems analysis with MVS and interest in a Marketing environment.

Positions Available Nationwide
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NCC Interviews June 5-8

Honeywell's highly successful nationwide Search for the best computer professionals in the industry is coming to The National Computer Conference.

All across the country, professionals from a wide range of large and small companies — including our chief competitors — have responded to The Search. And when they took a close look at Honeywell and where we're going, they decided that *here* is where they wanted to be.

Now The Search is coming to the National Computer Conference. Throughout the conference (June 5-8), you'll have a chance to talk with Honeywell managers and other key personnel about where Honeywell is taking computers and what we can offer you. Our Small/Medium Information Systems Division (S/MISD) and our Large Information Systems Division (LISD) are continuing to grow rapidly and have exciting career growth opportunities available in a broad range of areas.

So while you're at the National Computer Conference, find out why The Search — and Honeywell — are so successful.

LARGE INFORMATION SYSTEMS DIVISION — PHOENIX, ARIZONA

MICROPACKAGING ENGINEERS

Thin or Thick Film Hybrid Experience.

LOGIC ENGINEERS

Large Scale CPU and I/O Logic — Digital Design Experience

DIAGNOSTIC ENGINEERS

Conversant with Fault Simulation Techniques.

QUALITY CONTROL ENGINEERS

With experience in water processing, substrate processing, micro-circuit hybrid processing.

CENTRAL SYSTEMS AND COMMUNICATIONS ANALYST

With experience in Computer Systems Measurements or Modeling.

SOFTWARE SYSTEM TEST ENGINEERS

To plan, develop and execute systems test.

SOFTWARE ANALYST

To work in Internal Business Systems, Computer Techniques, Quality Assurance.

LARGE INFORMATION SYSTEMS DIVISION — LOS ANGELES DEVELOPMENT CENTER

SYSTEMS PROGRAMMERS

With experience in operating system kernel, language processors, communications, transaction processing, data base management, conversion aids, higher level implementation language, technical writing.

SMALL/MEDIUM INFORMATION SYSTEMS DIVISION — BILLERICA, MASSACHUSETTS

SOFTWARE TEST ENGINEER

Analysts/programmers to design and implement software test systems to qualify minicomputer communications applications and networks.

SOFTWARE SYSTEMS DESIGN ENGINEERS

Systems level definition and design in operating systems, data base management, communications, terminals, computer networking, and distributed processing.

SOFTWARE TECHNICAL SUPPORT ENGINEERS

Provide software technical support to customers. Experience with IBM communications software is required.

O/S AND COMMUNICATIONS DEVELOPMENT ENGINEERS

Experienced system software developers to work on enhancements and new capabilities within the GCOS 6 Operating System.

NETWORKING AND COMMUNICATIONS ENGINEERS

Develop networking and communications software for the Level 6 Minicomputer Family.

TERMINAL AND NETWORK APPLICATIONS ENGINEERS

Development and implementation of terminal and network applications. Communications experience is essential, and knowledge of Honeywell and IBM protocols is desirable.

COMPILER DEVELOPMENT ENGINEERS

Compiler designers with experience in the design and implementation of compilers such as PL/1, PASCAL, and FORTRAN.

CIRCUIT DESIGN ENGINEERS

Participate in state-of-the-art circuit technology programs including MOS and LSI microprocessor chip design.

TERMINALS AND COMMUNICATION DEFINITION ENGINEERS

Perform original system design work in communications processor, terminal, and related minicomputer I/O hardware ereas.

SOFTWARE/HARDWARE WRITERS

Software technioal writers with at least 5 years in computer programming or in technical writing with exposure to computer software and/or hardware.

HARDWARE/FIRMWARE ENGINEERS

Hardware/firmware professionals are needed in processor design, with the emphasis on firmware development and special emphasis on high performance product design.

TERMINAL ENGINEERS

Hardware/firmware experience in design and development of new CRT terminal products.

COMPONENT/MATERIALS ENGINEERS

Experienced in component evaluation and specification.

LEVEL 6 MINICOMPUTERS

SALES ENGINEERS

Sales Engineers, with a BS in Engineering or its equivalent and 3-5 years selling to OEM's, System Builders and large end users.

SYSTEMS ANALYSTS

2+ years sales support experience with minicomputers, a knowledge of assembly language, compilers and operating systems.

MARKET ANALYSTS/PLANNERS

3-5 years experience in Market Planning for minicomputers and/or sales experience to the OEM/Systems Builder marketplace.

SMALL/MEDIUM INFORMATION SYSTEMS DIVISION — BRIGHTON, MASSACHUSETTS

Manufacturing Support

PCB ASSEMBLY ENGINEERS

Apply process control techniques and generate quality plans and inspection procedures in PCB assembly and automatic component insertion: ASOC certification is required.

PROCESS CONTROL ENGINEERS

Professionals with ASQC certification to establish process control parameters in resist application, drilling, lamination and printed wiring board fabrication operations.

VENDOR ENGINEERS

Inspection and testing of vendor supplied devices, with responsibility for LSI, MSI, bipolar and linear IC types. Experience in the use and programming of IC test computers.

PROCESS ENGINEERS

Experience in electro/mechanical assembly processes and procedures in printed wiring board fabrication and assembly.

Even if you're not looking for a new position, don't pass up this opportunity to see for yourself what all the excitement is about.

NCC Interviews

To arrange for an interview during the National Computer Conference, please call Lou Sinagra for S/MISD positions or Stel Fedor for the LISD positions at the Griswolds/Anaheim at (714) 956-4978
Or drop by our Career Hospitality Suite at the Griswolds/Anaheim. Limousine service will be provided from the Convention Center to the Griswolds/Anaheim all during the conference.

If you are unable to meet with us at this time, please forward your resume, including salary history, and indicating position or positions of interest to:

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HONEYWELL S/MISD, BM-002, 300 Concord
Road, Billerica, Massachusetts 01821

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Manager, Recruitment & Placement
HONEYWELL, P.O. Box 6000, M/S Y-150, Phoenix, AZ
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FOR LISD POSITIONS — LOS ANGELES
Ms. Martha Andreani
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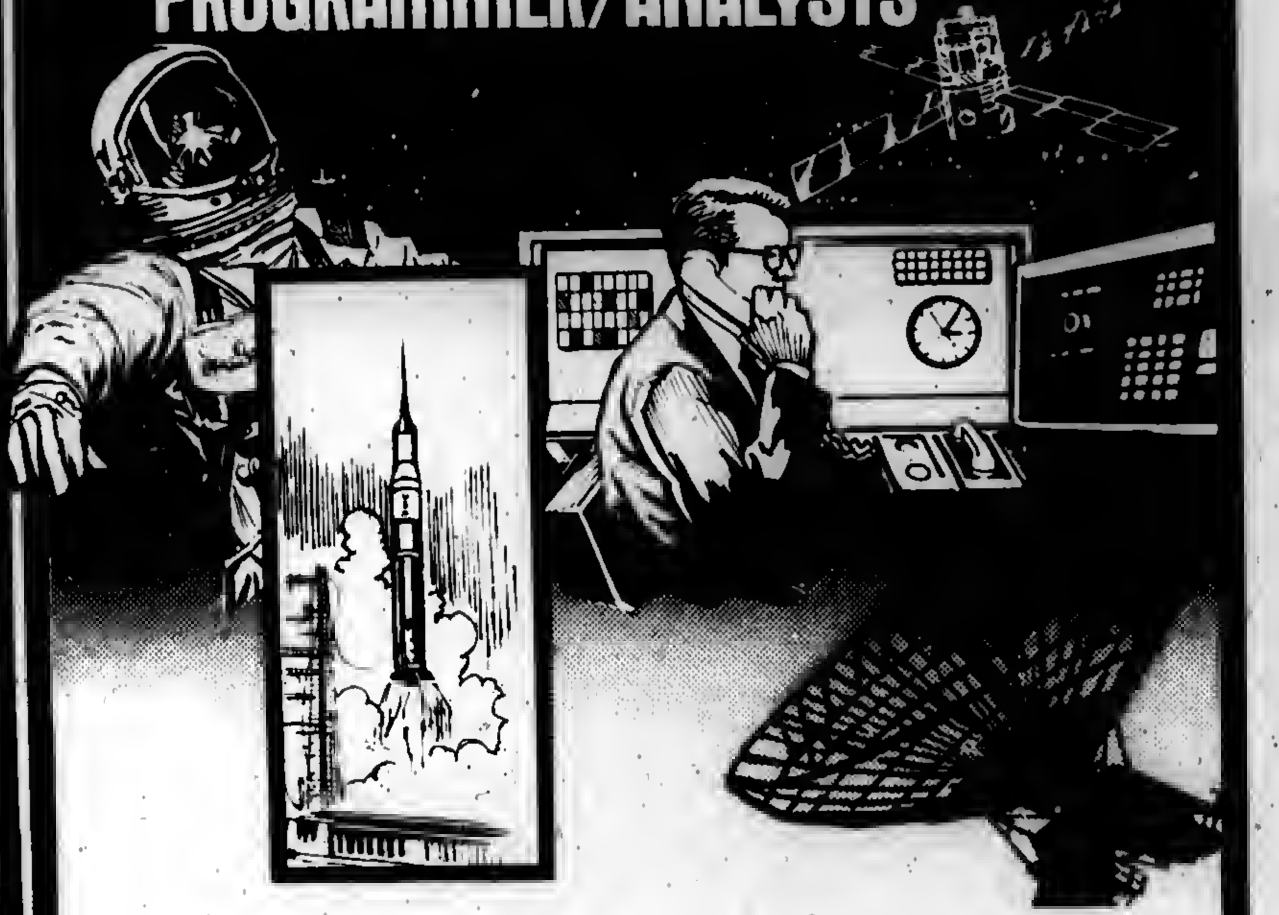

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Anaheim Interviews
Sunday, Monday, Tuesday
June 4, 5, 6, 1978

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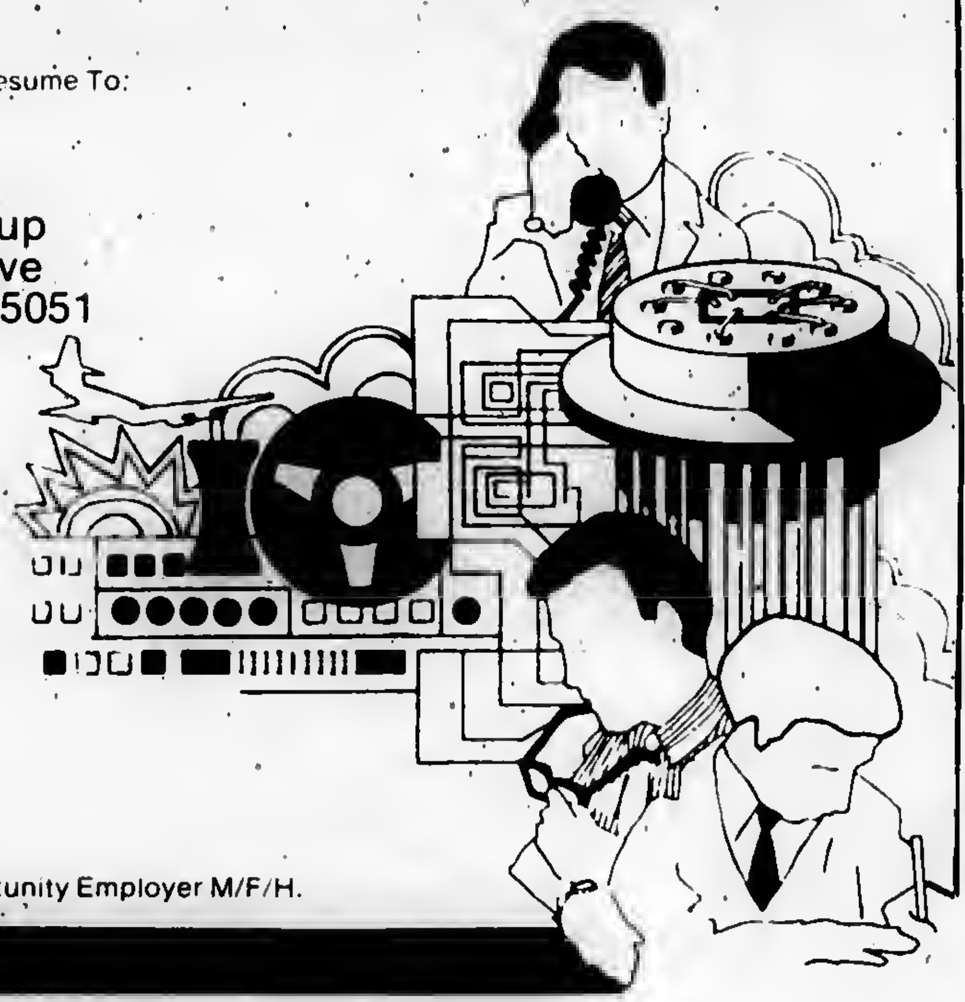

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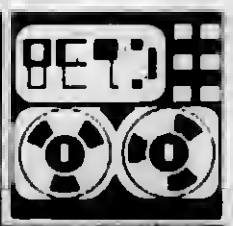

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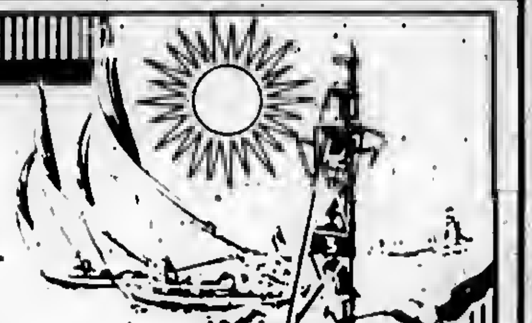

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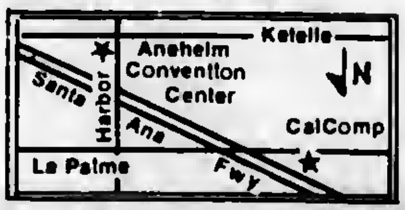

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HONEYWELL LEVEL 66 GCOS/GRTS SPECIALISTS

If you have direct experience in the internal workings of GCOS or GRTS, we would like to talk with you about these positions which are immediately available.

Software Programmer Analyst Project Leader

You will be responsible for providing GCOS support for our dual 66/20 computer and adapting Honeywell supplied software for our applications. In this position you will be a key person in looking at and making recommendations on our future hardware needs and will guide and train more junior people.

Communications Specialist Project Leader

This individual will be familiar with communications hardware, i.e. lines, modems, multiplexors, and have 1-2 years experience on Honeywell DN-355 GRTS software. Responsibilities will include the maintenance and enhancement of GRTS as it applies to the sophisticated DRC internal/external communications system. This will involve maintenance of telephone data communications.

DRC offers an excellent salary and benefits program, real technical challenge, good personal visibility and the opportunity to advance internally. Our north of Boston location on Rte. 93 is convenient to the cultural, educational and entertainment centers of Boston/Cambridge and 20 minutes from the New Hampshire border.

Please forward your resume, complete with salary history, to Mr. John J. Kelly, Dept. CW, at the address below.

DRC

DYNAMICS RESEARCH CORPORATION
60 Concord St., Wilmington, MA 01887

We are an equal opportunity employer, M/F.

Systems Manager

Polytechnic Institute of New York, a private higher educational institution, is recruiting a Systems Manager for its administrative data processing. Training and experience must include: design and installation of total integrated systems, both manual and automated, involving financial, student information, and fund-raising activity; systems documentation and training; review and redesign of work procedures and work flow to improve efficiency and effectiveness; supervision of PL1 and COBOL programmers, systems analysts, and industrial engineers. Bachelor's degree and 5 years experience required, Master's degree preferred. Send resume, salary history and current requirements to Personnel Office, Polytechnic Institute of New York, 333 Jey St., Brooklyn, N.Y. 11201.

Polytechnic

An Equal Opportunity Employer M/F

Systems Analysts

If you're skilled enough to handle key assignments on your own, contact Atlantic Richfield's fastest growing division.

Our Synthetic Crude & Minerals Division is seeking two analysts who can join our busy Systems and Computer Services section in our Planning & Control Department.

Positions are for professionals qualified to perform either of these two activities:

■ **Upgrade distributed processing systems** . . . you'll work with a high degree of independence implementing and supporting the division's computers (PDP-11/70's Data-100 used under IBM's OS/VS) in a Distributed Processing Environment. Scope of responsibilities include developing distributed computer hardware and software configurations to be used as satellite work stations which support mineral and coal mining operations.

Position requires undergraduate degree in computer science or similar discipline with a masters degree preferred. Strong interpersonal and system skills, and three or more years experience working with IBM's OS/VS, and DEC's, RSTS/E, or I.A.S. Executive Software in a basic, FORTRAN environment. Required experience with MACRO-11 and Telecommunication protocols (SRA, Decnet) are preferred.

■ **Support large-scale geological, engineering and operations activities** . . . you'll join a team of highly motivated technically oriented individuals and make independent contributions to the development of mini-computers and large scale IBM 370 systems.

Position requires a technical degree, preferably in geology, mining or related field, 2-4 years of experience in a technical systems environment, and solid experience with FORTRAN, APL and Assembler an advantage. Ideal candidate will have the ability to work well with others and translate user problems into proper programmed solutions.

Both positions offer fully commensurate salaries and comprehensive benefits. Send resume indicating position applied for and salary history to: **Mr. W. H. Sands, Atlantic Richfield Company, 515 So. Flower Street, Los Angeles, CA 90071.**

AtlanticRichfieldCompany

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SYSTEMS ANALYST

Position available in large medical facility currently converting from present Computer System to Burroughs 6800 DMS 11 Data-Comm System. On-line Data Base experience desired. Positions also available for LEAD PROGRAMMER/ANALYST and LEAD COMPUTER OPERATOR. Send resume and salary requirements in first letter to Employment Manager, Memorial Hospital, 1901 Arlington St., Sarasota, FL 33579.

DIRECTOR OF COMPUTER SERVICES COLBY COLLEGE

Applications are invited for the position of Director of Computer Services at Colby College. The position is available immediately. The Director will have overall responsibility for planning and directing the data-processing activities of the College, including management and development of PDP 11-based administrative systems as well as academic program. Preference will be given to candidates holding an appropriate advanced degree and having several years experience in a computer center at an academic institution. Salary and benefits competitive. Send resumes including names of three references not later than June 16, 1978 to: Paul G. Jenson, Dean of Faculty, Colby College, Waterville, Maine 04901. An Equal Opportunity/Affirmative Action Employer.

COMPUTER PROFESSIONALS

The Collins Divisions located in Cedar Rapids, Iowa are expanding their Information Systems capability. We have an immediate need for Senior Business Applications Systems Analysts and Programmer Analysts, to design and implement advanced marketing, engineering and manufacturing applications utilizing an IBM 370-168 and Front End Distributive Processing. Familiarity with PL1 and IMS Data Base Design with experience in manufacturing applications; design and distributed processing techniques is preferred.

If you are interested in these challenging opportunities please call Jan Albert at (319) 395-2351 or Dick Spurlock at (319) 395-5770 COLLECT between the hours of 10:00 A.M. and 4:00 P.M. to discuss arranging an interview.

Manager, Professional Staffing
Collins Divisions
Rockwell International
400 Collins Road NE
Cedar Rapids, Iowa 52406

Rockwell International

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MANAGEMENT INFORMATION SYSTEMS

Large Scale Installation at Borden, Inc.

Columbus, Ohio Administrative Headquarters

As a major corporation with four growing divisions totaling nearly S3-1/2 billion in sales, we have substantial needs in the development, planning and control of data processing systems. Our environment is one of unique challenge and diversity as we strive to utilize our talent and equipment to the fullest in developing and maintaining effective systems and techniques. If you're a professional who thrives in a modern and demanding management information system, we'd like to talk to you about your career.

SR. SYSTEMS PROGRAMMER

You'll provide a high level of IMS programming and technical expertise to insure the use of the most efficient and effective standards, techniques and procedures available in the industry. Also analyze application of information, specifications and systems design and determine the most effective approach for implementation. The position requires 5 or more years of programming experience in a business environment, including 2 years in current generation languages and 3 years with IBM computer system. A degree in computer sciences or related area helpful.

SR. SYSTEMS PLANNER

You'll assure effective, responsive, stable and economical data processing capabilities throughout the domestic corporation. Requires the evaluation and development of information systems plans coinciding with corporate objectives, plans and directions. The position requires 7 or more years experience and demonstrated sucess in conceptualizing, planning and installing significant information systems. An MBA is preferred. Must have highly developed oral/written communication skills.

We provide outstanding challenge and satisfaction along with an excellent salary and benefits package. For confidential consideration please send a letter and/or resume to: M. Tomaszewski.

BORDEN, INC.
180 E. Broad Street
Columbus, OH 43215
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BORDEN

COMPUTER PROFESSIONALS

SYSTEMS PROGRAMMER

Responsible for installation, support, and tuning of e large OS/VSI Operating System environment and associated telecommunications software. Also provides essistence to COBOL application programmers on dump reading end debugging. Applicant should have 3 years experience with OS internals and SYSGENS. Knowledge of CICS, data base, 3705, and VTAM/NCP highly desirable.

PROGRAMMER ANALYST

To analyze, design, program, implement and document computer systems for business and administrative epplications. Selected candidate will be assigned to a project group reporting to a project leader. Requires a minimum of 2 years experience progremming business applications in ANSI COBOL. IBM 360/370/OS/JCL experience and a degree preferred but not required.

PROGRAMMER ANALYST

Team of medical and computer professionals, seek programmer analyst for the COSTAR (computer stored ambulatory record system) project. Diverse responsibilities will include analyzing, designing, programming, implementing and documenting computer systems for patient care activities. Bachelor's degree with programming experience required.

Excellent fringe benefits include 3 weeks paid vacation and generous tuition reimbursement plan.

Please submit resume STATING POSITION to Ms. Federico or apply in person 9 a.m.-noon Mon.-Fri.

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Employment Office Boston, MA 02114
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R.O.I.

SOFTWARE

OPPORTUNITIES

Systems/Applications Prog./Analysts	To 28K
Software Design Engineers Mini/Micro	To Mid 30's
Communications/Network Software Development	To Mid 30's
Process/Real-Time Control	To 28K
Telecommunications Systems Scientists	To 40K
PDP-11 Business Applications Programmers	To 26K
Technical Writers	To 24K
Microprocessor Systems Design	To 27K
Distributed Processing, DMB	To 30K
Telecommunications Systems.	To 35K
Application Programmers/Analysts	To 24K
COBOL Programmer	To 18K
COBOL Programmer/Analyst	To 23K
Analyst/Programmer	To 24K
Software Analysts	To 18K
Diagnostic Programmers	To 21K
Technical Writers	To 25K
Technical Writer	To 28K
Systems Software Engineers	To 25K
Communications Programmers	To 25K
RSTS/E Programmers	To 17K
Computer Aided Design	To 18K
Senior Programmer	To 28K

Opportunities also available for Hardware Professionals

Plan to visit our Hospitality Suite at the Admiral's Cove Inn, 1028 W. Ball, Anaheim, (714) 774-1650, within a mile from the NCC Convention Center, June 6th, 7th & 8th. If unable to meet with us at NCC/Anaheim, submit your resume in complete confidence to R.O.I., 131 Middlesex Turnpike, Burlington, MA 01803, or call us collectat (617) 273-2130.

RESOURCES
Objectives, Inc.

131 middlesex turnpike, burlington, massachusetts 01803
(617) 273-2130

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COMPUTER SALES
SYSTEMS ANALYSTS
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PROGRAMMERS

We currently represent leading firms with openings throughout the U.S. You must neve 2-4 yrs of successful related experience. Total compensation packages range from 15K to 40K. Call Bill Coyne (617) 235-4670 or send resume to:

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Sr. Systems
Analyst / Programmer
$25,000

Design and implement complex business systems. Work to include feasibility studies and upgrading of existing systems.

IBM 370 OS/MVS, IMS,
COBOL, BAL, PL/1

Several years progressive experience in sophisticated environment. Good communication skills and ability to interface with top people in other departments. Must be creative. Degree in DP, Business, or related field.

Growth oriented company with good progression opportunities.

Also need:

Applications Programmers
Systems Programmers
Programmer/Analysts
Systems Analysts
Software Engineers
EDP Auditors
Process Control Specialists

Please call or send resume in confidence to ***Jeff Holmes.***

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1948-B South Glenstone
Springfield, MO 65804
(417) 883-1212

Programmer/Analyst

Growing Data Processing Department in national consulting engineering Firm seeks talented professionals to plan, develop and support engineering programs and systems. Varied work assignments in on-line program development using large, in-house DEC-10 timesharing system. Principal languages are Fortran, Cobol, Macro and Basic—plus others as needed. Must have degree in Computer, Science, Engineering or Math. Prefer technical background and work experience. Contact: (816) 333-4375 Personnel Dept.

Burns & McDonnell
Engineers - Architects - Consultants
Box 173, Kansas City, MO 64141

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ASSISTANT DIRECTOR

CENTER FOR THE STUDY OF DATA PROCESSING

We are looking for an energetic, imaginative individual to join a university-based date processing educational organization, and take responsibility for the development of professional development programs, seminars, and intensive courses in data processing. The Center for the Study of Data Processing is composed of a select group of individuals dedicated to providing the Saint Louis metropoliten area with a center of excellence in data processing educational services.

The position offers a wide range of opportunities, including:

- interaction with e dynemic metropolitan date processing community;
- an environment that mixes business, medicine, engineering, and arts and sciences computing activities;
- teaching and reseerch opportunities, including the Master of Data Processing (MDP) program;
- computer facilities that includa mini-computer networks and micro-computers as well as large treditionel (IBM) systems.

We would be particularly interested in cendidates who have business experience and a strong desire to join a dynamic academic organization and participate in teaching end research programs. Candidates should have significant experience and/or education in computing or data processing. Salary range is $17,000 to $25,000. Candidates should submit resumes by June 15, 1978, to:

Director, Box 1080
Center for tha Study of Data Processing
Washington University in Saint Louis
Skinker and Lindell Blvds.
Saint Louis, MO 63130

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Connecticut & New England

EDP CAREERS

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Fortune 200 mfg firm seeks IMS-OS internals plus management expertise

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IBM-OS insurance Analyze sftwr & hdwr needs solve performance problems

SOFTWARE PROGRAMMER – to 24K
Strong OS internals sys gen & debugging skills Mfg b/g preferred

PROJECT LEADERS – to 24K
Top Ct firm, solid OS mfg sys b/g BOM PC DB CICS all pluses

SYSTEMS PROGRAMMERS – to 24K
Min 2 yrs exp with MVS to develop new exciting projects

PROGRAMMER ANALYSTS – to 24K
2 yrs OS COBOL exp., high career growth potential DB IMS TSO all assets.

OPERATIONS MANAGERS – to 20K
5 yrs exp in lg frame IBM installation mfg b/g preferred

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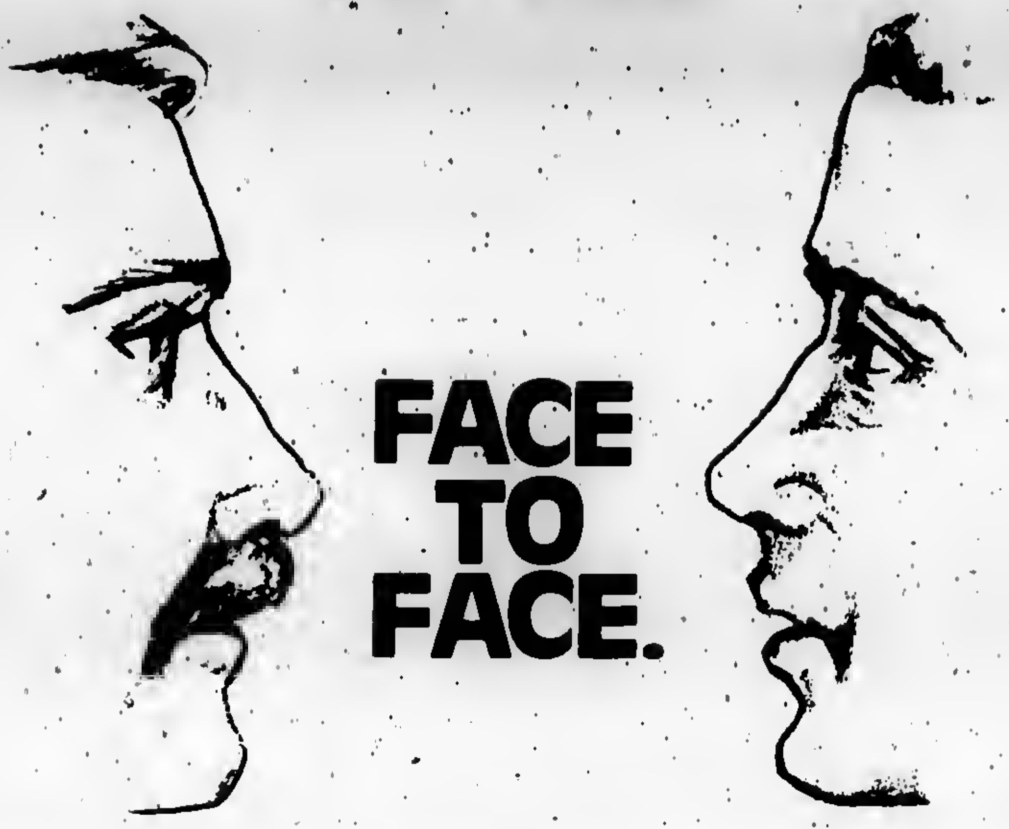

FACE TO FACE.

We'll be interviewing during NCC.

This is an ideal time for you to get an insight into our expanding markets, and the technological challenges involved in state-of-the-art distributed data processing systems. The surface of our user-universe has barely been scratched. Bring us ability, and we can offer you a wide open career opportunity with no strings attached These positions require a related degree or the equivalent plus a minimum of two years experience Senior positions require 4+ years

SENIOR ELECTRONICS ENGINEER • SENIOR DESIGN-FIRMWARE • FIRMWARE ENGINEER-DIAGNOSTICS • MANAGER-USER LANGUAGES SOFTWARE DEVELOPMENT • SYSTEMS LANGUAGE DEVELOPMENT •

If you have hardware or software experience in the above areas particularly in micro computer hardware or systems, we want to meet with you during NCC. If you're interested in the MANAGER-USER LANGUAGES position, we're looking for strong software engineering background including structured programming techniques and knowledge of compilers, table driven parsers, interpretive machine design SYSTEMS LANGUAGE DEVELOPMENT requires knowledge of compilers code generation for advanced micros, block structured language and machine level programming

To arrange an interview during the NCC contact:
Mr. C. J. Corona at (714) 549-9808

If unable to see us during the show, send resume in confidence to:
C. J. Corona • Director, Industrial Relations • SYCOR, INC. •
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ENGINEERS

Make Your Future With The Leader

Datapoint Corporation, the leader in dispersed data processing, invites you to explore employment opportunities with a dynamic, results-oriented leader in one of the fastest growing industries in the U.S. To sample the good life in one of America's four unique cities. To challenge yourself in positions which demand expertise, dedication, and which promise recognition and advancement.

- **Project Manager** — Electro-mechanical background for managing computer peripheral projects. BSEE, ME or Physics required with 8-10 years experience including at least 5 years in a design development environment and 2 years in management.
- **Electronics Engineers** — Logic designers with 2-5 years experience, including at least 1 year in microprocessor applications. A working knowledge of firmware is preferred. A background in computer peripheral controllers and interfaces desirable. BSEE required, MSEE preferred.
- **Electronics Engineers** — Analog designer with 2-5 years experience, including at least 1 year in servo circuit design for small electro-mechanical subsystems. Experience in driver circuit design, power supply design preferred. A background in computer peripheral design, particularly printers, desired. BSEE required, MSEE preferred.
- **Mechanical Engineers** — BSME required with 2-5 years experience in electro-mechanical subsystems design, preferably printers. A knowledge of electronics packaging desirable. Also ME's with 2-5 years experience in mechanisms, tooling with metals and plastics with computer peripheral experience.
- **Reliability/Maintainability Engineers** — Background in printers or similar electro-mechanical devices, preferably computer peripherals. Candidate will participate actively in the design and development of new products. At least 5 years experience, with an applicable degree, is required.
- **Manufacturing Engineers** — BSME or BSIE with 2-5 years experience in production support of peripheral products. Participate in producibility development, material/inventory control, production tooling and manage a prototype/pilot production facility.

If you are a qualified candidate, call Joe Carbone or Bob Harris, 1-800-531-7300, extension 7590 or 7548. Or send your resume to: **Charles Zeleny, Operations Personnel Manager, Datapoint Corporation, 9725 Datapoint Drive, San Antonio, Texas 78284.**

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DATAPOINT CORPORATION

The leader in dispersed data processing™

COMMUNICATIONS SOFTWARE SPECIALIST

for the World Leader in Information Services

As a Software Specialist in our growing communications group in Rockville, Md., you'll have a key role in defining functional requirements and designing both low-level and high-level telecommunications protocols. You'll be working within GE's worldwide Mark III network, and will not only be implementing protocols for distributed processing, but doing system software design, system implementation and assembly language programming.

If you have 3 or more years of systems programming in telecommunications, and in designing and implementing packet switching and protocols like SNA, DECNET, Telenet and Arpanet—preferably know intelligent terminals, mini/microcomputers and IBM 3780 protocols as well—contact us at once.

* * *

Send resume and salary history to:
Judy Power, Employment Representative, Information Service Business Division General Electric Company, 401 N. Washington St., Rockville, Md. 20850.

GENERAL ELECTRIC

GE takes pride in being an equal opportunity employer.

Sr. Data Base Analyst

BASF Wyandotte Corporation, a major subsidiary of one of the world's largest chemical companies, has the requirements for an additional analyst in our expanding Corporate Data Base Administration Department.

We are seeking an individual with 5-7 years experience in the design and implementation of IMS Data Bases for business and manufacturing applications. The ideal applicant will possess facilities and utilities, and the ability to interface with our Application Development Groups. Exposure to VSAM, BTS, TIMS or Data Dictionary Systems will be considered a plus.

Salary commensurate with experience and includes a comprehensive benefit package. For confidential consideration, please submit resume including salary requirements to:

BOB KAMBACH
BASF Wyandotte Corporation
100 Cherry Hill Rd.
Parsippany, New Jersey 07054.

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BASF

MSI...

Leading the Way in Portable Data Terminals

Working for a leader has clear advantages. Premium employees benefits, opportunity for career advancement, working with state-of-the-art technology...these are just a few of the things you get when you become part of a company that sets the pace and is out in front

MSI DATA is a winner. We're acknowledged as the leader in the portable applications terminal and systems industry. We can offer you all the challenges you need to grow and advance in your profession.

MSI's dynamic national Field Service organization is growing. We are seeking key people in the following areas:

FIELD SERVICE

Field Service Representative

Openings Nationwide

As an FSR for MSI, you have the opportunity to work independently representing our company in the professional business environment of our customers. In order to repair MSI terminals and receivers, this job requires previous experience in applying the fundamentals of digital electronic problems solving and troubleshooting. Excellent customer communication skills are also essential.

Technical Specialist

A minimum of 3-5 years' working experience along with military or vocational training is required in the following areas: Modems, telephone systems and interfaces; communications; mini and microprocessors; personnel training; technical administration; i.e. manuals, parts support, equipment histories.

Field Service Instructor

Responsibilities will include research, development and presentation of courses on MSI's terminal and receiver product lines at our Costa Mesa, California headquarters facility. Previous field experience in maintenance and repair of digital electronics equipment and the ability to create and implement effective training courses are required.

ENGINEERING

Microprocessor Design Engineer

A hardware design background or orientation, preferably with the INTEL microprocessor family is desired. Engineering responsibilities will include new product implementation and check out through high volume manufacturing phases

Senior Electro-Mechanical Drafters

Job duties include working from verbal or written instructions to generate formal drawings of piece parts and assemblies. Extensive printed circuit board layout and design experience will be an asset.

Senior Engineering Technician

Must have microprocessor experience, a working knowledge of analog and digital circuits. Knowledge of communications devices (MODEM, DAA telephone lines) desirable. Minimum of 3 years' experience preferred.

MSI's leadership is reflected in the excellent compensation, benefits and progressive work environment we provide. Benefits include paid medical and life insurance, profit sharing and educational reimbursement

Resumes should be directed to Vern Wiersma, MSI Data Corporation, 340 Fischer Avenue, Costa Mesa, CA 92627 or call (714) 549-6126.

MSI DATA CORPORATION

THE LEADER IN
PORTABLE DATA TERMINALS

Equal opportunity employer

SYSTEMS PROGRAMMER

To work in Computer Security for large central processing system with network to mutliple distributed computers, RJE stations, terminals. Primary concern is system and data security.

Require experience with at least two years at same installation working in systems programming under MVS. Experience in Computer Security desireable, but not required. Appropriate degree preferred.

Excellent opportunity and challenge for the qualified person who wishes to broaden their background and get on the ground floor of this new and growing field.

Please respond with resume to: C & DP Employment Dept. 63-CW, Ground Systems Group, 1901 W. Malvern, Fullerton, CA 92634.

HUGHES

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Now there are new opportunities in Oregon for people with the abilities to enhance the already high competence of Tektronix field and sales engineering people. Join our Marketing Training organization, an activity that is proud to have contributed to Tek success by communicating product and applications knowledge to the portfolio of competence carried by every member of the Tektronix Field Engineering and Sales organization.

BSEE or BSCS (or Equivalent) is required, along with specific competence in the fields of microprocessor technology/or computer/computer peripherals/or test and measurement electronic technology. Instructing experience is not necessary. The ability to plan, develop and implement programs is.

If your standards for a career are high, you should investigate. Write Art Anderson, TEKTRONIX, INC., P.O. Box 500, U64, Beaverton, Oregon 97077.

An Equal Opportunity Employer M/F/H.

Tektronix

COMMITTED TO EXCELLENCE

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(And some very good jobs for some very good Engineers in our fast-growing, almost $40-million company.)

The "good life" may well be an understatement. We're located in the foothills of the scenic Ramapo Mountains so you can live the life of a country squire yet be just thirty easy miles from the glamor- and clamor of New York City. Less than half that to the all-season Meadowlands Sports Complex. And throughout our area, the housing is plentiful, shopping and recreational facilities easily-accessible and the schools excellent. But just as our location offers ideal living conditions, our company offers equally ideal growth conditions.

A key subsidiary of Western Union Corporation, our success stems from maintaining state-of-the-art technology and applying it to leasing and servicing a full line of high and low speed teleprinter, video and intelligent terminals. This, coupled with our systems approach to service and our increasing dominance in the areas of electronic mail, communicated word processing and sophisticated word/data entry systems keeps us ahead of the competition in a very competitive industry. To stay ahead and accelerate our growth, we're seeking some growth-oriented individuals who may also be seeking that every-illusive "good life". We have it, if you have the professional skills we need:

SOFTWARE SYSTEMS DESIGNERS "INTELLIGENT" COMMUNICATIONS TERMINALS DDP

You'll have at least four years' experience backed by a BSEE or equal and the ability to design and spec multi-tasking, multi-programming operating systems. Areas of heavy concentration should include: Primitives, table layouts, queueing, calling sequences, I/O drivers and handlers and file access methods. In addition, you'll have a well-developed working knowledge of communication protocols, high level language intervals and organization techniques.

An MSEE in Computer Science, Engineering or Math will help greatly in carrying out your responsibilities which inlude the specification, design, writing, debugging and documentation of software for "intelligent" communications terminals, distributed data processing (DDP), word processing and electronic mail.

SYSTEMS ENGINEERS INTERFACE WITH MARKETING

The highly-skilled Systems Engineers needed to help us grow will have critical responsibilities in our aggressive sales/marketing program. Each should have Computer Sciences or equal. You should have communications computer systems and field sales experience with end users and know communications protocols, facilities, modems, systems design, computer operation, applications system design and programming. In addition, you'll be better able to carry put your substantial duties if you're familiar with micro-processing programming of user applications and have experience in IBM as well as other types of software.

You'll provide systems engineering support in the analysis, design and implementation of terminal communications systems and a technical support program. Responsibilities include: sales assistance, customer service, systems implementation account responsibility, staff and field sales assistance (communications protocol and applications software), and sales support telephones.

WE'RE ASKING A LOT; WE'RE GIVING A LOT.

Excellent salaries commensurate with experience, plus a continuing bonus package and a full benefit package for you and your family. For an immediate interview, call Mr. Hansen, at:

(800) 631-7050 Ext. 423
In N.J. Call COLLECT: (201) 529-1170

Or send your resume and salary history, in confidence, to: Personnel-CW.

WESTERN UNION DATA SERVICES
70 McKee Drive, Mahwah, New Jersey 07430

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SYSTEMS ANALYST

We are seeking several key individuals capable of assuming project management responsibilities for the development and implementation of large scale sophisticated banking systems. Initial assignments will be in such areas as EFTS, Central File, and On-Line Teller systems.

These are non-programming positions, however, candidates should have a programming background preferably in an IBM DOS environment. Experience with on-line systems and CICS is desireble but not required.

If you are interested in a challenging opportunity, personel growth and earnings potential limited only by your ability, and the contentment of working in a pleasant midwestern city, please contact:

Gene Ketchmark, AVP
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Conference Planner

We have an excellent opportunity for someone to be involved in the planning and execution of a series of computer-related conferences across the United States. These conferences are held in conjunction with trade shows managed by our company, and involve hundreds of speakers and thousands of attendees.

The job of our conference planner is to plan the format and content of each program based on attendee and industry feedback from previous conferences; prepare informational literature on the programs; and recruit speakers. You'll be dealing with industry leaders around the country, and spend a lot of time on the phone. You'll also be travelling about 25% of the time, as you attend each conference you've organized.

To qualify, you should have experience in conference planning and some familiarity with the computer industry or data processing. We offer excellent benefits, including profit sharing and bonus plans, and the chance to be part of a small, but successful and growing company.

To apply, send your resume or a detailed letter to Kim Wichert, Conference Company, 60 Austin Street, Newton, MA 02160.

The Conference Company

TANDEM makes Non Stop computers...
we offer Non Stop opportunities too.

TANDEM COMPUTERS . . . We're the only manufacturer who offers a non-stop multiple processor computer. It's the most important development in computer architecture since the development of the minicomputer itself. It's proven in the field. It's working in a wide variety of industries: banking, manufacturing, printing & publishing; and communications. It's great! It's growing! And we're growing too!

Dramatic product acceptance has created career opportunities at a time when we're small enough to recognize your contribution and yet large enough to offer you "big company" benefits, competitive salaries & career advancement.

HARDWARE INSTRUCTORS

5 yrs customer engineering exp. primarily in digital computer & peripheral areas. Military service background in computer maintenance and/or training exp. an asset.

COMPUTER TECHNICIANS

AA/Electronics with 2-2½ yrs exp (or equiv. to 5 yrs. exp.) necessary, along with knowledge of computer programming, microprocessor & TTL background IE tapes, discs. & communications

SYSTEMS ANALYSTS

Field support position. Key requirements include telecommunications exp., operating systems understanding, customer orientation, & familiarity in TAL, SPL, ALGOL & assembler languages

SOFTWARE SUPPORT

Must have exp. in multi-programming computer systems, data communications & software instruction

CUSTOMER ENGINEERS

Senior level requiring 4-5 yrs. maintenance computer exp. Associate position for recent technical school grad: Software background & demonstrable exp. in identifying, isolating & repairing system malfunctionings a definite plus!

DIGITAL LOGIC DESIGNERS

Requires 2-5 yrs. exp. in the industry. BS/MSEE desirable. Ideal applicants would have developed products which are in volume production and experience in 7400 & 7400LS logic families. Familiarity with microprocessor & microprogramming a must, at least 1 high level computer language helpful.

RESEARCH & DEVELOPMENT LAB TECHNICIANS

Must have working knowledge of TTL technology & be capable of detailing digital circuit analysis to breadboard new circuit designs. Must be familiar with minicomputer programming language & hardware architecture.

WE NEED YOU — Men and Women who enjoy the challenge and opportunities of working with the leader in the field. Come show us how you can contribute to our growth. The opportunities are real . . . The rewards are significant. Inquire about our "big company" benefits . . . Dental & Health Insurance including Maternity, Group Vision & Orthodontia care, credit union, 6 weeks Sabbatical Leave independent of vacation with full pay . . . and on . . . and on . . . and on!

TANDEM
COMPUTERS

For immediate consideration, send resume, including salary history, to TANDEM COMPUTERS, INC., ATT: Employment, 19333 Vallco Parkway, Cupertino, CA 95014, or call in California: **(408/996-6000)**; out of California, TOLL FREE: **(800/538-9380)**. Or contact local offices in Chicago, **(312/298-1355)**; in New York, **(212/594-2320)**; in Dallas/Ft. Worth, **(817/640-8771)**.

BIG WONDERFUL WYOMING

Excellent Opportunity to Join
Rapidly Growing Staff

PROGRAMMER/ANALYST

Knowledge of banking/financial systems, RPG, BAL desirable. B.S. degree required.

SYSTEMS ANALYST

Knowledge of banking/financial systems, programming. Good communications skills. Consulting experience preferred. B.S. degree required. Salaries are open.

Send resume in confidence to Dataman corporation, 1807 Capitol Avenue, Cheyenne, Wyoming 82001.

Programmers-Analysts
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Senior Software Engineers

To review and plan Retail Systems software strategy for Point-of-Sale terminals, communication processors, and general EDP systems. Will provide consultation to the Retail System family standards and hardware groups. Moreover, he/she will provide intra-and inter-divisional liaison to insure development of interfaces and problem solutions.

A broad understanding of operating systems methodology, application programming techniques, and technology directions will be required as well as sufficient familiarity with hardware design to allow effective assessment of hardware/software interfaces and interactions. A familiarity with high level languages and structural design techniques will be a strong asset.

An appropriate degree and from 2-7 years experience will provide the necessary skills.

Programmer Analyst

To develop and enhance operating systems software and support for Retail Operating Systems department. You will define projects under broad guidelines and objectives and specify programs for the system application; develop and participate in appropriate tests to assure systems reliability.

A degree and 2 years experience with micro/mini processor and real time programming as well as a good working knowledge of recent developments in hardware/software application will qualify you for consideration. This is a highly visible position.

Communications Systems Engineer

This senior position involves responsibility for generation of retail system communication standards and guidelines based upon Corporate Standards and industry practices. Will also serve as the division representative to the Corporate Distributed Network Architecture review board. Additional tasks will involve the design of retail communication systems architecture, development of strategy plans and serving as a consultant to other members of the division.

A degree (MS preferred) and 8-10 years experience including design level and system development management. Broad working knowledge of data communications products throughout the industry.

Computer Design Engineer

Excellent opportunity in our Advanced Development Group for candidate who will be conceptualizing the architectural and hardware design for Future Retail Terminal Systems and memories. Essential to this will be the evaluation and recommendation of levels of technology and then develop these concepts for microprocessors, memories, and other system components for use in future POS systems.

BS/MS Degree and from 6-8 years experience in logic design which should include a minimum of 3 years experience in microprocessor and solid state memory design.

Systems Integration Engineer

This is an excellent lead technical position for candidate with proven ability to take the system components (terminals, processors, modems, peripherals, etc.) and software packages and put them together into a working system, test the system to test plans, and insure that the system functions to overall specifications. In addition, you will characterize (measure) the system performance and document the operating characteristics. Will also provide support to field engineering and customer representatives in resolving system level problems.

A degree and five (5) or more years experience in real time computer systems and telecommunications is required. An ability to direct the technical efforts of associated team members is essential as is an ability to write effectively.

Please send resume or call collect

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Qualified applicants will possess the technical ability to understand the various components of a computer system, and the communications skills required to write about them clearly. A degree is preferred with a strong background in Computer Science and at least two years technical writing experience required. Individuals in this area will also provide writing support for other marketing publications. These positions offer career opportunities in our expanding DALLAS operation.

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To lead a section in the design and implementation of operating systems and software interfaces for FPS's Array Processors. Ability to lead a group in implementing real-time/multi-task/virtual memory operating systems is necessary.

Software Standards and Quality Section Manager

To lead section which designs and controls the development of software methodology and standards. Must have experience in software development methodology, programming standards, and software quality control, plus management ability.

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To do scientific applications assembly language programming for FPS array processors. Experience in such application areas as image processing, structural analysis, signal processing, or FFT applications involving assembly language programming desirable. Must have experience with mini or micro programming.

Computer Scientist

To participate in the design, implementation, and maintenance of Program Development software (assemblers, leaders, compilers, debuggers) for FPS array processors. Experience in language processors desired.

Operating System Programmer/Analyst

Design and implement operating systems software interfaces for FPS array processors. Experience in implementing real-time/multi-task/virtual memory operating systems is necessary.

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  Must have solid expertise in communications, network architecture, O-driven operating systems, in addition to job control language and multi-processor, real-time
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  Requires software development background from mini's to micro's in Operating Systems, Communications or Compilers.
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  To develop enhancements for existing systems, install and support newly developed industrial systems.
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  Requires a minimum of three years' experience, preferably in a distributed processing or teleprocessing environment. COBOL is required with FORTRAN experience desirable

Engineering

- **Systems Engineers**
  BSEE with 2-3 years' experience in minicomputer microprocessors and peripherals.
- **Development Engineers**
  BSEE with 3-8 years' experience in controller or power supply design interfacing with CRT's and peripherals.
- **Mechanical Designer**
  2-4 years in electro-mechanical packaging design with knowledge of small power supplies, computer chassis, printed circuit design, sheet metal and plastic fabrication
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  Must have 5 years' PCB design and drafting experience including 2 years in electro-mechanical drafting

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We currently have a number of openings for individuals with a background as a Computer Technician, Systems Technician, Peripheral Technician, Engineering Technician or Calibration Technician. Must be experienced in minicomputers and associated peripherals

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  Individuals with technical degree and minimum 3 years' experience in EDP.

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Technological, software and service advantages, features and values, success stories, merchandising strategies and direct mail.

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Product Marketing Specialist
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- **Sales Representatives**
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  Openings for our Industrial Systems with experience in a process control environment. Overall experience will include 5-10 year span in minicomputer systems applications with Electrical or Chemical Engineering degree preferred
- **Systems Applications Engineer**
  Technical degree with 4-8 years' minicomputer systems applications experience, primarily in communications and industrial systems sales.
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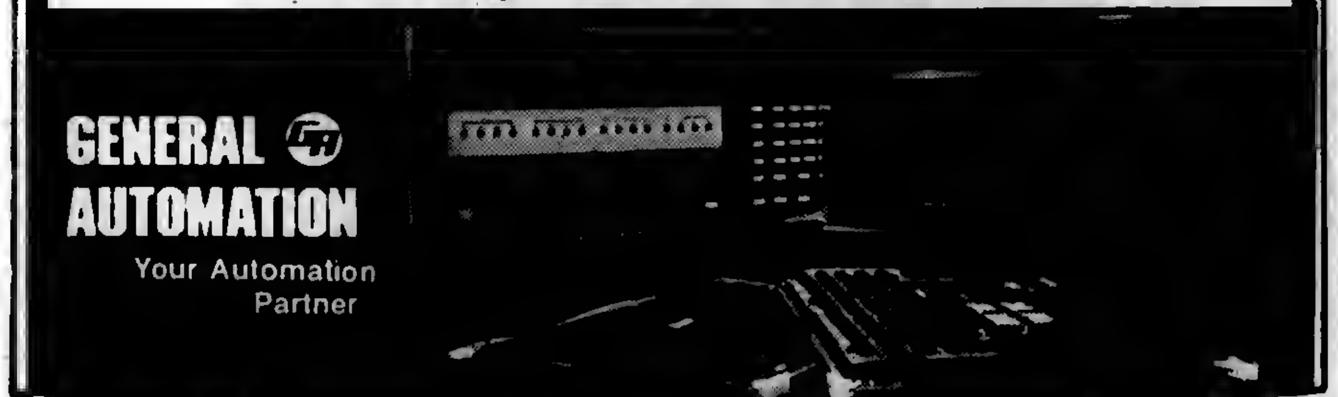

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Immediate openings are available in our Park Ridge offices in areas of software systems and support.

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Heritage Dental Laboratories, an International Division of Sybron Corporation, has a challenging new position for Systems Analyst to be based at our headquarters in Romulus. This position reports to the Controller and will have responsibility for the design, implementation and maintenance of a management information system.

A minimum three to five years systems experience with degree or equivalent experience in design and implementation of a M.I.S. required. Knowledge of general business accounting systems a must and will receive greatest consideration. Initial extensive travel required. Competitive salary and comprehensive benefit package. Please send resume with salary history and requirements to:

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Systems Programmers

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You will be responsible for the installation, daily operation, backup and recovery, debugging, maintenance and tuning of DBMS on the Corporate Computer Center systems utilizing MVS. You must have extensive knowledge of VS2 internals and concepts in a production environment. Additionally, you have experience with VS2, JCL, utilities, assembler language, and database concepts. Hopefully, you have teleprocessing experience. Please indicate 7531-E on your response.

MVS SYSTEMS PROGRAMMER

You will be responsible for the installation and maintenance of software on the Corporate Computer Center systems utilizing MVS. This includes the SCP, program products and utilities. Extensive knowledge of VS2 internals and concepts in a production environment is required. Additionally, experience with VS2 utilities, assembler language and SMP is a must. Please indicate 7532-E on your response.

VM SYSTEMS PROGRAMMERS

You will be responsible for the generation, modification, installation, maintenance and tuning of VM on the Corporate Computer Center system. This includes CP, CMS and program products. Extensive knowledge of CP internals is a must. Additionally, performance measurement and tuning experience is required. Please indicate 7533-E on your response.

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You will be responsible for supporting approximately 600 local Amdahl computer users in the effective utilization of computing facilities and services. This includes consultation and assistance in problem definition and solution, education and training in the use of TSO, SPF, JCL, utilities, JES2, CMS and Amdahl standards. You also will be responsible for the Users Guide and publishing bulletins. Experience in all the above areas and broad exposure to large systems is a must. Please indicate 7534-E on your response.

Qualified candidates are invited to direct their response to Employment Department, Amdahl Corporation, P.O. Box 5070, Sunnyvale, CA 94086. We are an equal opportunity employer.

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PROGRAMMER/ANALYSTS

Systems Development Project

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Our immediate needs are for individuals who will provide programming and analysis support for the development of a large scale on-line information system. This is an opportunity to use your skills in statistical programming, conceptual modeling, simulation, data dictionary, quality assurance, acceptance testing plus data base analysis and design. These positions provide the opportunity to apply state-of-the-art techniques in a highly motivating IBM/AMDAHL and OS/MVS environment. A minimum of 3 years programming experience required, with a working knowledge of BAL and JCL, knowledge of PL/1, FORTRAN and DBMS is highly desirable. Good verbal and written communication skills are essential.

You should also note that TRW/ISD is exclusively in the data services industry, and, due to our continued growth provides on-going opportunities for communication, network, data base systems, and applications Programmers/Analysts in a state-of-the-art environment. The benefits, salaries and professional atmosphere we offer are among the finest in the industry. If you have an interest in pursuring a career with TRW Information Services, send your resume including salary requirements to: Human Resources.

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Manage data processing activities for mining company and its subsidiaries. Handle major administrative functions including personnel, technical problems and systems design and analysis.

QUALIFICATIONS

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- Experience in remote processing and in data base management systems.
- Background in both business and engineering related computer disciplines preferred
- Mining industry experience helpful

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UNIVERSITY OF WISCONSIN-EAU CLAIRE

DIRECTOR OF ACADEMIC COMPUTER SERVICES

The Director of Academic Computer Services is responsible to the Vice Chancellor for Academic Affairs for coordinating all instructional computing services and for the related equipment and facilities. Academic computer services will be a new unit at the University of Wisconsin-Eau Claire beginning with the 1978-79 fiscal year. The unit will begin operation with eight positions and an operating budget of approximately $200,000.

Qualifications for the position include strong academic credentials (preferably a minimum of a master's degree, i.e., MBA, MS-Business, or MS-Computer Science) with preference given to candidates who have experience in teaching and directing students in programs emphasizing computing. An extensive knowledge of both computing hardware and software, as well as sufficient experience with university computing activities to give understanding to current needs and problems, are necessary. Administrative management and planning skills are required.

Appointment will be made as soon after July 15, 1978, as possible. Salary will be commensurate with training and experience.

Interested persons should send applications with vitas and supporting material, names of references, transcripts, etc. before July 15, 1978, to Dr. Larry Schnack, Assistant Vice Chancellor, University of Wisconsin-Eau Claire, Eau Claire, WI 54701. The university is an affirmative action, equal opportunity employer.

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The successful candidate should have at least 8 years experience in medical/hospital information systems with at least 4 years in a teaching hospital associated with a medical center. Must have progressive management experience including programming, systems development, and systems design with a working knowledge of data base concepts. Strong user orientation desired with emphasis on team approach to design and development activities. Candidate should be goal oriented with proven ability to manage effectively.

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An EOE/AA

Wanted

Sr. Applications Programmer

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RSVP SERVICES
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- Atlanta, Georgia
- Cincinnati, Ohio

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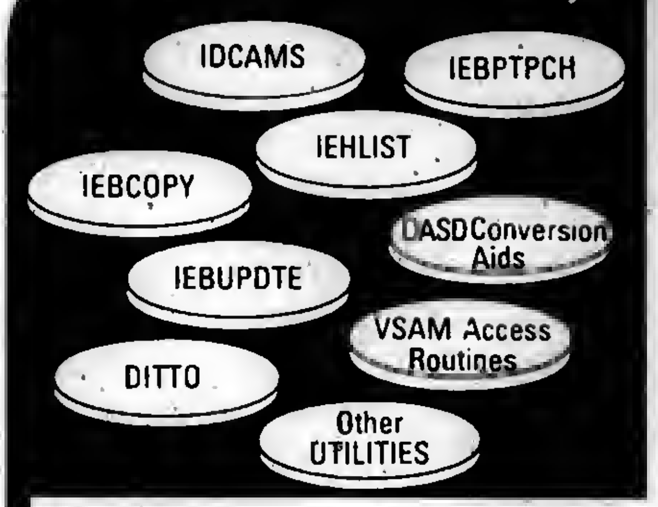

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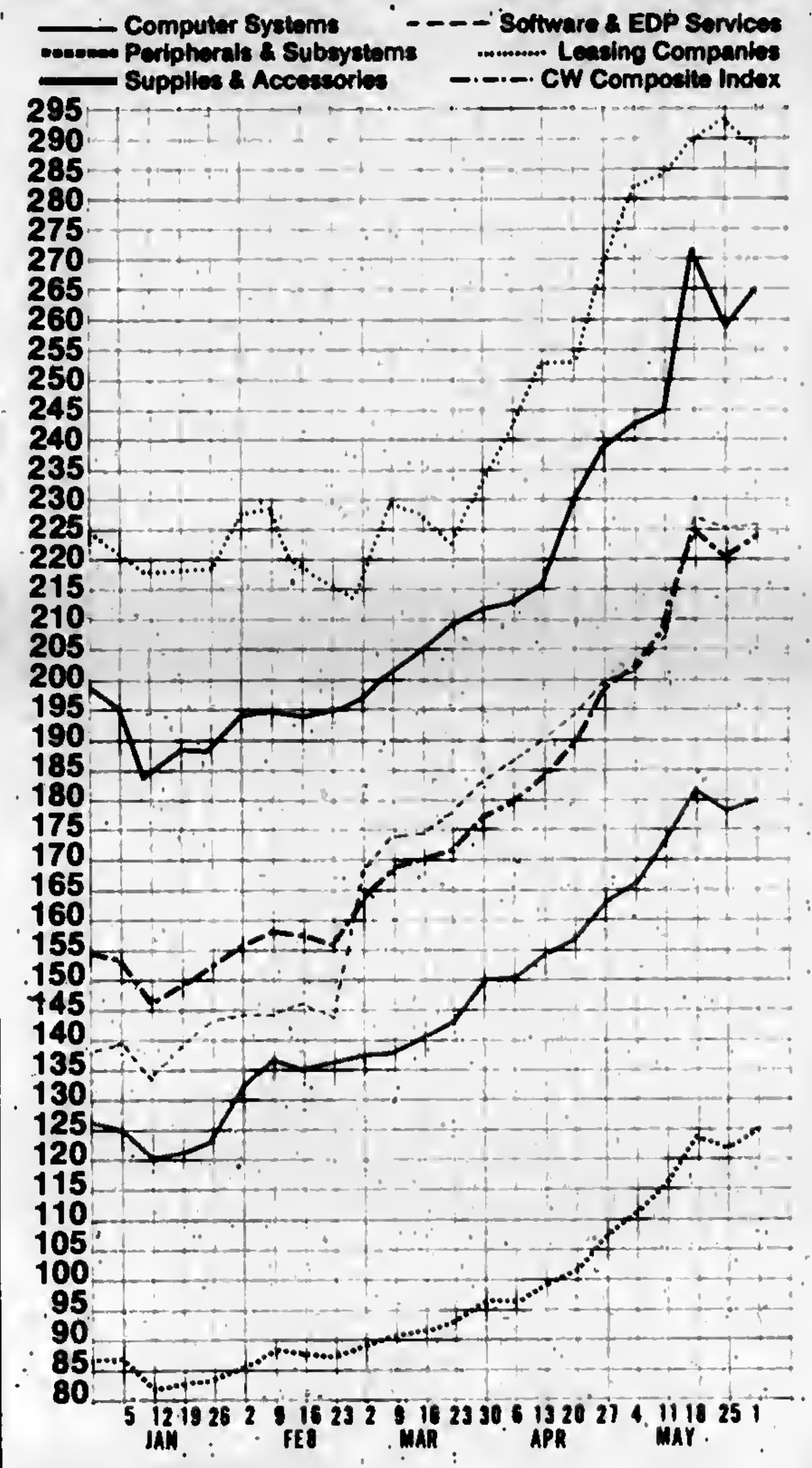

Earnings Reports

ANACOMP

Three Months Ended March 31

	1978	1977
aShr Ernd	$.38	$.29
Revenue	8,345,380	4,729,360
Earnings	418,883	350,511
a9 Mo Shr	.89	.78
Revenue	15,705,841	10,943,393
Earnings	1,060,265	972,596

e-Reflects a 10% stock dividend in September 1977 and April 1978.

CENTRONICS DATA COMPUTER

Three Months Ended March 31

	1978	1977
Shr Ernd	$.82	a$.53
Revenue	10,688,201	14,809,299
Earnings	3,600,765	3,249,569
9 Mo Shr	1.74	a1.51
Revenue	53,458,741	42,029,935
Earnings	10,125,711	9,171,820

a-Adjusted to reflect 25% stock dividend in October 1977.

CINCINNATI MILACRON

Three Months Ended March 25

	1978	1977
Shr Ernd	$.92	a$.56
Revenue	141,794,000	116,116,000
Earnings	8,788,000	4,122,000

a-Adjusted for two-for-one stock split in January 1976.

TESDATA SYSTEMS

Three Months Ended March 31

	1978	1977
Shr Ernd	$.33	$.39
Revenue	4,171,000	3,279,000
Earnings	417,000	393,000

WANG LABORATORIES

Three Months Ended March 31

	1978	1977
Shr Ernd	$.31	a$.17
Revenue	50,964,000	32,036,000
Earnings	3,518,000	1,903,000
9 Mo Shr	.79	a.47
Revenue	134,333,000	88,268,000
Earnings	9,765,000	4,675,000

e-Adjusted for a Class B stock dividend in July 1977.

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Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 31, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

CONPUTER SYSTENS

EXCH		1977-78 RANGE (1)	CLOSE NAY 51 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	ANOAHL CORP	22- 34	32 7/8	+ 3/8	+1.1
N	BURROUGHS COAP	55- 91	72	+ 1/8	+0.1
O	COMPUTER AUTONATION	18- 56	33 3/4	-1 1/4	-3.5
N	CCNTROL OA7A CORP	20- 55	52 5/8	+1 1/8	+3.5
O	CRAY RESEARCH INC	15- 46	40 1/2	-2 1/4	-5.2
N	OATA GENERAL CORP	35- 59	55 3/8	0	0.0
N	OATAPOINT CORP	18- 56	55 7/8	+5 1/2	+6.6
N	OIGITAL EOUIPNENT	57- 55	47 5/8	- 1/8	-0.2
N	ELEC7AONIC ASSOC.	2- 8	7 7/8	+ 5/8	+8.6
A	ELECTRONIC ENGINEER.	8- 17	15 1/2	- 1/2	-5.1
O	FOUR-RHASE SYSTENS	13- 32	51 1/4	+ 1/2	+1.6
N	FOK8ORO	28- 54	56 1/4	+1 3/8	+5.9
O	GENERAL AU7ONATION	6- 15	15 1/4	+2 1/4	+20.4
O	GRI CONPU7EA CORP	1- 1	1 1/4	+ 1/8	+11.1
N	NEWLET7-PACKARO CO	62- 87	77 5/4	-1 1/2	-1.8
N	NONEYWELL INC	45- 58	57	+1 3/8	+2.4
N	I8N	256-286	258 1/4	-4 1/4	-1.6
O	NANAGENEN7 ASSIS7	5- 18	16 1/4	- 7/8	-5.1
O	MICROOATA CORP	7- 18	15 7/8	+ 3/8	+2.4
O	MINI-CONPUTER SYST	5- 12	7 1/4	0	0.0
O	NOOULAR COMPUTER SYS	5- 15	14	+1 1/4	+9.8
N	NCR	32- 57	54 1/4	+ 5/8	+1.1
O	PRINE CONPU7EA INC	12- 22	22 1/8	+1 5/8	+7.9
N	PEAKIN-ELNEA	17- 25	22 7/8	+1	+4.5
N	AAYTHEON CO	16- 47	45 3/4	+2	+4.5
N	SRERRY RANO	30- 44	41 3/4	- 1/4	-0.5
O	SYCOR INC	8- 24	24	0	0.0
A	SYSTENS ENG. LABS	5- 19	17 3/4	+ 1/4	+1.4
A	WANG LABS.	10- 25	21	- 1/8	-0.5

LEASING CONPANIES

EXCH		1977-78 RANGE (1)	CLOSE NAY 51 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORR	3- 6	5 7/8	0	0.0
C	BOOTHE COURIER CORR	8- 18	16 3/8	- 1/2	-2.9
O	COMOISCO INC	9- 17	15 3/4	+1	+6.7
A	COMNEACE GAOUP CORP	1- 5	5/8	- 1/4	-28.5
A	CONPU7EA INVSTAS GRP	1- 2	7/8	- 1/8	-12.5
N	UA7RONIC RENTAL	0- 2	1 5/8	0	0.0
A	DCL INC	1- 4	4	+ 1/4	+6.6
N	UPF INC	6- 12	12	+ 7/8	+7.8
N	ITFL	13- 27	24 5/4	- 1/8	-0.5
N	LEASCO COAP	19- 34	32 1/2	+ 1/8	+0.3
O	LEASPAC COAP	1- 2	1 7/8	0	0.0
A	RIONEER TEX CORP	5- 11	6 7/8	+ 5/8	+5.7
N	U.S. LEASING	10- 16	14 7/8	- 1/8	-0.8

SOETWARE & EOP SERVICES

EXCH		1977-78 RANGE (1)	CLOSE NAY 51 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCEO COMR TECH	0- 2	1 1/4	- 1/8	-9.0
O	ANACONR INC	7- 14	14 3/8	+ 7/8	+6.4
A	APPLIEO OATA RES.	5- 14	12 5/8	- 1/8	-0.9
N	AUTONATIC DATA PROC	25- 32	31 1/2	+ 5/4	+2.4
O	COLENAN ANERICAN COS	1- 2	1 1/2	0	0.0
O	CONPU-SEAV NETWORK	7- 15	10	- 1/2	-4.7
O	CONP ELEC7ION SYSTNS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 2	3 5/4	+ 5/4	+25.0
O	CONPUTEA NE7WORK	6- 11	10 1/4	+ 3/8	+3.7
N	COMRUTER SCIENCES	7- 12	11 5/8	+ 3/8	+5.3
O	CONPUTEA TASK GRUUR	1- 4	4 1/2	+1	+28.5
O	CONPUTEA USAGE	1- 4	5 1/8	- 1/4	-7.4
O	CONSHARE	5- 15	13 1/4	- 5/4	-5.3
O	OATA OINENSIONS INC	3- 5	4 7/8	+ 1/2	+11.4
O	OATAPA8	1- 2	1	- 1/4	-20.0
N	ELECTRONIC OATA SYS.	14- 25	20 3/4	+ 3/8	+1.8
O	INSYTE CORP	2- 5	1 1/8	0	0.0
O	IPS COMPUTER NARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	3 5/4	0	0.0
O	KEYOATA COAP	1- 3	1 5/4	- 1/4	-12.5
A	LCGICON	7- 17	12 1/4	-1 1/8	-8.4
A	NANAGENEN7 OATA	1- 2	1 1/4	0	0.0
A	NATICNAL CSS INC	10- 26	24 3/8	- 1/8	-0.5
O	NATIONAL OATA CORP	4- 12	11	+ 1/4	+2.3
A	ON LINE SYSTENS INC	16- 25	25 7/8	+1	+4.3
N	PLANNING AESEARCH	5- 7	6 5/4	+ 3/8	+5.8
O	PROGRANNING & SYS	1- 1	7/8	0	0.0
O	RAPIOATA INC	2- 5	5	0	0.0
O	REYNOLOS & AEYNOLO	17- 26	24 1/4	-1	-5.9
O	SCIENTIFIC CONPUTEAS	1- 6	5 1/4	- 1/8	-2.3
O	TYNSHARE INC	14- 27	24 3/4	+ 1/2	+2.0
A	URS SYSTENS	4- 7	6 1/4	0	0.0
N	WYLY CORR	1- 5	4 7/8	- 1/8	-2.5

PERIPHEAALS & SUBSYSTENS

EXCH		1977-78 RANGE (1)	CLOSE NAY 51 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	AOORESSOGRAPH-MULT	10- 24	25	+1 3/8	+6.3
O	AOVANCEO NENORY SYS	7- 14	13 5/8	+1	+7.9
N	ANPEK CORP	8- 17	17 1/8	+2 5/8	+16.1
O	ANUERSON JACOBSON	3- 8	7 1/2	0	0.0
N	APPLIEO OIG OATA SYS	10- 20	16 1/2	- 1/8	-0.7
O	BEEHIVE INT'L	5- 12	5 7/8	+ 1/8	+2.1
A	BOLT,BERANEK & NEW	6- 10	8 1/2	+ 1/2	+6.2
N	BUNKER-AAMO	8- 17	17	0	0.0
A	CALCONP	5- 9	8 5/8	+ 5/8	+4.5
O	CAMBRIOGE NENORIES	1- 6	6 1/4	+ 5/4	+13.6
N	CENTRONICS OATA CONP	16- 50	26 1/4	+1 1/2	+6.0
C	COGNITRCNICS	1- 5	2	+ 1/4	+14.2
O	COMPUTER CONMUN.	5- 10	8 1/2	- 3/8	-4.2
C	CONPUTCR CONSOLES	4- 8	8	+ 3/4	+10.5
A	CONPUTER EOUIPNENT	2- 6	5 1/4	- 1/8	-2.5
C	COMPUTER TRANSCEIVER	1- 1	1 5/8	0	0.0
O	CONTEN	9- 24	22 5/4	- 1/2	-2.1
N	CONRAC CORP	19- 28	25 1/4	- 1/2	-2.1
O	DATA ACCESS SYSTENS	4- 5	4 1/4	0	0.0
O	OATA 100	6- 17	16 1/8	0	0.0
A	OATA RROOUC7S CORP	9- 20	18 1/2	- 1/4	-1.3
O	OATA TECHNOLOGY	3- 4	4	- 1/4	-5.8
C	OATUN INC	1- 4	4 1/4	+ 1/8	+3.0
O	DECISION OATA CUMRUT	2- 3	2 7/8	0	0.0
U	OELTA OATA SYSTENS	1- 1	1/2	+ 1/8	+55.3
A	OOCUNATION INC	6- 21	20 3/8	+ 5/8	+3.1
O	OATARAN CORP	2- 24	21 1/4	- 5/4	-5.4
N	ELECTRONIC N & M	4- 7	6 7/8	+ 1/4	+3.7
O	FABRI-TEK	1- 2	1 3/8	+ 1/8	+10.0
O	GENERAL CONPUTER SYS	0- 2	1 3/8	0	0.0
N	HAZELTINE CORP	8- 15	14 1/2	+ 5/8	+4.5
N	HARRIS CORP	28- 58	55 5/4	+ 1/2	+0.9
O	INEOREK INC	4- 9	9 1/8	+ 1/4	+2.8
O	INFORNATION INTL INC	8- 14	9	- 1/2	-5.2
O	INTEL CORP	38- 59	55	+1 1/2	+2.8
A	LUNDY ELECTRONICS	5- 6	3	- 1/4	-7.6
O	NSI OATA CORP	6- 19	17 1/4	+ 1/4	+1.4
N	MENOREK	23- 48	47 1/2	+1 1/4	+2.7
N	MOHAWK OATA SCI	5- 12	11 1/8	+ 1/4	+2.2
O	PENRIL CORP	2- 9	9 1/4	+ 5/8	+7.2
N	PERTEC CORP	7- 14	15	+ 1/2	+4.0
A	POTTER INSTRUNENT	2- 2	1 5/4	0	0.0
C	PRECISION INST.	2- 2	2	0	0.0
O	OUANTOR CORP	3- 5	5	- 1/8	-4.0
U	RECOGNITION EQUIP	6- 10	8 1/2	- 1/8	-1.4
O	SCAN OATA	1- 4	5 5/8	+ 7/8	+54.1
N	STORAGE TECHNOLOGY	10- 59	37 3/4	+ 1/4	+0.6
O	T BAR INC	7- 19	15	+1 5/4	+13.2
O	7ALLY CORP.	4- 9	7 5/4	- 5/8	-4.6
A	TEC INC	6- 10	7 1/4	- 5/4	-9.3
N	TEKTRONIK INC	29- 44	40 5/4	- 5/4	-1.8
N	TELEK	2- 7	6 5/8	+ 3/4	+12.7
O	TESOATA SYSTENS CR	13- 20	17 1/4	+ 1/4	+1.4
O	WILTEK INC	1- 1	5/8	0	0.0

SURPLIES & ACCESSORIES

EXCH		1977-78 RANGE (1)	CLOSE NAY 51 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	ANERICAN BUS PROOS	6- 9	8 1/4	- 1/8	-1.4
O	HALTINOAE BUS FORNS	1- 4	5 3/4	+ 1/2	+15.3
A	BARRY WRIGH7	10- 28	27 1/2	+1 7/8	+7.3
O	CYBERNATICS INC	1- 1	1 1/8	0	0.0
G	OUPLEK RAUUUCTS INC	14- 25	24 1/4	- 1/8	-0.5
N	ENNIS BUS. EORMS	6- 16	15	- 1/4	-1.6
N	3M COMRANY	45- 56	53 5/8	- 3/8	-0.6
O	MOORE CORR LTO	24- 57	52	- 1/4	-0.7
N	NASHUA CORP	16- 51	28 5/4	+ 7/8	+3.1
C	STANUARO REGISTER	18- 26	24 3/4	0	0.0
O	TAR PROUUCTS CO	8- 19	10 3/4	+ 1/4	+2.3
N	UARCO	18- 27	23 5/8	-1 1/4	-5.0
A	WABASH NAGNEIICS	10- 15	13	- 1/2	-3.7
N	WALLACE BUS FORNS	17- 24	23 5/8	+ 1/2	+2.1

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NCC '78: Well Worth the Wait

CW Photo by A. Dooley

While there was often little elbow room for those waiting to visit the exhibits at NCC '78 . . .

By E. Drake Lundell Jr.
CW Staff

ANAHEIM, Calif. — Lines and then more lines marked the largest computer conference ever held as more than 51,000 showed up for the National Computer Conference here last week.

Lines for registration sometimes stretched more than a mile long as some conference-goers waited more than three hours to get into the massive exhibit, which featured 353 companies in 1,041 booths.

With more than $100 million worth of equipment shown on the convention floor — ranging from the nitty-gritty of the components and OEM business to two large mainframes, an Itel Corp. AS/5 and an IBM 3031 — there was something to satisfy every technological palate.

For large users, the big news was the advent of add-on memory for the IBM 30 series as well as a plethora of terminal equipment spread throughout the four halls used to house the exhibition and technical sessions. For those interested in distributed processing, minicomputers on the exhibit floor presented the full gamut of alternatives.

News of NCC's growing popularity, however, was clouded by rumors that 100 exhibitors planned to skip next year's show at the New York City Coliseum to protest that site's limited floor space and high rental costs. Robert Rector, the executive director of the American Federation of Information Processing Societies (Afips), the NCC sponsor, and other federation officials conceded they had heard the reports, but said they had not verified their accuracy.

In addition to the registration lines, there were lines for almost everything else — for lunch, for viewing the popular exhibits, for registering at the hotels. The only other major glitch was the heat in the parking lot that was converted to an exhibit hall. With the crowd and hot equipment, temperatures reached 100° in that hall at times.

Aside from those problems, the entire event was well run and operated smoothly. The technical sessions were, for the most part, of extremely high quality, mixing blue sky computer architecture with real world problems.

The companion Personal Computing Festival drew a mob scene to the Disneyland Hotel and while panelists predicted a shift away from hobby computing to more applications-oriented uses, it was hard to tell from the exhibit floor that such a shift is under way.

In Show's Large System Action

Add-Ons Boost IBM 30 Memory

By E. Drake Lundell Jr.
And Howard A. Karten
CW Staff

ANAHEIM, Calif. — The IBM plug-compatible memory makers led a parade of firms offering new products for large system users at the National Computer Conference here last week, leaving behind a trail of lowered prices.

In addition to the memories, product debuts of interest to large users included a distributed data entry system, a computer output microfilm (COM) unit, plotters and measurement equipment.

With IBM showing a 3031 system — and rumors abounding about its inability to deliver the amount of memory needed by users — Electronic Memories and Magnetics Corp. (EMM), National Semiconductor Corp. and Memorex Corp. all were touting their replacement memories for the IBM 30 series. Several other firms — Itel Corp. and Storage Technology Corp. in particular — said they will soon be announcing systems for the 30 series family, and Intel Corp. showed its previously announced memory for the 30 series.

The heavy action in this area is apparently prompted by IBM's inability to deliver memory in the quantity desired by users, according to most of the

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Congress Wants DP Policy, Not Regulation: Hollings

By Edith Holmes
CW Staff

ANAHEIM, Calif. — Congress has no desire to add to the regulatory burdens the DP industry already carries, Sen. Ernest F. Hollings (D-S.C.) said at the 1978 National Computer Conference here last week.

"All the nation's problems can't be solved in Washington; in fact, they are usually better solved elsewhere. I don't know of a better example of this than the computer industry seated here before me," the senator stated.

But the country's legislature does feel the need to develop national policies regarding information and the computer and communications technologies that support its collection, manipulation and dissemination, Hollings said. In the absence of policies, "technology, which should provide only the force for change, also dictates the direction change takes," he explained.

The more Congress employs computer technology on Capitol Hill, the more its members become aware of the policy issues pervading the use of DP. At present, the government's information policy development is spread among several agencies.

"There is no information policy, and

(Continued on Page 6)

CW Photo by E D Lundell Jr

. . . The exhibit floor sometimes looked like it offered room to roam.

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Communications Act Rewrite Asks Industry Deregulation, New FCC

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. – Deregulation of the communications industry, a new and smaller version of the Federal Communications Commission (FCC) and streamlined procedures for handling common carrier services are the main points of legislation drafted by the House Communications Subcommittee and released here last week.

A complete rewrite of the Communications Act of 1934, the draft bill would abolish the FCC and create the Communications Regulatory Commission (CRC). That commission would be mandated to rely on market forces and competition to provide fair rates and a variety of communications services, according to sources close to the House subcommittee.

The CRC would consist of five commissioners rather than the present seven on the FCC and would only exert its regulatory authority where marketplace forces are deficient and monopoly services exist, the sources said.

The third of the draft act's eight sections deals with common carrier telecommunications – domestic and foreign. One provision would bar a manufacturer of telecommunications equipment from providing communications services, effectively requiring the divestiture of Western Electric Co. from AT&T.

Specifically, the draft law reads, "No person shall provide a noncompetitive telecommunications service and also be engaged in the manufacture of equipment used in furnishing any common carrier service." This provision would take effect three years following the enactment of the law by Congress, sources stated.

The proposed Communications Act of 1978 would also make it illegal for any common carrier to deny specialized carriers the use of its facilities. AT&T would have to permit specialized carriers access to its local loops and could only be exempted from providing such a connection if it could prove that the technical and economic harm to the Bell network would exceed the benefits of the specialized service to the public, the Capitol Hill sources said.

On the other hand, specialized carriers would have to pay an access charge when providing their intercity services through AT&T's local switching facilities. Because these specialized services may deprive Ma Bell of some revenue and force telephone rates up, the draft legislation calls for the CRC to establish a "Universal Service Compensation Fund" to help maintain telephone rates at levels the public can afford.

The proposed law suggests that specialized carriers should bear the burden of forcing an increase in the costs and rates of the monopolized, public-switched network, the sources noted.

Another provision favorable to AT&T would require the CRC to evaluate depreciation schedules every five years with the goal of making this cost to the monopolist less burdensome. The House Communications Subcommittee believes Ma Bell can do a great deal with her network if she can write off much of the cost of depreciation on her huge facilities, the sources suggested.

AT&T should have the monetary ability to keep up with the kinds of services being offered by the smaller, more specialized carriers who don't have the depreciation of a plant built up over decades, the sources said.

The act would allow common carriers to hold or acquire shares in companies providing nontelecommunications services. Common carriers could also offer nontelecommunications services through subsidiaries, according to the draft law.

Defining 'Common Carrier'

The CRC would be charged with deciding what constitutes a common carrier. The carrier, however, could construct, extend or operate a new line so long as it informed the new regulatory agency of its intentions. Unlike the FCC, the CRC could not veto a carrier's expansion plans, the congressional sources stated.

The seventh section of the draft law would rename the National Telecommunications and Information Administration (NTIA) in the Commerce Department the National Telecommunications Agency.

Like President Carter's Reorganization Plan No. 1 of 1977, the Communications Act of 1978 would make the Commerce agency "the principal adviser to the President in matters relating to telecommunications issues and policy," the congressional source said.

In announcing the draft rewrite of the Communications Act last week, House Communications Subcommittee Chairman Lionel Van Deerlin (D-Calif.) said his counterpart in the Senate, Sen. Ernest F. Hollings (D-S.C.), has agreed to the bill's provisions.

The House committee expects to begin hearings on the rewritten Communications Act in late June or early July. Revisions will be made to the draft and the congressman hopes to introduce it in the House in January.

Anticipating opposition from the Bell System, Van Deerlin hopes the Congress will pass a new communications law by late 1979 or early 1980.

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SOFTWARE INDUSTRY ASSOCIATION

Peripherals Dominate NCC's Mini Highlights

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Only nearby Disneyland offered area visitors a larger and more varied assortment of attractions than last week's National Computer Conference, and minicomputer equipment vendors did their share to keep the Anaheim Convention Center bursting at the seams with attendees.

Among the scores of minicomputer companies jammed into the NCC exhibit areas, users and prospective users found examples of nearly every DP equipment type, including many products that had never before been publicly displayed.

As with some of the smaller product shows that immediately preceded the conference, the minicomputer sector of this year's NCC floor was dominated by peripherals introductions, although freshly announced CPUs and memories were also much in evidence.

In the processor area, Computer Automation, Inc. used the conference as an occasion to announce its first foray into the end-user market with the introduction of its Protos computer system. Described as a high-end addition to the company's product line, Protos incorporates a CA 4090 processor modified to compete in the same performance class as the Digital Equipment Corp. PDP-11/70, Data General Corp. M/600 and Prime Computer, Inc. Model 500, according to CA.

Protos reportedly holds a minimum of 128K bytes expandable to 2M bytes and provides a feature called Automap, which permits users to access files in memory without forcing them to perform I/O operations. It also provides a Protos multiprogramming operating system with a systems implementation language dubbed Alamo, company officials said.

A minimum configuration with one 80M-byte disk drive unit, a CRT terminal, a 300 line/min printer, eight asynchronous I/O ports and dual 256K-byte floppy disk drive units costs $80,000, a spokesman added.

Multiprocessor System

Also introduced at the conference was a modular multiprocessor system from Basic Timesharing, Inc. (BTI). The Model 8000 embodies a "variable resource architecture" with a 32-bit master bus that transmits 60M byte/-sec to as many as 16 hardware modules, BTI officials said.

The bus structure also reportedly allows the system to accommodate up to eight supermini-like processors.

Software features available with the system include Pascal plus Ansi-standard Cobol, Fortran IV, the Codasyl data base management system, extended Basic, RPG-II and assembler, company officials said.

A minimum 8000 configuration with one 256K-byte CPU, 33M-byte disk unit, four I/O channels and one asynchronous terminal port costs $86,850.

Designed to accept multiple on-line terminals, the system also comes with a virtual multiprocessing monitor.

Another vendor to introduce a miniprocessor at the show was Ampex Corp., which announced a 15-in.-square single-board computer compatible with DG's Nova series. The Model 12 reportedly represents the first in a series of Ampex minis that can accommodate Nova peripherals and applications packages.

The second computer in that series is slated for introduction in late summer, Ampex officials said.

Expandable to 64K bytes, the Model 12 cycles in 1,200 nsec and is said to come in several versions. One of these versions occupies 5.25 in. of rack space and five CPU chassis slots, the product's developers said.

Another requires 10.5 in. of rack space and 13 board slots, while the largest version occupies 22.75 in. of rack and 17 chassis slots, they added.

A 32K-byte system requiring five board slots costs $3,975 in OEM quantities, Ampex officials said.

Peripherals Debut

In the peripherals area, Control Data Corp. announced its Certainty series, a line of IBM Series/1-compatible mass storage and I/O units. The introductions include three members of the 270 series of removable disk systems with 63M-, 126M- and 240M-byte storage capacities; four members of the 230/-240 series of fixed disk systems designed to hold 9.3M bytes and 19.7M bytes; a 592K-byte 210 series floppy disk system said to transfer 31,250 byte/sec and access in 23 msec track-to-track; and two 450 series band printers said to output 220- to 360 line/min and 440- to 720 line/min.

Also introduced were a Series 420 matrix printer described as outputting 70 line/min with a 132-char. line and a 610 series CRT terminal that displays 1,920 char. and operates up to 4,000 feet from its host processor.

Purchase prices for the 270 series range from $21,250 to $41,500; for the 230/240 series, from $6,850 to $14,990; and for the 450, from $10,995 to $15,300, CDC said. The 210 series, meanwhile, costs $2,690, compared with $4,030 for the 420 series and $2,420 for the 610 series, the company added.

Among the show's other peripherals manufacturers, Shugart Associates announced it was charting a new corporate direction with the introduction of its first rigid disk systems — the SA4000 series, which comes in 14.5M- and 29M-byte versions with an optional 144K bytes of head-per-track storage.

Compatible with the IBM System/32, System/34 and Series/1, the fixed-disk systems reportedly access in 87 msec, rotate at 2,964 rpm and transfer 889K byte/sec. The single-disk SA4004 provides 808 addressable tracks, while the dual-disk SA4008 has 1,616 addressable tracks, Shugart noted.

The 14.5M-byte unit costs $2,550 in end-user quantities and $1,325 in quantities of 250 or more, compared with the 29M-byte version, which sells for $3,500 in end-user quantities and $1,800 in OEM quantities.

Show's Only Software Surprise

Cobol Switched Between Environments

By Don Leavitt
CW Staff

ANAHEIM, Calif. — A Cobol system was moved from one hardware environment to another with the switch of a pair of floppy disks in one of the most dramatic software demonstrations linked to this year's National Computer Conference.

Unfortunately, most NCC attendees never saw this particular demonstration. The UK's CAP-CPP group of software companies showed its Microcobol capabilities in a third-floor suite in the Disneyland Hotel, a quarter of a mile from the overcrowded Convention Center.

The software — an interpreter and runtime system — was switched back and forth between a Digital Equipment Corp. LSI-11 and Mostek Z80-based small business system. The floppies could have been transferred to any other microcomputer with equally effective results, spokesmen claimed.

In order to emphasize how simple the switch from one of the micros to the other really is, the vendor let a couple of its nontechnicians handle the chore of swapping the floppies and running the programs.

An American affiliate of the British firms is currently offering Microcobol to any interested system vendor, a spokesman noted.

Nothing Else New

Other than Microcobol and its transportability, this year's NCC had very little new to attract those interested in software. There were useful packages being discussed, but apparently no new offerings this time around.

The vendors of data base management systems probably made up the biggest single group. Cullinane Corp. had a booth where it described the latest version of its Integrated Data Base Management System (IDMS) and its related supporting packages.

MRI Systems Corp. was there, as well, with descriptions and demonstrations of its data base system, System 2000, and the Control 2000 data dictionary. Almost next door was the booth sponsored by Software AG of North America, where Adabas was the topic of dicussion.

Software AG also had a neatly handled radio-controlled robot which attracted the curious, even though there were at least two other "automata" roaming the exhibit floor.

Management Science America had a booth to show off its application software, as did McCormack and Dodge. A newcomer to the main NCC exhibition, but a carryover from last year's Personal Computing Fair, was Billings Computer Systems of Provo, Utah, which is offering a micro-based hardware system and a range of accounting application packages.

Issco was on hand, too, talking about its Disspla graphics software and the Tellagraf facility that allows an intermixing of graphics and tabular data to make management reports more meaningful.

MSP, Inc. was at the big show, but almost lost in the look-alike booths financed by the British government for about a dozen firms that are based or had their roots in the UK.

Unlike many of the earlier NCCs or even earlier Joint Computer Conferences, NCC '78 attracted very few remote computer service vendors. Control Data Corp. had a hardware booth, as usual, but there wasn't even a reference to its Cybernet service anywhere to be seen.

Tymshare was touting its Tymnet packet-switched communications and General Electric people were talking about terminals and not their timesharing service.

Altogether, a quiet show — in terms of software — except for the Microcobol demonstration.

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Wants '76 Law Amended

Contu to Recommend Copyrights for Programs

By Edith Holmes
CW Staff

AHAHEIM, Calif. — The National Commission on New Technological Uses of Copyrighted Works (Contu) will recommend that Congress extend the protection of the 1976 Copyright Law to cover computer programs when it issues its report to Capitol Hill on July 31.

If Congress agrees with this recommendation, the moratorium on employing the full weight of the copyright law to guard against unauthorized copying of software will be lifted, Michael S. Keplinger, lead attorney on the Contu staff, told a 1978 National Computer Conference session on the legal aspects of software protection here last week.

Contu will suggest that the copyright law be amended to include a definition of a computer program, calling it "a set of statements or instructions to be used directly or indirectly in a computer to bring about a result," Keplinger said.

The proposed amendment of the law also includes a new section that would make unquestionable an owner's right to "copy" his program for use in a computer system, the Contu lawyer added. Copies of the software can be leased, sold or transferred with the authorization of the owner of the program and, hence, the copyright.

These suggested changes to the copyright law represented the majority opinion of the commission of 12 men and women on what legal protections should be afforded software, Keplinger noted. A minority stance, taken and led by prize-winning author and Contu commissioner John Hersey, contended that programs are a part of a machine and that extending copyright protection to them would harm the status of works traditionally guarded by copyright, ultimately doing severe cultural damage.

Hersey recommended that a new protective category — something like copyrights and patents — be devised specifically for software and other products of an electronic age. Though much debated, that concept was rejected by Contu.

Debate Goes On

Independent of Contu's actions, the debate on what legal protections best fit software continues in the computer industry and was evident at the NCC session as Martin R. Goetz of Applied Data Research, Inc. agreed with Hersey that computer programs are "machine components" and Robert O. Nimtz of Bell Laboratories maintained that nothing less than the trade secret laws will provide adequate safeguards for software that has a commercial value.

While he echoed Hersey in the belief that software is part of the computer system machine in the same way as a disk or a tape, Goetz ventured further, saying the same laws — federal and state — that apply to machines and their components should apply to software.

Software should be eligible for protection by copyright and patent; software should be eligible for investment tax credits, Goetz said. But software should also be subject to sales and personal property taxes and should be able to be capitalized, he added.

There is no logical argument for exempting software and software systems from taxation, Goetz stated. There is overwhelming evidence that computer programs are tangible items and should be treated exactly as hardware is under state and federal laws — "no better and no worse," he said.

"It's time we stopped twisting the legal definition of software to meet our own economic desires," Goetz declared.

The National Bureau of Standards (NBS) believes copyright protection is applicable to computer programs and simple clarifications in the law will suffice, he said. NBS would copyright only the source code and then call conversion of source code to object code making a copy of the software because no logic is added in the process.

The translation of a program to another language should be regarded as a derivative work that is also entitled to legal safeguards, in NBS' view, Goetz said.

'Bought and Sold'

"I don't care how any of us defines software," Nimtz stated. "It is a commercial product that exists and is bought and sold in the commercial marketplace. Software has costs and profits associated with it."

The commercial value of computer programs can only be protected, "now or ever," by trade secret laws, Nimtz said. "The copyright law doesn't stop anyone from taking a program; that law just provides a remedy once the software has been copied," he added.

Nimtz is convinced software firms and others creating programs will continue to license their wares for use under contracts with trade secret clauses.

Nimtz believes the copyright law will have no impact on the computer industry if applied to software — except for a notice of preemption in the law which could keep programs protected by copyrights from being safeguarded by trade secrets at the same time.

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Vendors Exhibit Bevy of Intelligent Terminals

By Ronald A. Frank
And Marguerite Zientara
CW Staff

ANAHEIM, Calif. — Intelligent terminals and terminal systems proliferated among the data communications products displayed at the National Computer Conference here last week.

An intelligent terminal with IBM 3270 compatibility was introduced by Teletype Corp. The Model 4540 interactive I/O terminal includes dual microprocessors and was designed for such applications as inquiry/response, data entry and data retrieval.

The 4540 operates with binary synchronous communications protocol using either Ascii or Ebcdic code and has transmission speeds ranging from 2,400- to 9,600 bit/sec. the company said.

The intelligent terminal is described as the first of a series and includes error checking and correcting. The microprocessor-based controller incorporates up to 64K of addressable memory, up to 32 ports for device connection and two RS-232 ports to interface with transmission facilities.

A typical system of six CRTs in a clustered configuration costs about $17,000, with first deliveries scheduled for the first half of 1979.

Racal-Milgo, Inc. introduced the System 4000 intelligent terminal system, which is available with built-in emulators for the IBM 3270 and 2260, Univac UTS 400 and Honeywell Information Systems, Inc. 7700 terminal modes. The system includes a cluster/controller, up to 1M byte of floppy disk storage and CRT terminals.

Program and task scheduling and dynamic memory management in the controller are supervised by the Virtual Machine Operating System.

A typical configuration with four CRTs and a line printer costs about $20,000 with initial deliveries scheduled for this September.

Incoterm Corp. showed the 1001 CRT with detachable keyboard which is said to be compatible with earlier Incoterm display devices. The unit costs $1,665.

The company also introduced its 3000 line of intelligent source data collection terminals. Model 3102 and 3106 are data entry stations with alphanumeric keypad. The 3102 costs $1.650 while the 3106 is priced at $1,750.

The 3305 labor-reporting terminal includes an 18-character display with keyboard in a wall-mounted unit. A typically configured terminal costs $3,595, Incoterm said.

Computer Devices, Inc., showed its Miniterm PRO Model 1206, a portable terminal with 32K of main memory and built-in tape drive. The 1,200 bit/sec unit is said to operate in typewriter, teletypewriter or numeric cluster configurations and costs $5,495. Rental on a three-year lease is $225/mo, the company said.

General Automation, Inc. introduced its Network Data Series (NDS) for distributed DP applications using the firm's Autonet network architecture, which is said to employ packet-switching techniques.

Each NDS host processor can handle four CRTs, a 10M-byte disk and a 200 line/min printer. First deliveries are set for this fall.

Digital Equipment Corp. unveiled the PDT microcomputer-based programmable data terminals. All three PDT-11 terminals use the DEC VT100 display.

The PDT terminals are said to be compatible with the instruction set of PDP-11 processors. The PDT-11/110 costs $3,900.

Honeywell Information Systems, Inc. showed its VIP 7801 CRT, a microprocessor-based display. The 7801 costs $2,885 and is said to have extensive data edit and validation capabilities.

Rash of TI Offerings

Texas Instruments, Inc. announced a plethora of products here, including the DS 990/AMPL multistation prototyping lab in three versions for TI's 9900 family of microprocessor applications. Each of the systems can reportedly support four lab stations.

The systems are based on the DS 990 models 4, 6 and 8 systems with their 990/10 minicomputers, according to the firm. These systems include a 128K-byte memory, disk storage from 10M to 100M bytes, DX10 disk-based software and Model 911 CRT terminals.

A configuration including the DS 990 Model 4, Model 810 printer, TMS 9900 emulator and software, Trace and programmable read-only memory programming is priced at $36,745, a company spokesman said.

TI also introduced five members of the Series 700 intelligent terminal family. The models 771/1 and 2 and the 774/2, 3 and 4 were designed for distributed processing environments, the firm said, and each model offers upward compatibility with the models 770 and 774/1.

The Model 771/1 is a single-station intelligent terminal with a 1,920-char. CRT display, two diskette drives, data entry keyboard and 64K-byte processor. A built-in Silent 700 terminal printer is included with the Model 771/2, the firm said. The Model 771/1 is tagged at $7,450, the Model 771/2 at $8550.

The Model 774/2 is a multistation intelligent terminal system with dual diskette storage. Standard hardware reportedly includes a 96K-byte processor, 1,920-char. Model 911 CRT, dual 256K-byte diskettes and two communications ports. The price of the unit is $15,450.

The Model 774/3 standard configuration adds a 5M-byte fixed platter and 5M-byte removable cartridge disk drive to the 774/2. Its price is $23,200. The Model 774/4 substitutes a 160K-byte processor and an expansion cabinet to support as many as eight CRT stations and five printers. Memory can be expanded to 416K bytes, TI said. The unit costs $35,725.

Also introduced was the Omni family Model 820 KSR terminal, which reportedly features 150 char./sec printing of an original and five copies with a 9 by 7 dot matrix format, 128-char. alphanumeric Ascii keyboard and answerback memory. Transmission rates are from 110- to 9,600 bit/sec. The unit costs $2,395.

Tektronix Products

Tektronix, Inc. previewed several new products, including a color graphics terminal, 25-in. CRT terminal, C-size programmable plotter and a library of graphic software. The 4027 color graphics terminal has a raster scan display with capabilities of scrolling graphics and alphanumerics and multipage graphing with the added feature of color, according to the firm. The unit will be available later this year for $8,695.

The Model 4016-1 computer CRT terminal was also shown. It has a 25-in. diagonal screen and 4,096 by 3,120 "viewable high resolution," according to the company. It is suited for displaying the graphics found in contour mapping, seismic analysis and energy field modeling. Available later this year, it will cost $19,500.

Tektronix's Model 4663 interactive digital plotter has a built-in processor and can plot on up to 17-in. by 22-in. paper or Mylar with felt tip, ball point or wet ink pens. Available in the fall, the unit is priced at $9,495.

The Plot 10 interactive graphics library supports color graphics terminal applications with color paneling of irregular polygons and support for color output to the Tektronix 4662/4663 interactive digital plotter, the firm said. It is divided into five logical levels and is priced beginning at $2,500.

Congress Wants Policy, Not Regulation

(Continued from Page 1)

we must have one," Hollings maintained. "The government must come to grips with information, computers and communications."

Hollings highlighted four issues that have captured congressional imaginations and may see some action in that third of the federal government soon. The relationship between computers and communications and how much of the DP business the Federal Communications Commission (FCC) should be permitted to regulate headed the senator's list of concerns.

Hollings added to this concern congressional interest in the federal government's own computer operations — specifically, how better software standards might make computer procurements more sound; in the export of U.S. electronic goods to such hardy world competitors as Japan and West Germany; and in individuals' rights to the privacy of their records and limited government access to personal information.

The FCC is nearing the completion of its second Computer Inquiry, designed to further define the line between what the agency can and cannot regulate, Hollings reported. Although scheduled for some decision this week, resolution of the Computer Inquiry has been postponed until mid-July. Congress is very interested in what the FCC will have to say, the senator told the NCC audience.

The House Communications Subcommittee last week announced the initial results of its efforts to rewrite the Communications Act of 1934 to take into account changes in communications technology in the last 40 years (see story on Page 2). The rewrite involves many of the same questions with which the FCC is wrestling, Hollings said.

CW Photo by A. Dooley

Sen. Ernest F. Hollings.

"Neither Congress nor the FCC should regulate the DP industry," the senator stated. "It is an industry that has grown and prospered through competition in the free market."

Hollings termed encouraging the National Bureau of Standards' (NBS) request for substantial funding increases for the software standards work planned by its Institute for Computer Sciences and Technology. He and others on and off Capitol Hill believe standards to be the key to better acquisitions of computer and communications equipment by federal agencies.

While the U.S. wants neither protectionism nor trade wars, Hollings stressed that the government must do something to stop growing trade imbalances between the U.S. and such countries as Japan and West Germany. He asked the industry to let Congress know whether its new U.S.-Japan Trade Facilitating Committee is having any positive effects, measured by an increase in U.S. electronics exports to Japan.

Congress will also pay increasing attention to trade barriers in the form of restrictions on the flow of information across national borders, Hollings maintained.

No Omnibus Bill

Finally, Hollings discussed privacy, telling his audience that there are presently more than 100 privacy-related bills before Congress. He said the Senate is reluctant to go the route of omnibus privacy legislation, fearing overregulation and preferring, instead, to pass laws that govern specific areas, such as financial and medical records.

Hollings stated that while Congress hopes to head off some of technology's negative social impacts through the development of national policies, it wants to foster continued competition in the computer industry by not regulating it. "The policies will become obsolete almost as quickly as the technology does," the senator suggested, adding "the industry has done a good job of regulating itself."

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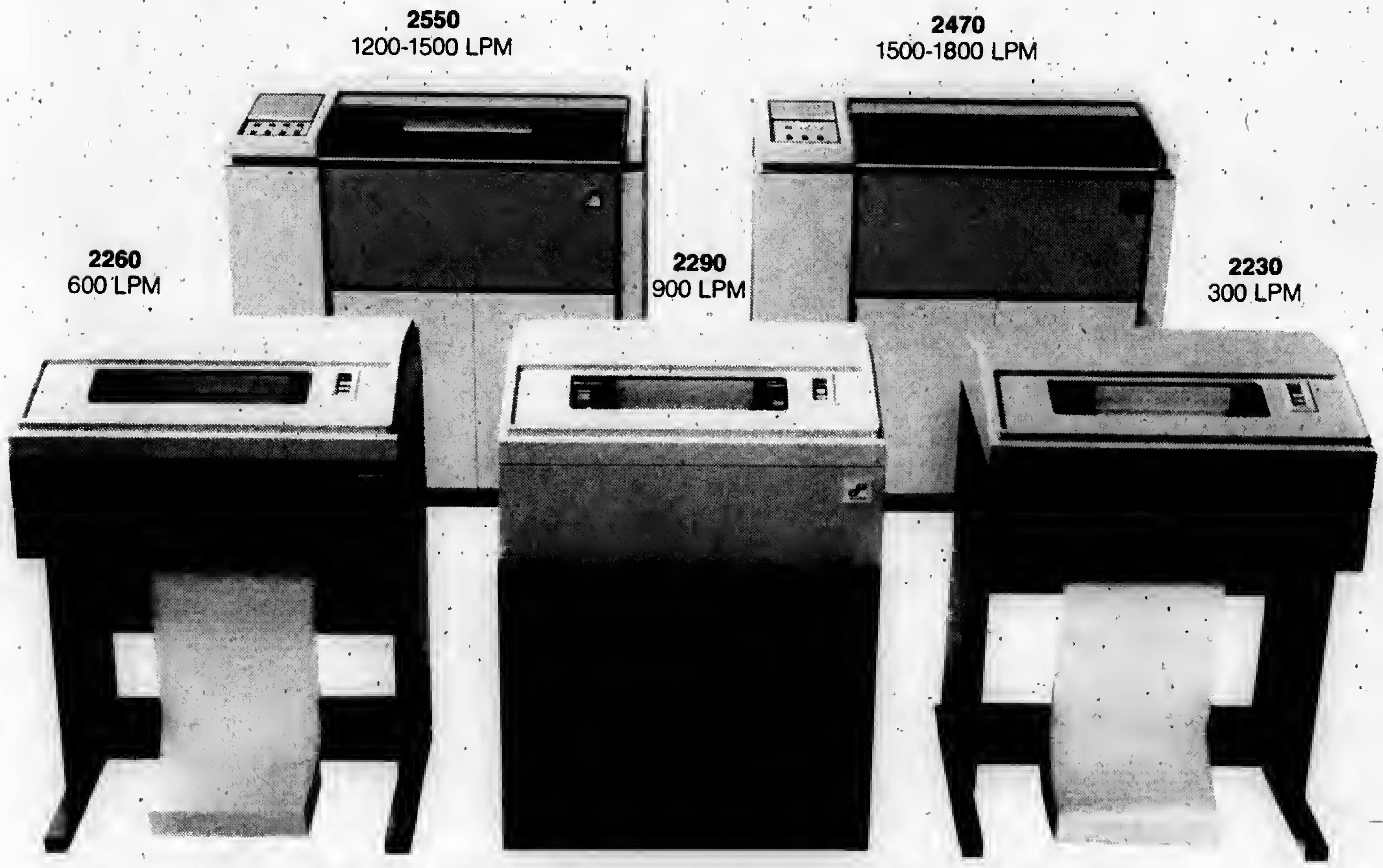

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Not the Only Show in Town

By Don Leavitt
CW Staff

ANAHEIM, Calif. — The National Computer Conference was expected to draw 40,000 people, but at least one person — with a substantial DP background — wasn't even aware of the conference the night before it opened.

He was here for a conference all right, but it had nothing to do with DP. It was a training session for real estate salesmen.

An amiable soul, his story came out over a quick supper. Seems he was a systems analyst at the University of Wisconsin until about seven years ago, when he decided enough was enough. He had a good job with good pay, but he was also at the university when terrorists bombed the data center.

He decided he wanted something out of life with a good deal more human contact. So he got into real estate. He sells new houses, but he also buys, remodels and sells old ones, too.

Recently he and his partner bought a franchise under the Century 21 real estate plan when it became available in Wisconsin. It helps with training, supplies and management planning. He sounded both satisfied and appreciative of all the help it had provided, leaving him free to work with clients.

So what's that got to do with Anaheim? Easy: Century 21's national headquarters is here and Mr. X — we never did catch his name — had come for that company's national conference.

Although he was politely interested in NCC, he doubted he'd even look in; the vocabulary he could remember from a few short years ago "just didn't seem to fit what I've heard of computers today."

CW Photo by A. Dooley

This year's NCC was held in the Anaheim Oranges tennis team's home town; next year's conference will come to fruition in the Big Apple.

Three Independents Boost IBM 30 Memory

(Continued from Page 1)

vendors here. They indicated users are receiving only minimum memory with their 30 series processors and reported extremely high demand for storage with the systems.

The price cuts offered by the plug-compatible memory makers were startling — ranging up to 50% off IBM's standard $110,000-per-1M-byte price.

The biggest problem facing the manufacturers, they said here, is finding user sites for beta tests of the machines since there are so few 30 series systems in the field.

Three From EMM

EMM offered 30 series users three memory models: the 7/3031, 7/3032 and the 7/3033, covering the range of the 30 series processors. Based on 4K static MOS chips, the units are field-installable and expandable, EMM said, adding they are available in 1M-byte increments vs. the 2M-byte steps offered by IBM for the 3032 and 3033.

Four-way interleaving is featured on the 7/3031 and 7/3032, while the 7/3033 is capable of eight-way interleaving. Fetch time for the 3031 replacement is 345 nsec, while the 7/3032 features a 320 nsec fetch time and the 7/3033 offers a fetch time of 285 nsec, the firm said.

Deferred maintenance is offered on the system as it is on other EMM replacement memories. Any troublesome 1M byte of memory can be taken offline by a switch on the front panel for later maintenance.

CW Photo by A. Dooley

Sometimes it was all just too confusing, and maps helped.

The 7/3031 can be upgraded in the field to a 7/3032 "within hours," EMM claimed. In addition, the 7/3033 has a standby memory feature which can take over in the event of double-bit errors, and the front panel permits users to switch out either IBM memory or EMM memory while diagnostics are run.

The EMM units will cost between $77,000 and $88,000 per 1M byte, depending on configuration and amount of memory.

'Chip Is the System'

National Semiconductor Corp., whose exhibit proclaimed that "the chip is the system," is also offering a complete line of series 30 replacement memory — the 8331 for the 3031, the 8332 for the 3032 and the 8333 for the 3033. The units provide performance similar to that of IBM memory, but are based on 16K random-access chips rather than the 4K MOS chips used by IBM — and National Semi is offering some models for half the price of IBM memory: $55,000 per 1M byte, a spokesman said here.

National Semi is also featuring regulated switching power modules in the units which permit them to run for 50 msec without input power, reducing the risk of losing data with momentary power outages, the firm said.

Error diagnostics with the memory systems allow them to pinpoint individual chips so a chip instead of an entire board can be replaced when found faulty.

Deliveries will begin in the fourth quarter of this year.

10M Total From Memorex

Only two units were announced by Memorex — the 6331 for the 3031 processor and the 6332 for the 3032. For 3031 and 3032 users, Memorex offers 10M bytes of storage in 1M-byte increments, which give the system a total of 12M bytes when combined with the minimum IBM memory.

Memorex has taken the middle route in the size of its chips, using 8K MOS random-access chips. The unit is said to equal the IBM performance levels of 345 nsec for fetch and store.

A typical 2M-byte system lists for $148,000 with a monthly maintenance charge of $675. A two-year lease is available at $4,900/mo. The memories will be shipped later this year, the firm said.

Cache With CCD

Memorex also introduced an innovative 3770 disk cache system that combines disks with a 1M-byte charge-coupled device (CCD) array. The unit, which sells for $55,000 and rents for $1,650/mo on a two-year lease, fits logically between the string controller and the disk drives themselves and stores the most used data on the disk drives.

With its own software, the system determines which data is getting heaviest usage and shifts this data from the disk to the CCD memory in a staging operation. Depending on the hit rates for data in the memory, the performance improvements can be dramatic, Memorex claimed, adding that an improvement of 50% is guaranteed for users with the Memorex 3674 control unit.

On the average, for example, the seek time for a full track of 13,030 bytes from the 3770 is .1 msec for the unit compared with 10 msec on disks and the transfer time is 10.9 msec for the CCD device compared with the 16.7 msec disk time; the rotational delay is 2 msec with the CCD memory compared with 8.3 msec, the firm said.

First deliveries of the unit are slated for next February.

Test Unit Sans Sensors

On the performance side, Tesdata Systems Corp. expanded its line of measurement equipment with the MS-108 Channel Event Processor. The unit uses no sensors and can be attached to the channel interface of any IBM-compatible block multiplexer or selector channel, Tesdata said.

The Channel Interface Module (CIM) in the system essentially recognizes all data coming through the channel. This in turn can be analyzed by five microcomputers in the control unit, each with 32K of memory, a spokesman explained.

The user can program the system to determine what exact measurements he wants to make on the channel data, Tesdata said, adding each CIM can handle eight channels and up to eight CIMs can be linked together for a total of 64 channels. However, only eight channels can be measured at any one time, the spokesman noted.

The unit sells for $27,500 and is used with the firm's MS88 series of measurement systems.

Calcomp COM Unit

California Computer Products, Inc. used the occasion to introduce a 15,000 line/min COM unit. Company officials said the Model 1680 includes a number of program-selectable character sizes, as well as several differing reduction formats.

Scheduled for initial delivery in October, the unit will sell for $225,000, company officials stated.

Other offerings from the company were plotter controllers and a desktop drum plotter. The controllers, designated the models 909 and 930, are microprocessor-based units designed to drive plotters; they sell for $13,000 and $35,000, respectively.

Pertec Computer Corp. weighed in with a scaled-down version of its previously introduced XL40 distributed processing system. Company officials said the microprocessor-based system, called the XL20 and scheduled for initial delivery in October, is capable of serving up to four CRTs and four diskette drives with a maximum of 4.8M bytes of storage.

Memory for the system ranges from 80K to 128K bytes in 16K-byte increments, with a memory cycle time of 600 nsec. Terminals for the system have either 480- or 2,000-character CRT displays, with printers capable of speeds from 160 char./sec to 900 line/-min.

A configuration with 80K bytes of memory, two diskettes with 2.4M bytes each, data communications, the 480-character CRT and a 160 char./sec printer sells for $20,560, according to the company.

But Change Predicted

Federal Privacy Attitude Called 'Benign Neglect'

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — "Benign neglect is the federal government's approach to the problem of individual privacy in the face of increasing numbers of data banks," according to Robert Ellis Smith, publisher of the "*Privacy Journal*" in Washington, D.C. Speaking at a lively and well-attended National Computer Conference session on privacy and data banks, Smith predicted the Carter Administration's attitude will change in the next few years as the public becomes more aware of the issue and of its legal rights in regard to it.

The session, chaired by Oliver R. Smoot, vice-president of the Computer and Business Equipment Manufacturers Association (Cbema), opened with a discussion by Richard Neustadt, assistant director of the White House Domestic Council Policy Staff, of the government's past and present attempts to come to grips with the problem of information gathering as it affects administrative efficiency and personal privacy. He cited several disjointed studies that have been conducted in the past five years by government task forces which then disbanded and said a permanent mechanism must be institutionalized to study the problem.

The government is now starting to "develop policy" in this area, Neustadt said, and "hopefully, next year legislation will be passed addressing the issue."

Points to Ponder

Neustadt mentioned four points that the government must consider in its policymaking. The first is the necessary constraint of the government's ability to repress. "We do not want a police state and we do want individual protection," he said.

Secondly, institutions must be prevented from making decisions based on information such as sex or income. The accuracy of information must be ensured, Neustadt said, and a citizen should have "the right to be left alone."

He noted that even though the Privacy act of 1974 restricts the transfer of information among governmental agencies, the actual guidelines are very vague, necessitating a statement of limits and procedures.

The top priority task is to do some federal "housecleaning." "We are still collecting too much information on people," he said, although the rate has been reduced by 8%.

He also said the public should be leery of extending federal regulation to the private sector and also noted some privacy recommendations, if implemented, would have significant detrimental impacts on the inflationary economic situation in the U.S.

Neustadt recommended openness of information dispersal by institutions so citizens can make informed choices about the institutions they patronize. Since individuals in the U.S. have widely varying degrees of interest in the issue of privacy, a policy that reflects that fact by transferring privacy costs to individuals should be developed, he said.

Willis H. Ware, corporate research staff member of The Rand Corp., deferred for a moment his discussion of the international issues involved in the privacy question to berate the federal government for its "tardiness' in acting upon the privacy situation. He cited the country's "irreversible commitment to computer technology" and called the issue a global one, as opposed to an issue of details.

A cohesive strategy is needed for dealing with the problems raised by electronic funds transfer (EFT), electronic mail, privacy and recordkeeping and international data flow, he said. He also called for a "trigger mechanism" to cue legislators and the populace when important developments in technology are imminent.

In discussing the international privacy issue, Ware called it a "horribly confused mess — an information stew in which the ingredients don't blend." Included in that "stew" are the matters of privacy, telecommunications, trade tariffs, cultural heritages and national security, he contended.

One of the problems in international security, Ware said, is merely a semantic one. Europeans call it "data protection" while Americans call it "privacy." Another stumbling block is the pervasive sense of nationalism in Europe. A third concern is that underdeveloped countries are "beginning to notice the goodies and they want their share in the information world," Ware said.

The new and different concept to be considered now, Ware said, is what happens if information becomes commingled in one physical location, but under different legal jurisdictions.

Ware proposed that, in the case of travelers, data collected about a traveler in his resident country stay in the resident country and be subject to the privacy safeguards of that country. Data collected about the traveler in a foreign country would stay in the foreign country and would be subject to the foreign country's private safeguards.

Ware concluded by praising the com-

(Continued on Page 12)

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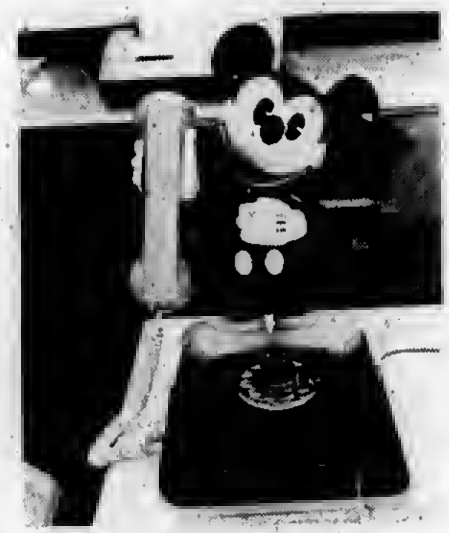

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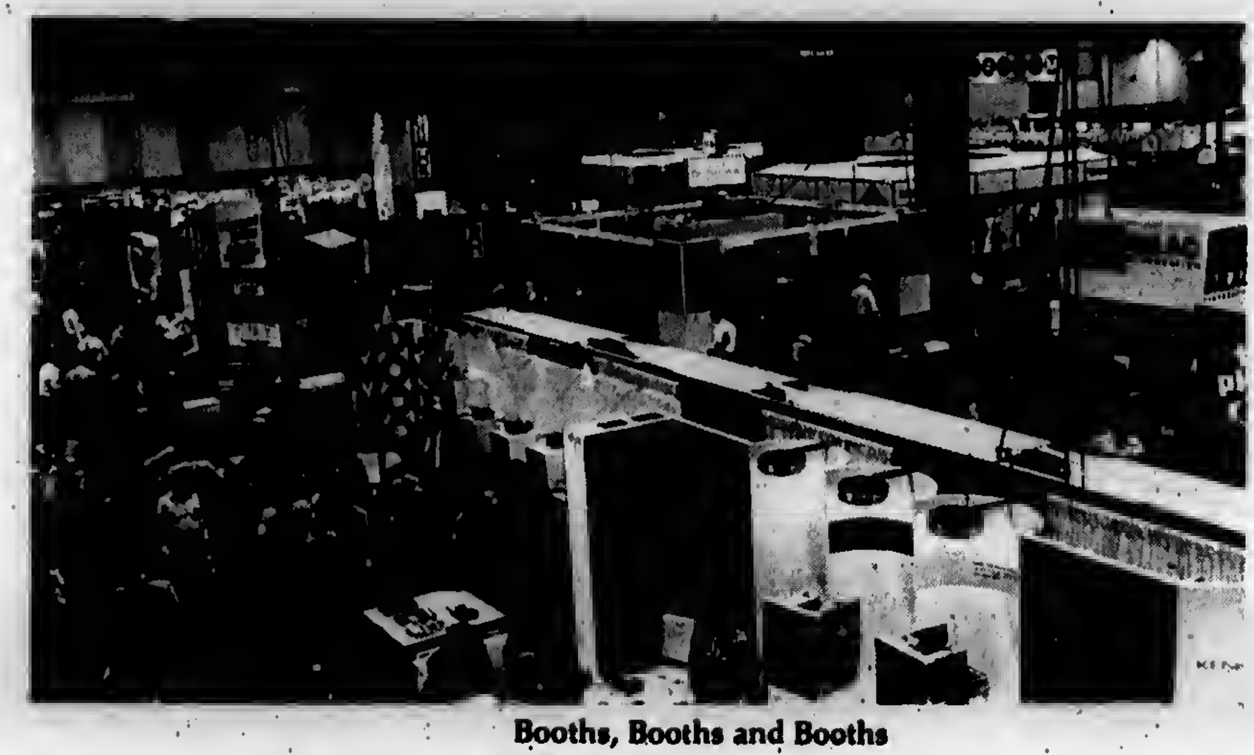

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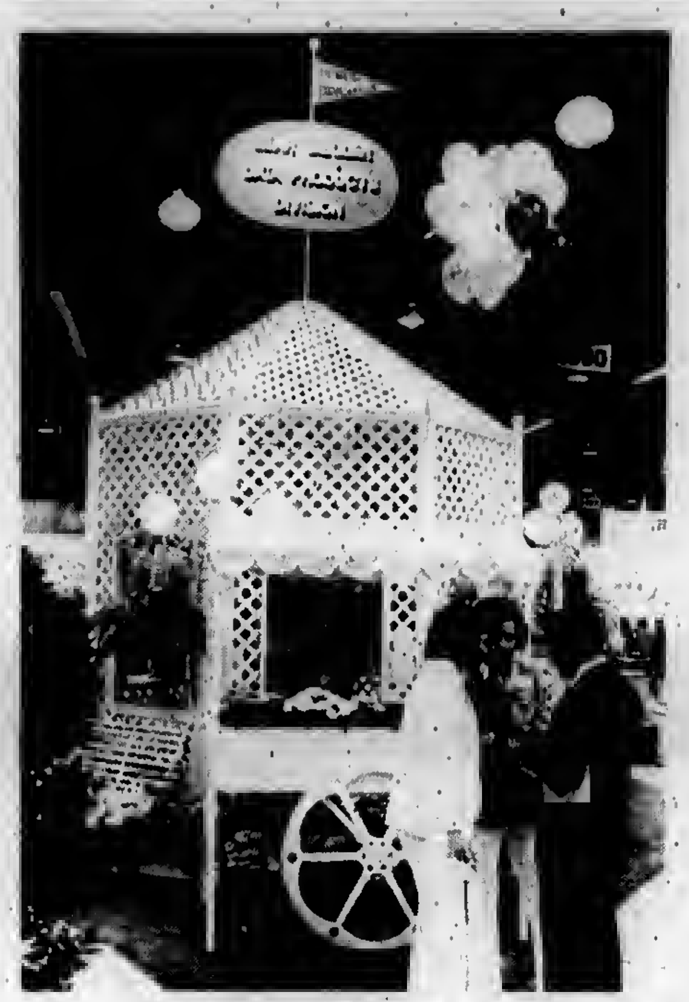

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Synthetic Fuel No Answer, DP Energy Analysis Finds

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — Would synthetic fuel be an effective commercial alternative to continued dependence on costly fossil fuels by foreign nations?

This was a policy question faced by a task force appointed by former President Gerald R. Ford, according to Dr. Steven N. Tani of SRI International, and the answer was no.

The answer was arrived at through use of a computer-based method known as probalistic decision analysis, Tani explained. SRI International performed the analysis under contract to that energy task force.

Speaking at the National Computer Conference here last week, Tani indicated the project represented one of a growing number of instances in which computers have been used by government to resolve policy issues in the best interest of the nation.

As originally conceived, commercial synthetic fuel would, among other benefits, give the U.S. bargaining power against foreign oil suppliers as well as an actual oil supply. However, balanced against these benefits were the billions of dollars needed to develop the technology as well as the risk of environmental damage that could be caused by mining oil shale for synthetic fuel manufacture, Tani said.

The critical uncertainties the model examined were the cost of making synthetic fuel, future energy needs, the prices of imported oil and events in the Middle East. In addition, sensitivity to a strong foreign oil "cartel" and the risk attitude of the nation were built into the model, Tani said.

Among the alternatives for which probabilities were assigned were three investment levels for synthetic fuel production: low, medium and high.

The decision analysis was reduced to a 400-line Fortran program that was run on a commercial time-sharing basis. None of the program alternatives for commercializing synthetic fuels were shown to be in the best interest of the country, and potential losses connected with this project were forecast in the $1.65 billion to $11 billion range, Tani said.

A bill subsequently introduced in Congress requesting appropriation for a minimal commercial synthetic fuel program was defeated, Tani noted. At the present time, however, synthetic fuel manufacture has not been entirely abandoned, he said, but rather has been funded through research grants.

CW Photo by A. Dooley

Electronic Memories & Magnetics had arches at the National Computer Conference, but no hamburgers.

Smith Charges 'Benign Neglect'

(Continued from Page 9)

puter industry for speaking out about the issue of privacy before it became an unsolvable problem, contrasting it with the matter of pollution.

Smith, in supporting his theory of "benign neglect" within the federal government, cited a number of federal agency plans to install various computerized information systems and plans to exchange information among data banks. "The federal government thinks the solution to every problem is to expand a data base," he said.

Among the instances he discussed was an Internal Revenue Service proposal to install computer terminals in each regional office so each regional office could have access to the data concerning any U.S. taxpayer. "That was clearly not necessary and fortunately was shot down by the Administration," he said.

He cited NCC Booth No. 2100, occupied by the National Technical Information Service, as a violater of the Privacy Act of 1974, since it offered for sale a mailing list of all CB owners in the U.S. "You can give away a mailing list but, according to the Privacy Act, you can't sell it," Smith said.

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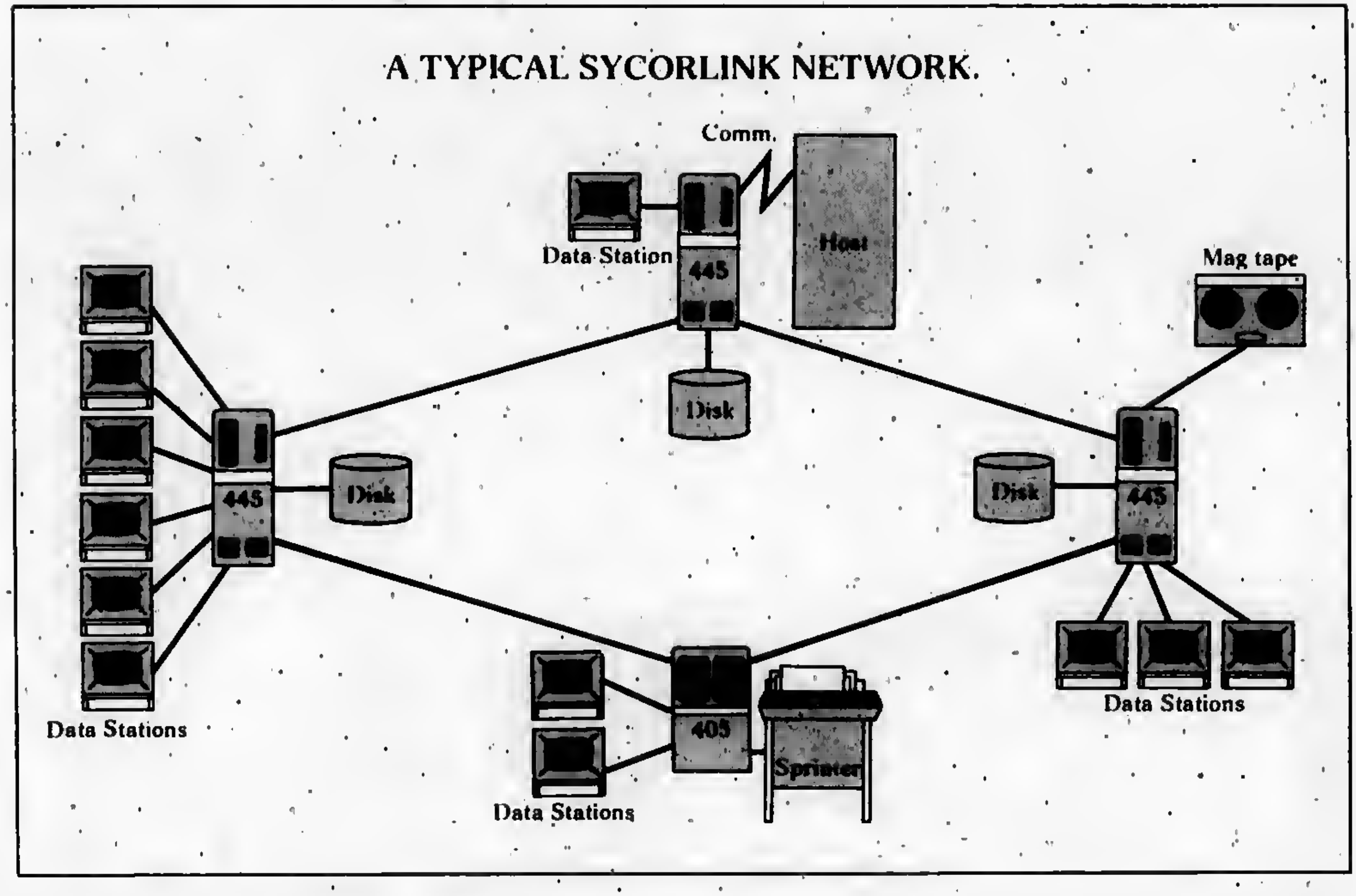

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Besides Usual Hobbyist Gear

Personal DP Festival Features Business Aids

By Tim Scannell
CW Staff

ANAHEIM, Calif. — The National Computer Conference's Personal Computing Festival here last week boasted the usual display of terminals, keyboards, CRTs and microprocessors aimed at the hobbyist, but it also featured a number of microprocessor-based business systems and software packages.

The Demarco-Shatz Corp. unveiled two Z80-based systems geared to both business and medical billing applications. The basic business system offered by the firm contains 32K of random-access memory (RAM) and features two RS-232 I/O ports, a 200 line/min printer and a 12-in. intelligent CRT, a spokesman said.

The system can accommodate up to four CRT terminal stations on a time-sharing basis and the memory can be incremented by 8K bytes for each added CRT. Also included with the system are 512K bytes of expandable floppy disk storage space, the spokesman said.

The medical billing system contains all the features of the business configuration except that it is supplied with 64K bytes of RAM, six I/O ports and a capacity for more than 10M bytes of disk storage space.

Software is also supplied by the company and included as a part of both the business and medical system packages, the spokesman noted. The business software consists of inventory control, accounts payable and receivable and general ledger, as well as sales entry, purchasing and a maintenance-type program.

The medical software is made up of facility analysis, patient billing and inquiry, charge ticket entry, receipt batch control, insurance preparation and physician analysis functions. The system is capable of preparing reports related to each of the billing areas.

Prices for the billing and medical systems begin at $15,900, which includes installation.

Problem Solver Systems, Inc. introduced a microprocessor-based, RS-232-compatible terminal with data rates ranging from 75- to 19.2k bit/-sec. The Little Computer Terminal (LCT) features programmable function codes, can accommodate 48 lines of data for scrolling and utilizes the full Ascii character and graphics set, a representative stated.

The unit also has a self-test analysis function, a modular structure and socket-mounted integrated circuits. Company representatives were unable to quote prices.

Business Software

The Space Byte Corp. of Los Angeles demonstrated a business-oriented applications package designed for use with its modular business computer. The software is included as a part of the computer system, a spokesman explained.

Optional software facilities offered include an inventory control package, a medical package, a word-processing routine and a program that produces mailing labels. Space Byte could not provide pricing information.

32K Unit From TEI

TEI, Inc. of Houston displayed a business system consisting of 32K bytes of RAM, a floppy disk controller and two Shugart Associates floppy disk drives, a CRT controller and keyboard. The system has both serial and parallel I/O ports and 22 slots for additional memory.

Software includes Digital Research, Inc.'s CP/M disk operating system, which contains prewritten programs to assist the user in performing routine processing tasks.

The price of TEI's RTS-22 system is $5,275. A desk-mounted version is available at an additional cost.

Three Systems

Meca, a California-based vendor, introduced three business systems at the festival. The first, System 1, is a development system with an 8080-based MPU with seven level vectored interrupts.

The system is S-100 bus-compatible and has 32K bytes of memory and 18 available slots on the mother board. It features a CRT monitor, keyboard, two parallel and one serial I/O port and a dual-drive tape cassette storage system.

The System 2 is a word-processing system for business applications. It is similar in construction to the System 1, but it includes an I/O Ascii IBM Selectric terminal/typewriter. The configuration also incorporates the Electric Pencil word-processing program.

The System 3 is a general business system with the same hardware in the previous two systems; instead of the terminal/typewriter, however, a Centronics Data Computer Corp. 80-column printer is supplied.

Each of the three systems' software includes a file management system with an editor, assembler, debugger, directory recovery and tape copy programs. Extended Basic is utilized as the language in each of the systems and the general business unit features a payroll program. The systems are priced at $3,300, $4,395 and $5,985 respectively.

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'Gluing Oranges to Pancakes'

Session Examines Language/DBMS Interfaces

By Don Leavitt
CW Staff

ANAHEIM, Calif. — Embedding a nonprocedural query language within a procedural programming language is like "gluing an orange to a pancake," a speaker told a National Computer Conference audience here last week.

The speaker was Charles J. Prenner, of the University of California at Berkeley, who admitted he had borrowed the phrase that expressed his feelings so well.

Addressing an NCC session on Programming Language Interfaces to Data Base Management Systems (DBMS), he said one of the major problems lies in the fact that the conventional programming language "has no knowledge of the data base" or of the management system that drives it.

Current interface techniques are weak, he told the overflow audience. A CALL statement does provide linkage but not necessarily enough information to make the interface particularly effective. A preprocessor approach is better, but even that is an awkward construct, sometimes leaving type checking and protection of objects in the data bases in doubt.

One of the most difficult problems in attempting to interface conventional languages with DBMS develops because programmers — and their normal languages — tend to consider data records as composite objects but DBMS do not. The systems provide just the field or attribute requested, and that can be very disconcerting, he said.

Other Interference

Two other factors interfere with the possibility of a generalized interface, he continued. Since some languages — and some DBMS — work from an interpreter and some utilize a compiler, they handle the whole concept of names and domains differently.

Even within the relational DBMS that are beginning to emerge, this distinction is apparent. Ingres, for example, is an interpreter-based system that provides great flexibility, supporting variable relational and domain names. By contrast, System/R, using a compiler, has more run-time efficiency but is limited to fixed relational and domain names because of its binding time requirements.

But, Prenner said, he and coauthor Lawrence A. Rowe have been able to at least postulate an integrated approach to the interface problem, particularly focusing on relational systems. Such an approach should support a unified-type system for the definition of "language" objects and "data base" objects, the professor noted first.

It should provide an interaction based model of the data base operations and a better match with common programming language facilities. It has to allow variable binding times to cope with the variations in the possible DBMS. And it has to provide a vehicle for abstract data types, recognizing the varied views of different users, integrity constraints and the different trigger mechanisms within DBMS, he continued.

In response to a question, Prenner said a language supporting such an integrated approach should be ready in about two years.

The other speaker at this session was Prof. Stanley Su of the University of Florida, and his concern was the effort needed to convert from one DBMS to another or to accommodate data base changes, even if the DBMS is unchanged, with the least possible rewriting of the application programs.

He reminded the attendees that there is a wide range of reasons for reorganizing or restructuring a data base including changes in the user environment, changes in an installation's hardware or software, modifications for efficiency and changes in the data base semantics appropriate to the situation.

The original programmer works with a knowledge of the original data base and that is perfectly natural, he admitted. But it can create problems for those handling the restructuring: tests for possible, but admittedly unlikely, conditions may have been left out but need to be added in the rewrite.

'Translation' Process

In his work, Su noted that there are several ways in which a data base and the relationships needed to access it can change over time and that a "semi-automated" approach seems to be able to cope with all of them.

Su proposed a six-step "translation" process that should successfully move a data base query under an old DBMS to an equally effective query in a new DBMS setting.

This included a translation dictionary development that utilizes descriptions of the old and new settings to create tables matching such things as old names and old data relationships with new names and relationships. From there, the system analyzes the source data base query and begins the query translation effort in global terms.

Working with the tables created in the first step, the process continues with what amounts to a "pretranslation effort" to match new and old factors. A formal translation algorithm, the fifth step, leads to creation of the query in the new setting.

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Boon to Software Design

ANAHEIM, Calif. — The current methods of designing and developing software are "intolerable" and must be replaced with an engineering approach and "software on silicon," a semiconductor industry representative told computer designers and programmers here last week.

Speaking at a session on semiconductor technology and its affect on computer architecture, Robert Heikes, assistant general manager of Motorola, Inc.'s semiconductor operations, said that if the present ways of designing software continue, the growth of semiconductor technology could be seriously limited.

That will not happen, however, because semiconductor technology is an "inexorable" force pressing for change, he added.

Very large scale integration is an "irresistible force" that will overcome the "immovable object" of software, he said to loud cheers from the packed session.

Based on the present curves, he pointed out, there should be — and will be — 256K chips by 1982, and he half facetiously pointed out that if the current rates of progress continue, there will be one transistor for every electron on earth in just 200 years.

While that may be a little far-fetched, he said the progress in the semiconductor technology over the

(Continued on Page 16)

Semi, Computer Technology At Crossroad, Panelists Say

By E. Drake Lundell Jr.
CW Staff

ANAHEIM, Calif. — Semiconductor and computer technology is at a crossroad as the semiconductor manufacturers continue to bring out larger and larger systems on a chip, panelists agreed here at the National Computer Conference last week.

At the same time, there is a changing interface between the two groups, Gordon E. More, president of Intel Corp. and session organizer, said.

Each year, the semiconductor industry has been doubling the complexity of the systems it can put on a chip, and the trend will continue, Moore said.

The challenge will be to keep up with these changes in technology, he added.

Because of the changes, Moore said the development of computers is limited less by the technology than by the ability to take advantage of the increased size and ability to pack more complexity in less space.

In the next few years, chips will be available with plenty of space for lots of additional functions beyond the memory and logic functions now available, he indicated.

Because of this, the "opportunity for significant changes" is greater now than it has been in the past, and designers should not use this increased space just to pack on more logic and memory but should think innovatively, he said.

No Longer Just Components

Lester Hogan, vice-chairman of Fairchild Camera and Instrument Corp., agreed, noting that in the age of LSI and very large scale integration (VLSI) it is no longer possible to view semiconductors solely as components.

In the past, he said, the relationship between the semiconductor industry and the computer industry has been one of synergism, but at present there are strains on the relationship.

The expected chips with one million components will not be components only, he said, and will have to be designed as part of the total system. Technology is at a juncture, he said, where there must be feedback from the computer architects to the circuit designers in order to do this.

At the same time, for the foreseeable future the semiconductor industry will build memory chips better than the computer industry does because the semi industry's high volumes make its prices hard to beat.

For the synergism to continue between the two industries, computer architects need to find ways of using chips that can be mass-produced rather than customized for applications, and they should consider multiprocessor microcomputer systems for their designs.

Emphasis Shifting to Software

Bernard H. List, manager for MOS in the U.S. at Texas Instruments, Inc., told the computer architects that they can expect the exponential gains in semiconductor technology to continue at their present rate.

But at the same time, he indicated that the emphasis of the semiconductor houses will be shifting so they can put more emphasis on micro system software than on hardware.

Presently, software accounts for about 20% of the semiconductor firms' efforts, he said, but this will increase to around 50% in the coming years.

For the foreseeable future, there are no technical limits in sight for semiconductors, he said, predicting that electron beam etching methods will be used soon and X-ray etching will be possible in the mid-1980s.

And the market for the products will also continue to explode, he indicated, predicting that the advances in semiconductor technology will really make distributed processing possible and economically feasible.

Joseph F. Kruy, president of Cam-

(Continued on Page 16)

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Semi Advances to Help Improve Software Design

(Continued from Page 15)

next decade will destroy the basis of the present way software is developed and will create an entirely new way for developing software.

Software development today is labor-intensive and there is little automation to support that effort. Furthermore, it is extremely expensive, he said, noting that there will be 64K-bit microcomputers in 1979 that sell for around $750 while it still costs as much as $100,000 to develop a payroll package. And the divergence between the two is increasing, he said.

Because of this, the semiconductor manufacturers will begin putting software on silicon chips instead of allowing it to be developed under the present methods, he said.

Reliability will be the key to this type of "software," he said, and will be the main area pursued by developers.

The software will have to be reliable, he said, because the semiconductor industry will be shipping more processors per day in 1980 than the entire minicomputer industry shipped during 1978.

Some applications "programmed" into silicon, he said, will be sold in the millions, and in such applications the units will have to be extremely reliable. Because of the need for reliability, the semiconductor manufacturers will bring the discipline of engineering to the area of software development, he predicted.

Today most programs are written with little of this discipline; he said, and they lack the formal design specifications needed by engineering, the formal methodologies for design and testing and the documentation that is a part of any engineering design effort.

Better methodologies will eventually be used, he said, adding that the semiconductor houses have already started by putting architectural features into their systems to support higher level languages. He predicted that systems software will be written on silicon by 1990.

And with such a system — and the formal engineering discipline — he predicted that software cost could go from $10 per line of code today down to only 5 cents per line when incorporated in silicon.

Two Fields At Crossroad

(Continued from Page 15)

bridge Memories, Inc. and the computer industry's representative on the panel, agreed with the predictions of the semi makers, but said there is a need for novel approaches to chip design for distributed applications.

"Chip complexity is not itself a solution," he said, adding that microprocessing has to be coupled with the movement to distributed DP and that the chips must provide communications functions as well as processing.

This will require integrating software into hardware.

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But DP Trainees Cleared of Fraud

Charges Against Prison Site Led to Crime Bill

By Edith Holmes
CW Staff

ANAHEIM, Calif. — A false accusation that a software house running inside the U.S. Penitentiary at Leavenworth, Kansas, and staffed by its inmates was defrauding the Internal Revenue Service (IRS) led to the introduction of the first computer crime bill in the U.S. Senate last year.

The Leavenworth Prison's software firm — a rehabilitation effort designed to teach inmates to be competent programmers — has since dealt with the adverse publicity and revamped its security program to meet the perception as well as the reality of risks to the public, according to Willard V. Handley, manager of data graphics products for Federal Prison Industries, Inc.

Speaking at a session on computer crime at the 1978 National Computer Conference here last week, Handley said the charges of fraud by the IRS initiated congressional investigations that culminated in Sen. Abraham Ribicoff's (D-Conn.) introduction of S. 1766 a year ago. In addition to the drafting of that bill — before the Senate again this year and scheduled for hearings by the Senate Judiciary Committee's Subcommittee on Criminal Laws and Procedures on June 19-20 — the Leavenworth controversy also caused the prison to conclude that its security program was "too esoteric."

Recidivism Rate Reduced

Leavenworth's software firm falls under the operating guidance of Federal Prison Industries, a federal agency that operates more than 70 factories in 32 penal institutions across the nation, Handley explained. Programming at Leavenworth is but one activity sponsored by the agency; others include the manufacture of footwear, office furniture, textile and electronic products and the production of such services as printing, bookbinding, architectural drafting and data entry.

Security is "second nature" to the prison staff that operates Leavenworth's computer programming firm, an effort that by June 1976 led to the placement in private-industry jobs of 24 of the project's 48 inmates released from incarceration, Handley said. Only 15% of these former inmates who learned programming at Leavenwroth have ended up back in prison, compared with a national return rate of nearly 50%, he added.

At Leavenworth, four teams of seven to eight inmate programmers and two teams of four inmates training to be systems anlaysts work with computer professionals and a support staff of maintenance and marketing personnel. Using a U.S. Department of Agriculture NCR Corp. 200 located in Kansas City — and until the IRS incident, commercial time-sharing services — the Leavenworth software house sells its programs to several federal agencies.

One Inmate's Scheme

Problems developed between the IRS and the prison software house when, unknown to either of them, a Leavenworth inmate discovered he could defraud the IRS by sending in phony tax returns reporting money he had not earned and bogus W-2 forms showing taxes that had never been withheld. Banking on the fact that the IRS rarely matches the wage amounts reported by employer and employee, the Leavenworth inmate had refund checks sent to an accomplice on the outside.

When an IRS investigator uncovered the fraud, he felt sure the IRS computer system should have kicked one or more of the inmate's returns out for audit and concluded the Leavenworth software firm must have had a hand in assisting the returns through the IRS computer checks, Handley said. Specifically, the IRS investigator thought the inmate had used the Leavenworth computer shop to penetrate the IRS system through the Computer Science Corp.'s Infonet, the commercial time-sharing network employed by the prison and the tax agency.

"We knew that this couldn't have happened, that our computer system was secure," Handley said. Leavenworth called in an independent contractor, the Mitre Corp., however, to study the prison's computer security.

Because Leavenworth's inmates are under constant supervision and security is a normal, everyday consideration at the prison, Mitre concluded, "the security procedures in use at this

(Continued on Page 18)

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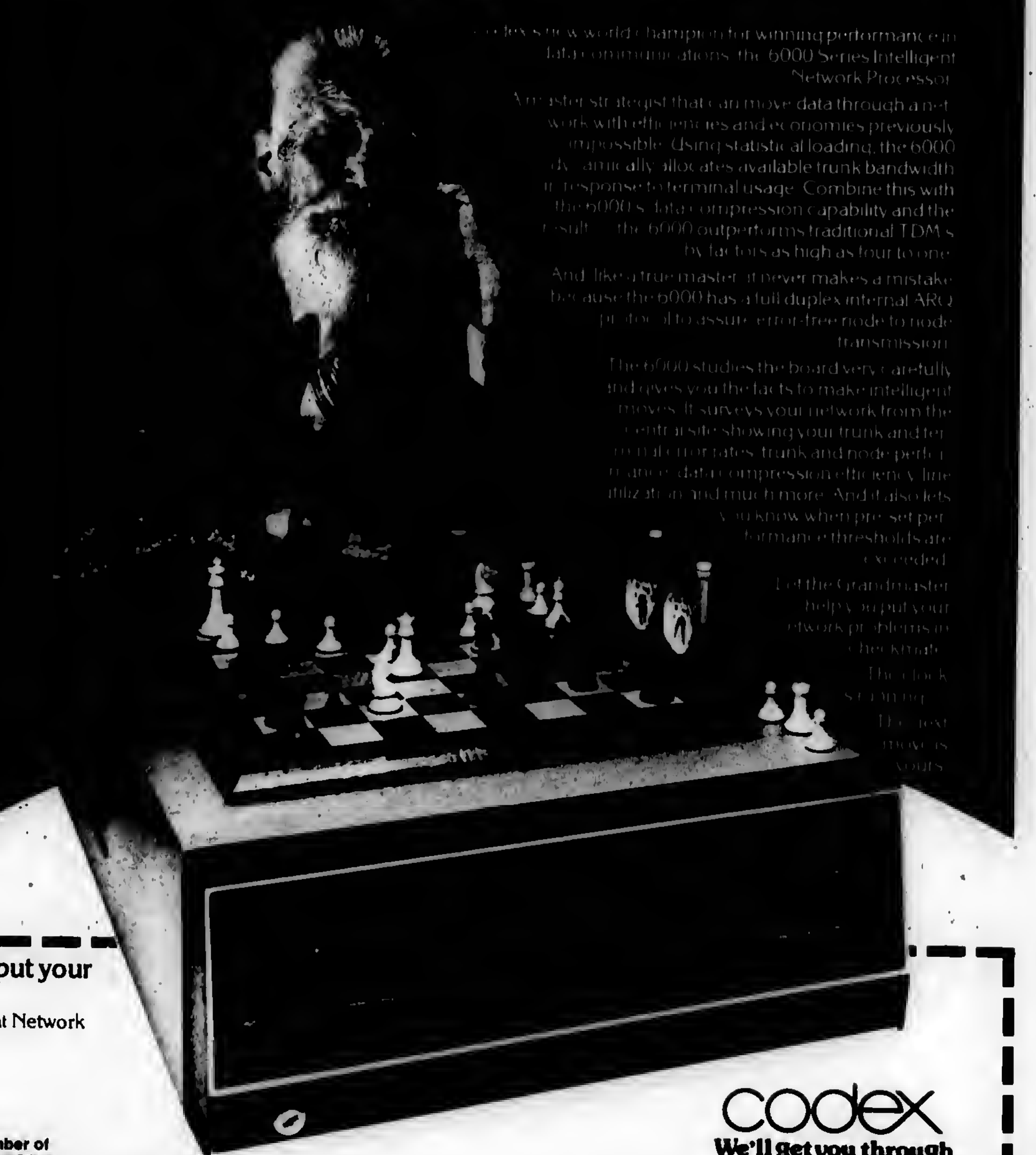

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DP Crime Bill Spurred By False Charges of Fraud

(Continued from Page 17)

time are probably stronger than those used in most software development shops and are more adequate for the types of programs (chiefly report-generating programs) currently being developed."

But despite the orientation of this software firm toward turning inmates into accomplished programmers, the strict control of comptuer runs, the selective process used to choose programmer and analyst trainees and the encouragement to federal agencies to test the software products purchased from the Leavenworth operations, Mitre also determined that "it was too much to expect the uninformed public to understand the threats they perceived weren't real."

Theoretically, Handley said, the inmate programmers could acquire outside programs by penetrating a time-sharing service in use at Leavenworth. They could penetrate the in-house computer's operating system and install software modifications — trap doors or "Trojan horses" — there. Federal Prison Industries decided the only way to defuse these possibilities was to isolate the user systems completely from the program development work at Leavenworth.

No More T/S

Accordingly, today the prison no longer uses time-sharing, putting to an end the original plan to acquaint the inmate programmers with additional computer systems. The only item that flows from the program development effort at the prison to the federal agencies which are its clients is a card deck containing the software developed and tested on a Department of Justice computer system, Handley noted.

The IRS-Leavenworth "scandal" raised a variety of security issues. But perhaps even more serious for the life of the rehabilitation program at the prison, the controversy caused the public to question whether the federal government should turn known criminals into computer programmers, he said.

Handley stressed the selection process the inmates undergo and the training they receive. "An inmate wants most of the same things out of life that we desire — money, status, security. The criminal is someone who exhibits less patience to acquire these things," he said.

Inmates must be patient if they succeed in passing the standards required for participation in the program — a high school or equivalent degree, a 10th grade general math and language arts performance ability and a minimum score of 45 out of a possible 90 points on the IBM Programmer Aptitude Test. Once in the software house, they must spend a year in intensive classroom training and two to three years producing programs.

Then, Handley said, the inmate has to be released from prison and to find a DP job. The impatient simply don't last.

NCC attendees try their hand at a terminal display.

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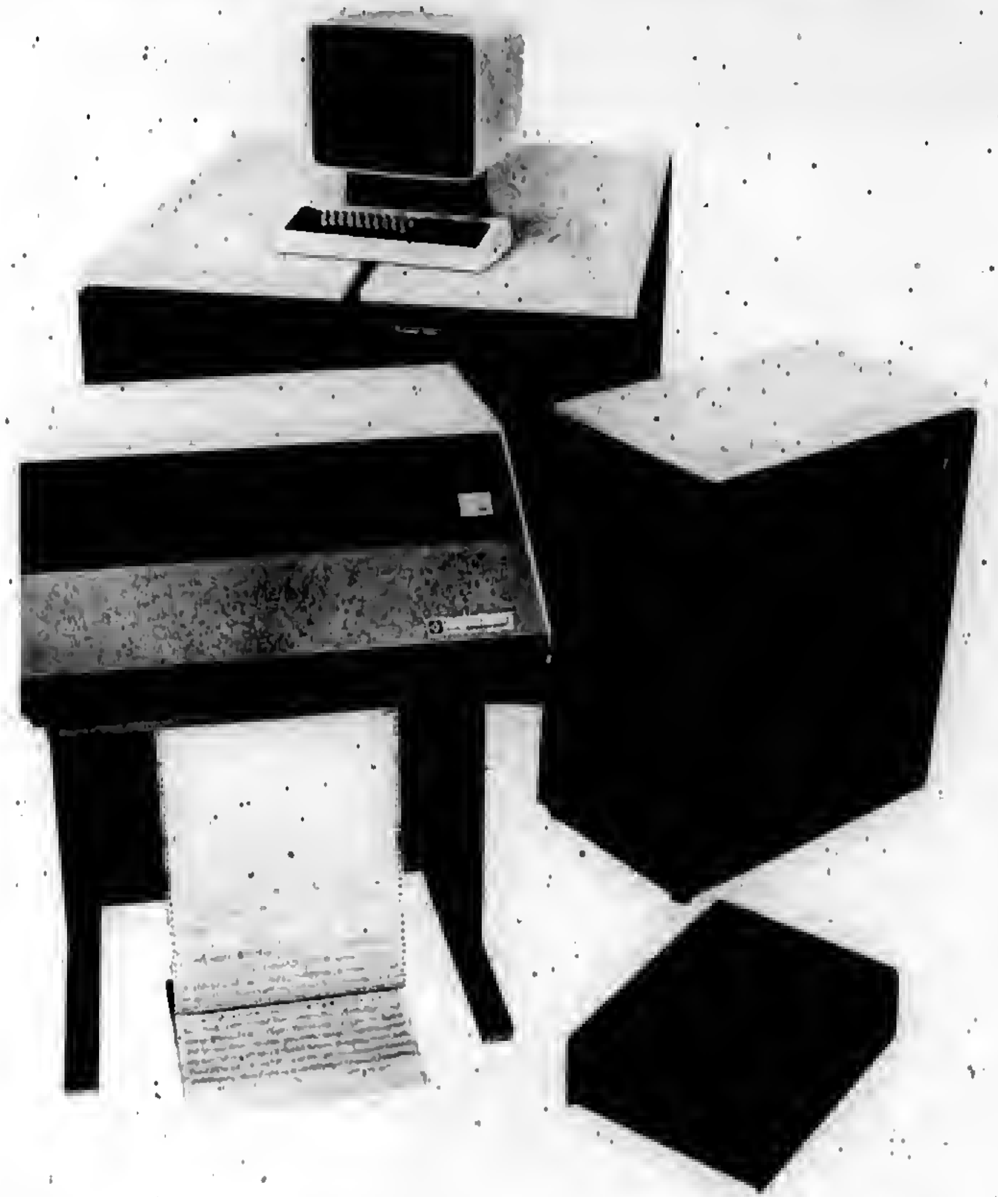

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Euronet to Include 100 Data Bases

Europeans Planning Packet-Switched Network

By Ronald A. Frank
CW Staff

ANAHEIM, Calif. — Nine European countries are working together to establish an international public packet-switched network in Western Europe, according to George Orchard, head of international data transmission policy and strategy for the British Post Office.

Called Euronet, the network will enable data terminal users of the European Economic Community (EEC) to gain access to data bases holding specialized scientific, technical and socioeconomic information, Orchard told a National Computer Conference session on international data networks here last week.

Euronet will be operated jointly by the postal, telephone and telegraph (PTT) administrations of the network's nine member countries. Euronet was conceived after studies showed European taxpayers could benefit by having a single, shared network rather than a number of separate nets, each providing one segment of the same total service.

Because Euronet will utilize packet-switching techniques, users will not be penalized because of geographic location. Rates on the network will be for the most part volume-sensitive and distance-independent, so all users will be served on an equal footing, Orchard said.

22 CPUs, 100 Data Bases

Euronet will have four nodes with Packet-Switching "Exchanges at London, Frankfurt, Paris and Rome. Remote access facilities will be provided by multiplexers in Amsterdam, Brussels, Copenhagen, Dublin and Luxembourg.

Transmissions between the PSEs and on the major links will be at speeds of 48k bit/-sec, while the remaining multiplexers will operate at 9,600 bit/sec, according to Orchard.

A network management center will be set up in London. When Euronet begins operations early in 1979, the first of an expected 22 host CPUs offering access to about 100 data bases will be connected to the system.

Low speed start/stop character mode terminals will access the net at speeds ranging from 110- to 1,200 bit/sec while packet mode synchronous terminals will operate on Euronet at speeds ranging from 2,400- to 48k bit/sec. Some user terminals will be connected to Euronet directly via private lines; many start/stop devices will gain access using the switched telephone network, Orchard explained.

Access to the network will be by two modes. The first of these is a virtual call; users will also be able to utilize a permanent virtual circuit.

The permanent virtual circuit establishes a network connection on a permanent basis, similar to a dedicated point-to-point private line, Orchard said.

Euronet will be based on the CCITT X.25 standard, although some variations will exist. A packet assembly/-disassembly (PAD) facility will be established to handle start/stop devices and the network will include a Network User Identifier (NUI) for billing purposes.

The network is not "basically restricted" to the nine-member countries of EEC, Orchard said. Switzerland and Spain have already applied to participate, he noted.

X.75 Described

Another speaker at the session, Masanori Amano, staff engineer at Kokusai Denshin Denwa Co. Ltd. (KDD), the Japanese international common carrier, described the CCITT X.75 standard for the interconnection of national packet-switched public data networks.

The X.75 standard has a three-level structure made up of physical, frame and packet levels. Internetwork administrative signalling functions such as routing, flow control and accounting are provided as well as call set-up, transpar-

(Continued on Page 28)

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Low-Cost Satellites Urged for Public Service

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — Since libraries, educational institutions, health centers and local government agencies are among the emerging markets for satellite data communications in public service, common carriers and major public service institutions should make an effort to keep the costs of such services as low as possible.

That sentiment was expressed by James G. Potter, director of planning and analysis for the Public Service Satellite Consortium (PSSC) of San Diego, at a session on "Satellite Data Communications for the Public Service Sector" at the National Computer Conference here last week.

Frank W. Norwood, executive director of the Joint Council on Educational Telecommunications in Washington, D.C., the only one of three scheduled panelists to participate in the session, noted there is interest in extending public services to all citizens within an inexpensive framework, thereby increasing the quantity and quality of these services. Satellite technology lends itself very well to this goal, he said.

Contrasting the logistical considerations of satellites with terrestrial communications systems, Norwood said satellite systems are distance-insensitive, terrain-insensitive and less climate-sensitive than terrestrial systems. In addition, the cost of satellite systems does not depend on the density of population in an area, as does telephone service, for example.

While Russia and Canada developed the first domestic satellite systems out of a need to reach scattered populations, the U.S. could use such a system to join nongeographic communities of interest, Norwood said. Congress and the White House are interested in creating a "new rural society" via the dispersement of information, thereby eliminating the need for people to "crowd together in cities" to enjoy such information accessibility, he added.

With fewer, more powerful channels in a satellite system, ground stations could make use of smaller and less sophisticated equipment for receiving communications, thus increasing the economic feasibility of such systems, he pointed out.

Potter noted the 1982 potential demand for satellite communications capacity from public service users, as indicated by a recent PSSC study undertaken for the National Aeronautics and Space Administration's (Nasa) Goddard Space Flight Center, was projected under four assumptions.

The first assumption is that an appropriate, affordable satellite communications network will be available; the second is that there will be no gap in the development of public service satellite communications; and the third is that organizations will benefit economically from such networks.

The last assumption is that modest organizational changes will be required for users of such systems.

Four Markets

In discussing the four emerging markets, Potter began with the U.S. health care system. He said the three opportunities most likely to lead to extensive utilization of satellite communications for health care involve the aggregation and sharing of computer power, data bases and software for use in hospital information systems for accounting, billing, inventory control and patient records; clinical support systems for radiology, cardiology and pathology; and audiovisual materials and programs for computer-managed instruction to support the continuing educational requirements of various professional groups in hospitals.

The projected 1982 revenue in this area is $49 million and the projected 1982 volume is 1.7 by 10^{13} bit/year, Potter said.

A survey conducted in 1976 by PSSC indicated 81% of its membership expressed interest in a network for continuing education, with response strongly oriented toward one-way video, Potter said. On the basis of this response, PSSC projected a demand for 12,000 channel-hours of one-way video in 1982, representing an annual revenue of about $4.8 million.

Three protected transponders will provide adequate service for the demand, PSSC predicted. Assuming the 12,000 channel-hours figures and 1,000 students per class, Potter said, only 6 by 10^9 bit/year need to be transferred.

In the area of federal and state government agencies' equipment maintenance, Potter said the use of telemetry, microprocessors and telecommunications probably could effect "tremendous savings" in equipment maintenance and load management of various resources such as power, water, light and heat. The projected potential satellite traffic revenue in public service agencies is $32 million, and the projected annual transmission rate is 4.3 by 10^{11} bit/year, he said.

Requirements to support "technical services" in American libraries such as cataloging, serials, control, acquisitions, circulation and interlibrary loans were based on the present budget of the Ohio College Library Center which now spends about $2.3 million annually on leased terrestrial lines to reach 1,100 libraries in 44 states.

The potential revenue in 1982 for technical services was estimated at $4 million. The potential volume of satellite traffic in 1982 was projected at 4.8 by 10^{10} bit/year, according to PSSC.

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Users Told of Ongoing Studies

Software Conversion 'As Inevitable as Taxes'

By Brad Schultz
CW Staff

ANAHEIM, Calif.— Software conversion is a "disruptive, largely nonproductive process" that a DP organization must face at some point in its life with the fabled inevitability of death and taxes. So said panelists here last week at a National Computer Conference session addressed to conversion problems.

The session chairman, Alan Merten of the University of Michigan, remarked that the subject of software conversion is now a discipline of spirited study by DP users and computer scientists at a time when people's attitudes toward death are widely discussed and the fundamental principles behind taxes are under reassessment if not attack.

Conversion is the process by which computer programs are modified to enable their correct execution on a CPU other than that for which they were devised. Most DP organizations considering conversion have at least 1,000 to 1,500 programs in stock with half of these programs effectively obsolete, according to Mayford Roark of Ford Motor Co.

The obsolete programs typically are "fragmented" or were not written via a top-down approach or are not structured as is presently the vogue, Roark said, adding that state-of-the-art software must be adaptable to data base management systems (DBMS), yet only 10% to 20% of existing programs have this flexibility.

A large portion of standing software is thus in imminent need of conversion, Roark indicated, offering his estimate that the U.S. contains a total investment in programs of $100 billion to $200 billion and must therefore spend enormous sums of money in keeping its software usable by the latest processors.

Government Plans

Paul Oliver of the U.S. Navy cited a 1977 General Accounting Office report that the federal government spends $450 million annually on software conversion. A federal conversion support center has been planned over the past three years, Oliver noted, explaining that the center is intended to provide assistance to federal agencies undertaking conversion.

The center would offer resources and expertise to facilitate the design and implementation of conversion projects, but would not try to supplant the conversion services available from private-sector vendors, Oliver said.

The federal government is also planning to establish standards in conversion methodology through the National Bureau of Standards (NBS), Oliver continued, indicating that he has long supported the idea of standardization in this instance but is "beginning to wonder why" in view of the bureau's difficulties in devising and promoting its Federal Information Processing Standard series.

A report by the conversion technology panel that recently met at a workshop jointly sponsored by the Association for Computing Machinery and NBS, entitled "Data Base Directions — The Conversion Problem," was discussed by James P. Fry of the University of Michigan, one of the report's authors.

The report concluded that hardware development "will increase the need for generalized conversion tools," Fry said, explaining that the proliferation of minicomputers, computer networks, mass storage devices and distributed data bases is greatly enhancing the need for software adaptable to a diversity of processor environments. And the situation is accelerating, he noted.

The expected reduction in hardware costs will keep down the costs of conversion, the report also found, and "special hardware DMBS machines (SHDBMS) will be available to simplify conversion by promoting logical level interfacing.

Software advances will not eliminate the need for conversion, but may facilitate the process in a manner similar to SHDBMS, the report predicted, adding that several logical models for DBMS interfacing are likely to appear, compounding the need for conversion tools between DBMS.

Standards will not eliminate the need for conversion but may greatly simplify the process, the report said.

Conversion should be carried out by qualified contractors, Oliver advised, adding that developers of the software being converted tend to be ill-suited to undertaking the conversion themselves because they are "too imaginative" and may try incorporating improvements in the software as they convert it.

Software should not be "improved" just before or concurrently with the conversion process, Oliver said, explaining that even conspicuous flaws should be allowed to pass through.

However, developers of the programs under conversion must participate in the process, contributing their insights as needed by the converters, Roark stated. Using a baseball analogy to make his point, Roark noted that unless developers and converters cooperate effectively, "the ball will drop between two outfielders."

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International Data Users 'Demanding Breed'

By Ronald A. Frank
CW Staff

ANAHEIM, Calif. — Data communications customers are a demanding breed who want new technology to be introduced fast. If it is not forthcoming, they attach a very valid threat of taking their business elsewhere or doing it themselves, according to David Horton, development director of computer communications for the Hawaiian Telephone.

Speaking at a National Computer Conference here last week on international computer communications regulations, Horton described packet-switching technology as a "hyperactive child" that is constantly exploring new possibilities and often getting itself into a little trouble.

The pace of change in this area is higher than in any other area of telecommunications, and with the introduction of microprocessors, third-generation equipment is already being used only three years after the first packet went into commercial service, he said.

The branches of packet switching now encircle the world. At last count, there were almost 20 such networks in service or about to begin operation. Today, there is extensive access to North American data bases by European customers using packet networks and similar plans are under way in the Pacific area, he noted.

Special emphasis is being given to the emergence of Korea, Taiwan, Singapore and Hong Kong as the "new Japans," and as trade with these areas increases, the need for more telecommunications traffic will grow.

In response to a later question, Horton said he expects to see network service for these Pacific rim countries within the next 18 months.

Regulatory Delays a Problem

If the demand for increased telecommunications services is to be met, ways will have to be found to eliminate the regulatory delays that now hamper the introduction of new services, Horton said.

Simply increasing the staff of the Federal Communications Commission (FCC) is not the answer, he said. Instead, he suggested steps should be taken in the regulatory area.

First, the FCC should establish guidelines and policies for international telecommunications. The roles of individual carriers should be clarified with regard to segmenting their areas of authority, and the commission should anticipate the kind of actions that will be necessary based on technological advances and market demands, he said.

There must be a thorough understanding of what technology can do, what the customer wants and what the various vendors are trying to achieve. Then, regulations must be produced which are fair, which stimulate innovation and keep prices as low as possible, he noted.

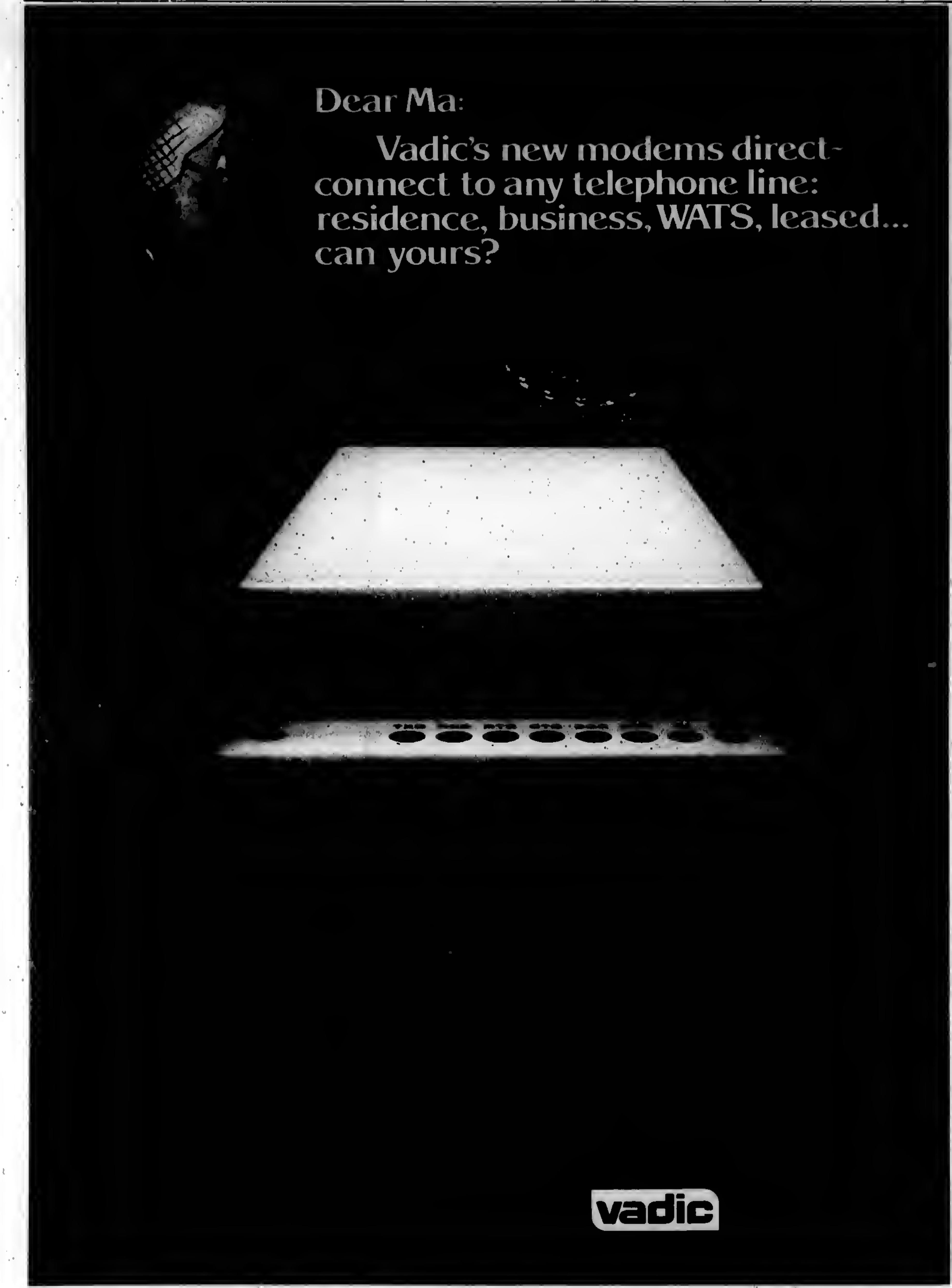
The carriers should play an active role in this effort to streamline regulation, Horton suggested.

Private-Line Rates

Speaking on a particular aspect of international telecommunications policy, Phillip Onstad, manager of telecommunications policies at Control Data Corp., expressed concern about attempts to eliminate flat-rate private-line services in favor of volume-sensitive packet offerings. Large users should retain the option of electing the use of private-line flat-rate services if they see this as more beneficial than packet offerings, he said.

Large time-sharing compa-

(Continued on Page 26)



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But Some Applications Lagging

Packet Nets Gaining Some Ground, Users Told

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — There is a growing need for specialized packet-switching network systems in the U.S. and efforts are being made to fill that need in a number of areas. That was the thrust of a well-attended session on nationwide packet-switching networks here last week at the National Computer Conference.

The Department of Defense (DOD) is presently developing the Autodin II system to bring the new technology to an already established environment, according to Donald O'Rourke, associate director of the Civil Service Commission. Autodin II, which will be in use in 1980, will not supersede the existing Autodin I store-and-forward message-switching technology, however. It will supplement it via parallel operation for the most efficient transfer of bulk transaction and interactive data, O'Rourke said.

Developed and implemented in the early 1960s, Autodin I communicated on a worldwide basis. The system traffic has grown from 625 million lineblocks (one lineblock equals 640 bits) in 1972 to over one billion lineblock/mo in 1977, O'Rourke said.

DOD studies indicated that by the mid-1980s there will be approximately 2,500 computers with about 20,000 terminals involved in on-line communications. Therefore, the decision was to use common-user rather than dedicated networks to ensure the most efficient and economical service possible.

System Connection

High-speed interconnect channels will connect the two systems, O'Rourke said. The message-type traffic handled by Autodin I will be transferred over these dedicated links to Autodin II and then transmitted over a common high-speed transmission network, thereby providing users with a choice of two data switching facilities through a common transmission network, according to O'Rourke.

Security requirements of the system will necessitate personnel, physical, administrative, communications, emanations and software security, O'Rourke said. Elements of software security include a packet-switching node (PSN), transparent terminal interface, transparent host interface, transmission network, encryption equipment, test facilities at each center and a central network control center at the headquarters, he noted.

The control center will monitor the operational status of the circuits, the switching computers and the user computer and will assist in diagnosing and correcting malfunctions using the PSN's Digital Equipment Corp. PDP-11/70, O'Rourke said.

A patch and test facility will monitor circuit reliability and quality, O'Rourke said.

Other Areas Lagging

Although the military is forging ahead, the same cannot be said for higher education and science research, according to Ronald Segal, director of research and development for Educom, Interuniversity Communications Council, Inc. of Princeton, N.J. The reasons, he said, are economic, political and organizational.

One of the problems is that many educational institutions are unprepared to modify their computer facilities, Segal noted, even though most institutions believe strongly that they must have a major computer facility on site if they are to maintain their research and educational positions. Incentives for sharing are missing both for the buyer and seller of services, at the level of both the individual and the institution, he explained.

Further, unfair competition exists in that not all institutions that might belong to the network are bound to operate under the same pricing regulations. In addition, institutions that might potentially offer computer services over a national network have shown little willingness to provide service guarantees to outside users, except in special cases, he said.

Unique quirks at single computer sites also constitute a barrier to use of outside services, Segal said. In addition, the network overhead involved in such a system would discourage institutions that wanted only to distribute or gain access to a small volume of services, he said.

Since current systems provide inadequate protection against malicious or unintentional access to system resources, Segal observed, most institutions will choose not to maintain sensitive data on remote storage devices accessible via a network.

Finally, unresolved legal and regulatory issues stand in the way of such a system. For example, can a nonprofit educational institution freely sell computing services and still retain its nonprofit status? he asked.

Segal concluded by saying that while barriers exist to the establishment of such a national network, attitudes toward networking are positive and constructive and top-level administrators are becoming involved in the issue.

The likely deciding factor, he said, is whether or not short-term payoffs can

(Continued on Page 24)

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MEMOREXCELLENCE

CW Photo by A. Dooley

A terminal caught Dad's eye at the National Computer Conference last week, but Junior found a passing photographer's camera more fascinating.

National Packet Networks Gaining Ground in U.S.

(Continued from Page 23)

be made attractive enough to sustain interest during the difficult development period.

View of Telenet

Jay Hoffmeier, senior systems analyst for Telenet Communications Corp., presented a highly technical description of the hardware architecture of Telenet's public packet network. His associate, Roy Spitzer, also a senior systems analyst, discussed in detail the system's software architecture. Spitzer stated that the Telenet system satisfies the following user requirements: high processing power, large memory capacity, flexibility, low cost and a variety of interfaces.

Wrapping up the session was Gilbert Falk, senior computer specialist at Bolt, Beranek and Newman, Inc. of Cambridge, Mass., with a comparison of the network architectures of Arpanet and IBM's Systems Network Architecture (SNA).

Architectural similarities in the two designs result from fundamental similarities of objective, Falk said. The architecture goals of both networks are to support distributed processing and to facilitate resource sharing, he noted.

Both designs have attempted to provide a single-purpose interprocess communication facility upon which application-level communication rests. Both architectures also seek to separate the DP and data communications functions, Falk noted.

Considerable Difference

But the networks differ considerably since Arpanet was developed for operation within a research environment, while SNA was developed for use in a commercial environment, Falk noted. Furthermore, SNA was designed to provide a networking capability for equipment from a single vendor. Arpanet, on the other hand, was developed to provide a networking capability for subscriber equipment from many different vendors, Falk noted.

Finally, SNA is an implementation-independent architecture, while Arpanet is an evolving implementation of the general concept of packet switching, he pointed out.

Architectural Characteristics

Comparing the key architectural characteristics of the two networks, Falk said they have the same store-and-forward packet-switching technology. Routing for SNA is centralized static, while Arapanet's is distributed adaptive, he said.

In SNA, segmenting and reassembly can be performed at each node, while for Arpanet, data is packetized at the source node and reassembled at the destination node. SNA has blocking/-deblocking while Arpanet does not.

In sequencing, basic information units (BIU) and BIU segments are kept in order over the entire path for SNA. For Arpanet, the packets are reordered at the destination node, Falk said.

SDLC vs. Arpanet

Although Synchronous Data Link Control (SDLC) and Arpanet's IMP-to-IMP protocol both support communication over transmission circuits, they differ in several respects, Falk said. SDLC implements data transparency by bit insertion in the data stream while transparency in the Arpanet protocol is based on the doubling of DLE characters, according to Falk.

Under SDLC, a variety of data link configurations are supported, including point-to-point, mutlipoint and loop, but IMP-to-IMP is designed only for dedicated full-duplex point-to-point links.

In addition, a variety of network elements with different physical capabilities are accouhted for under SNA, whereas only a single type of network element exists in the Arpanet design, according to Falk.

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DP85/CW6128

Performance Management Overdue: Kiviat

By Edith Holmes
CW Staff

ANAHEIM, Calif. — Computer performance management is "way overdue" and should be defined, not by CPU utilization, but by how well a DP system delivers services, according to Philip J. Kiviat, technical director of the Federal Computer Performance Evaluation and Simulation Center (Fedsim).

How well a DP system delivers services depends on what users want and what they feel they get out of their organization's computer operation, Kiviat and other speakers at a National Computer Conference session on computer performance measurement agreed here last week.

Often considered "nice but not practical," performance measurements must be commonly understood by DPers and users if they are to be useful, accordingto Richard J. Cieslowski of Aetna Life & Casualty.

All the software and hardware monitors currently available and in use won't tell an organization as much about the performance of its DP system as the combined performance perceptions of its DPers and the system's users, he suggested. Cieslowski also stressed the users' responsibility to share the task of defining and improving system performance.

The Aetna official's observations stemmed from the insurance company's experience with its Employee Human Resource Data Bank, which contains personnel records and handles Aetna's payroll. The system covers 30,000 employees throughout the U.S., Canada and Puerto Rico, processes 1.2 million transactions per year and annually turns out 350,000 personnel reports and 860,000 paychecks, Cieslowski said.

Initially, the DP staff supporting the technical aspects of the system numbered 19, while 39 payroll and personnel employees worked with this personal data.

Two years after the system was installed, problems developed in the form of backlogs, high processing costs and low service levels.A 33% increase in personnel failed to solve the problems the system was experiencing, and the organization tentatively decided more advanced computer technology was the answer, Cieslowski reported.

'Perception' Problems

At this point, a project team of DPers and personnel/payroll employees was formed to evaluate the system against selected performance criteria. To the team's and Aetna's surprise, the team discovered their existing DP operation met the standards they had established. "The difficulties were problems of perception requiring education rather than new hardware and software," Cieslowski said.

Aetna revamped the manual aspects of the system, saving the $200,000 a change in hardware would have cost. The company also realized staff reductions of 50% in DP and 10% in personnel/payroll, he stated.

In the course of its study, Aetna found that its DP department placed too much emphasis on mechanical measures and not enough on user satisfaction. Advancements in technical performance are not usually the answer to performance problems, Cieslowski told the NCC audience. More often the key to solving system performance difficulties is the user's realization that he has not used DP resources effectively, he said.

Once objective criteria for evaluating the collective performance of the DP and user operations have been established through communication and feedback between these groups, employee overtime and work backlogs melt away, Cieslowski noted.

Standards established and closely monitored can provide still another benefit: They can alert an organization to the approaching need for an upgrade or replacement, he said.

He cautioned his audience to set performance standards at the highest management levels of their DP and user operations, to regularly monitor performance criteria and to refine standards when necessary. If standards aren't revised and replaced periodically, all the gains initially made through performance evaluation can easily be lost, Cieslowski said.

Involve Top Management

Echoing the notion of a "top-down" definition of standards, Stephen Lowry and David Schaefer, also with the Air Force's Fedsim, argued in their NCC paper for the early involvement of top management in the definition of information requirements and system performance criteria.

Central to their approach to implementing a "performance management system" is the concept of "thresholds," basic process control measurements to tolerances within which the system must operate if it is to perform well, Lowry said.

Hailing from the University of California at Berkely, David F. Stevens suggested many popular performance measures are meant to "obfuscate" the system's actual operation, telling the story the DP manager wants told to the users.

Stevens poked fun at common measures of system availability and reliability, throughput, turnaround and general productivity, suggesting, among other things, that "judging a programmer by the number of lines of code he writes is like judging Homer by his lines of ode."

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GENERAL ELECTRIC

Panel Looks at Future Word Processing Gear

By Ronald A. Frank
CW Staff

ANAHEIM, Calif. — As functions are added to word processing systems, it is important that people operating the systems are not forced to change their work habits to conform.

Additional capabilities will transform these units into office automation systems, according to David Moros, director of new product development for Wang Laboratories.

Speaking at a National Computer Conference session here last week on hardware architecture for office automation, Moros said the time is coming when electronic mail, intelligent copiers and even large business CPUs will be interfaced to office systems.

The next big area to be added to word processing is communications, according to Paul Mangione, director of product planning at Lexitron Corp. Today, only 10% to 15% of the installed word processing systems have communications, but a true communications environment for this type of system is just beginning.

The latest systems from Lexitron have RS-232 interfaces to support communications devices and users are being offered features such as IBM 2741 compatibility, Mangione noted.

Word processing systems began as hardware-only equipment. They evolved first to firmware and then to full software systems that offer users greater flexibility and protection against their systems becoming obsolete. The original systems from Lexitron had 18 printed circuit boards and this has now been reduced to about seven, he said.

This evolution means that users now have programmability and the systems are easier to maintain because software diagnostic routines can be run on the systems, Mangione said.

An attendee at the session asked why none of the vendor representatives had talked about standards. He said that word processing systems had little uniformity and this left the user in a bad position.

Jack Gilmore, group product line manager of word processing computer systems at Digital Equipment Corp., agreed, saying that vendors today are engaged in a features war to provide users with the capabilities they want. But standards will come later as communications capabilities grow, he added.

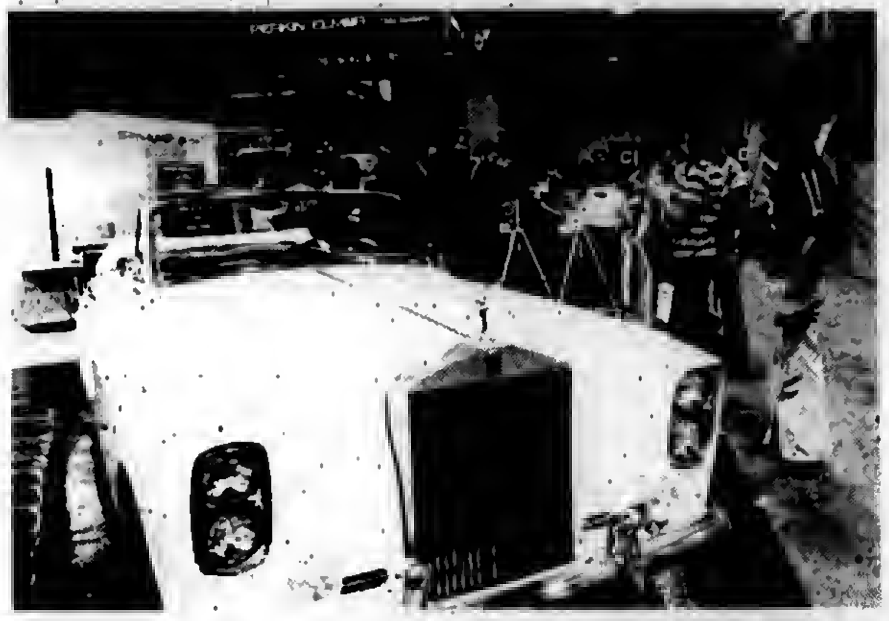
Another attendee, Tony Rybczynski of Bell Canada, asked the speakers whether they saw an eventual interconnection between digital PBXs and office automation systems. Mangione replied that these PBXs would become the bus structures of future office automation systems with workstations and other peripheral devices being interconnected through the PBX.

Moros said that even though most word processing systems are stand-alone single-station units, the multiple user system will become popular because it offers certain advantages. Multiuser systems allow cost-sharing, more on-line storage, greater speed and a variety of functions.

Other advantages include device sharing, such as the ability to use several printers in parallel, he added.

A natural evolution will be the interconnection of phototypesetting systems to word processing units so that direct input will eliminate the need for rekeyboarding, Moros said.

Gilmore said that at present, 40% to 50% of company costs can be traced to the office, but productivity in this area has not increased to keep pace with the rise in clerical wages. Office productivity has gone up only 4% since the 1960s, thus making it feasible for most users to investigate word processing systems.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Perkin-Elmer photographed attendees in a 1959 Rolls Royce to illustrate its theme "on the road to success."

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International Users 'Demanding'

(Continued from Page 22)

nies such as CDC often feel it is more efficient to provide their own protocols rather than having to conform to the protocol standard implemented by the packet carrier.

In another area of concern, Onstad spoke about laws being implemented by various countries to restrict the flow of data across international boundaries.

Ultimately, these regulations can affect a user's ability to freely transmit data that is "tied to an individual." DP records are included in this category, he explained.

European Treaty Pending

The Council of Europe is presently working on a treaty to cover transborder data flow and the Organization for Economic Cooperation and Development also has a study group looking into this area. The Council of Europe expects to have a draft treaty finished next year.

The European countries are also looking at the possibilities of regulating the flow of data from "legal persons," which includes corporations and other businesses.

If these trends at data restrictions continue, eventually all data could be affected, Onstad warned.

One future carrier looking at potential international implications is Satellite Business Systems (SBS), according to Ronald McCabe, manager of communications analysis with the satellite firm.

Under present regulations, an SBS customer would interconnect with an international record carrier by interfacing his earth station closest to the carrier's gateway office. This process has limitations, and SBS would like to see some changes to current regulations, McCabe said.

There is a need for high-speed circuit switched digital service. Many of the applications identified by SBS in its study of user needs require periodic transmission of bulk data. This requirement applies to international users also, McCabe explained.

Among other promising applications identified by SBS during its recent Project Prelude satellite tests are high-speed facsimile, "televisual" telecommunications and high-speed data service. SBS hopes that implementation of its service in the U.S. in 1981 will stimulate similar satellite services to be offered on an international basis, McCabe said.

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To Ease Distributed Design

DDB Standards Held Necessity, Not Nicety

By Brad Schultz
CW Staff

ANAHEIM, Calif. — Distributed data base (DDB) standards would not only be "nice" to have, they are necessary for the proliferation of DDB systems, according to the 1973 winner of the A.M. Turing Award.

Speaking here at a National Computer Conference session on DDB technology, Charles Bachman said that without standardization of DDB procedures and methodology, most DDB systems must be designed "from the ground up" as they are tailored to specific environments.

Since the long-term direction of DDB development is oriented toward worldwide pooling of data base resources — where data traffic can cut across industrial, political and geographical boundaries — DDB standardization is a global issue, he noted.

The present lack of DDB standards prevents organizations from internally developing DDB networks unless they possess substantial resources of money and expertise, Bachman said, indicating the benefits of DDB are for this reason kept not just from would-be developers, but also from would-be correspondents of those developers throughout the world.

DDB implementation does not "break up" that which was centralized, but rather integrates that which is distributed, Bachman stated. Large organizations undertake DDB development in order to create a single system that can satisfy a multitude of needs, he added.

It is not possible for any currently existing computer system to comprehensively handle the needs of any Fortune 500 company, he said. Large corporations are administered on the basis of diverse data sets that are stored and manipulated in complex ways beyond the power of present-day, general-purpose processors, he explained.

Large corporations, government agencies and other organizations are thus attracted to DDB technology, Bachman continued, suggesting that uniformity in communications procedures between nodes of a DDB network is far more important than uniformity in processing among those nodes.

Design Concerns

The two preeminent concerns in DDB design, according to Bachman, are communications between nodes of the network and the total system's ability to recover from a "crash" or other kinds of failures.

On the latter point, Bachman noted that acts of terrorism and employee strikes can cause an entire distributed network to suddenly cease functioning. He cited the case of one of Europe's largest banks, the Societe Generale, which recently experienced a strike at the primary computer facility of its network. The shutdown of that one site's computer room forced hundreds of the bank's branches to cease operating.

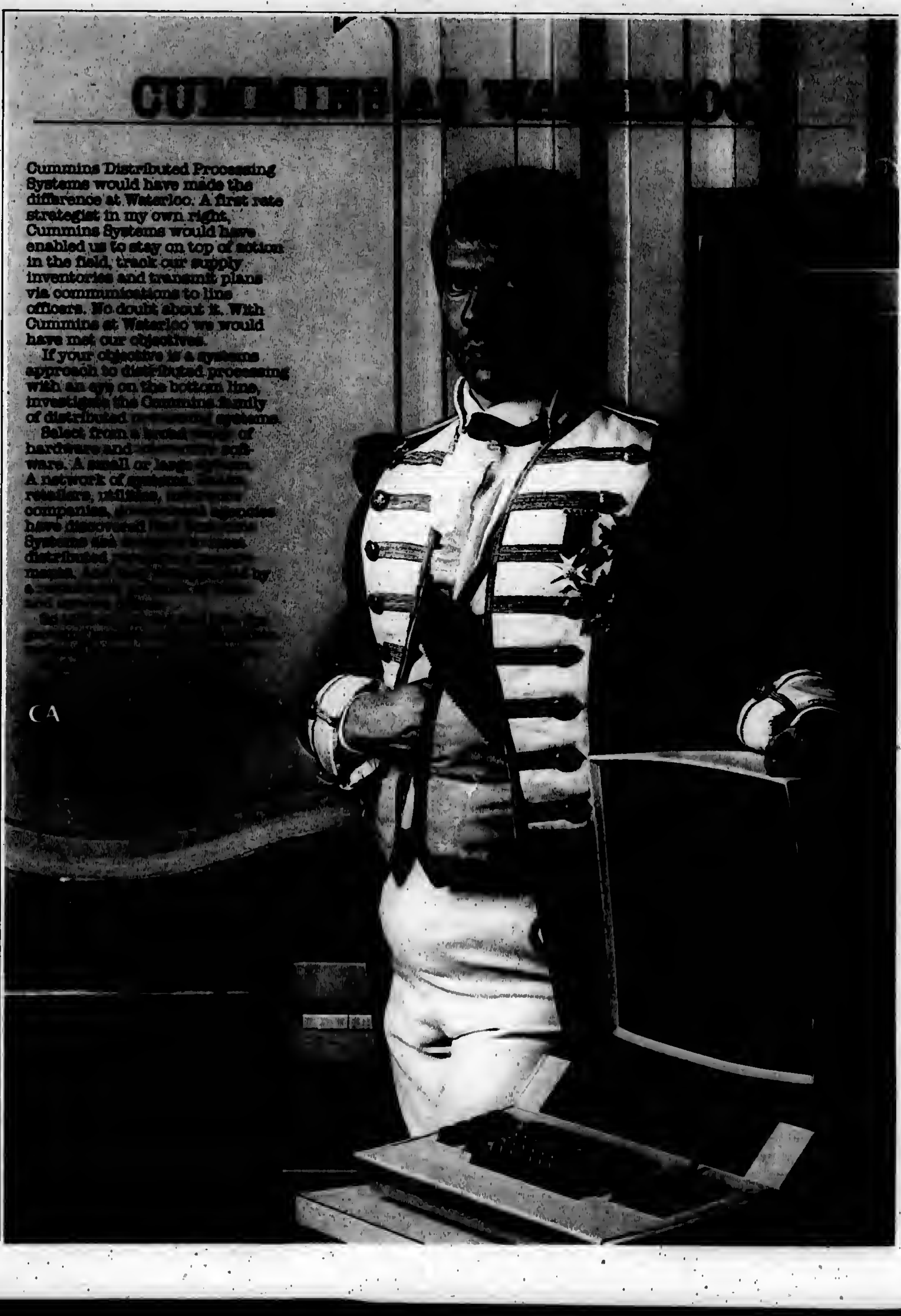
Behind the total community of people concerned with DDB technology — comprised of academics, DP technicians, public and private sector managers and legislators, among others — there is a powerful motivating force that is distinctively human, Bachman noted.

This force is based on a sense of loss and is characterized by an urge to recover local control of data, he explained, indicating that the massive centralization of data that has occurred during the past few decades has taken a toll in human anxiety.

DDB entails a reverse process in data accumulation; data germane to activities at a given location is stored and processed at that location. This characteristic can expedite local level management, but does not necessarily enhance data security — either for the local node, or for the entire network, the session's other panelists agreed.

James P. Fry of the Univer-

(Continued on Page 28)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DDB Standards Termed Necessity, Not Nicety

(Continued from Page 27)

sity of Michigan, who has concerned himself with the privacy implications of DDB, said the general security of data in a network is independent of the extent of its detachment from central control. Data security is by definition a question of access to the resources of nodes within the network, he explained.

William H. Steiger, chairman of the Codasyl Systems Committee, which is preparing a report of DDB implications, contended the responsibility for preventing abuse of distributed data lies with those who understand DDB technology. DDB experts have a duty to educate legislators on the nature of DDB and on the ways by which distributed data can be employed to invade privacy, Steiger said.

For data to be useful, it must be interpreted in the context of the system by which it was generated, Steiger said, noting that any applications system — such as an accounting system — has its idiosyncracies and flaws.

For this reason, data must be interpreted on the local level, where the system peculiarities are appreciated, rather than at some central facility far removed from where the data was produced, he added.

Although various issues connected with DDB are currently much discussed and explored, Bachman estimated that less than 1% of large automated organizations have implemented DDB and that this figure will rise only to 5% to 10% range several years from now.

Bachman attributed DDB's slow start to a scarcity of marketed software systems able to support DDB. The first type of DDB network that will be implemented on a large scale is that of "cooperating workstations," he said. In such arrangements, each workstation has the same data base management system.

The next type of DDB network to gain wide acceptance will feature "cooperating storage management" among its nodes, he predicted, explaining that each node will have sophisticated techniques for accessing data in other nodes of the network.

In the more distant future, there will be DDB networks which swap data with each other, although they will differ greatly in internal hardware and software, Bachman continued. These networks will possess powerful data conversion and translation capabilities, he added.

EEC Nations Planning Net

(Continued from Page 19)

ent data transmission and clearing functions.

The X.75 levels are "aligned" with those of the X.25 protocol to provide international end-to-end service without any inconsistencies, Amano explained.

The Level 1 physical interface specifies the use of an international digital circuit with the characteristics of synchronous full-duplex lines and transmission speeds of 64k bit/sec. Lower speeds with analog facilities are also compatible, Amano said. The international circuit can be either terrestrial or celestial.

Frame-Level Link

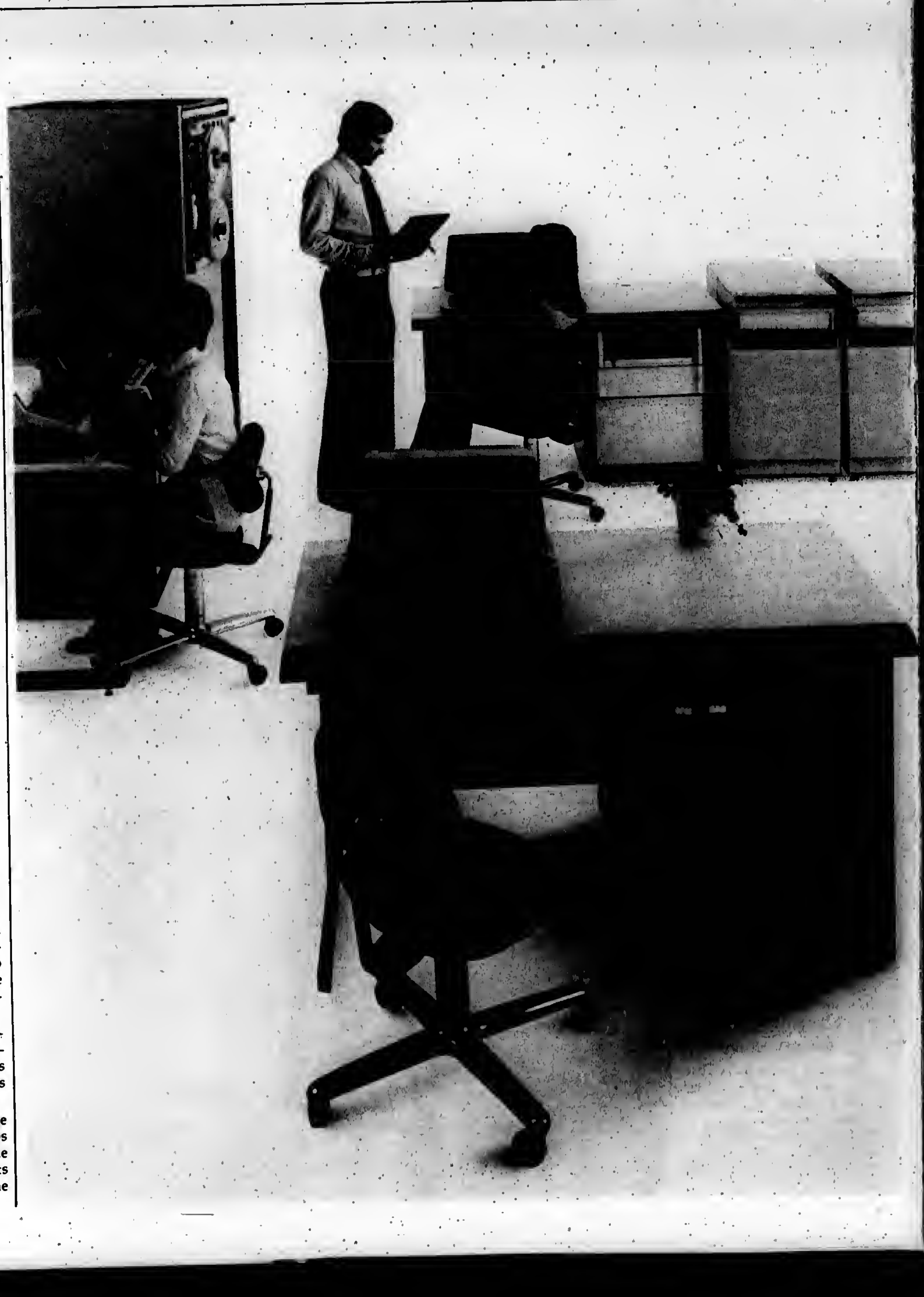
Level 2 of X.75, the frame-level interface, specifies the use of data link control based on the Link Access Procedure B (LAP B) as defined in X.25. It is compatible with the High-Level Data Link Control (HDLC) protocol specified by the International Standards Organization.

Each gateway switch is an international connection with equal status, so netiher a primary or secondary gateway switch is needed, he explained.

Level 3 specifies the way in which a packet is transferred, and the procedure to be applied. This level allows up to 4,095 virtual calls to be handled on each physical circuit.

This level does not cover datagrams and permanent virtual circuits; these are topics for further study by standards groups, Amano said.

Possible future needs for the other packet-switched services can be implemented within the X.75 standard because of its open-ended structure, he added.



CW Photo by A. Dooley

After four days of standing at NCC, sitting was welcome.

No Longer 'T-Shirt Industry'

Define Personal DP? Sellers Clash

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif.— "A year ago the personal computer area was a T-shirt industry," Chuck Peddle, vice-president of systems for Commodore Business Machines, joked. "Now, because of less expensive technology and retail distribution, personal computer marketers can sell the consumer a cost-effective product that was not available a year ago."

Although personal computer industry representatives at the National Computer Conference here last week agreed there was a booming market for personal or consumer computers, there was less accord on exactly what a personal computer is and what applications are in store.

Lewis F. Kornfeld, president of Radio Shack, contended that the primary uses for personal computers are in small businesses and for instruction. "The personal computer," he said, "was never meant to compete with TV games or a Cuisinart."

Opposing Kornfeld's view, Dr. Albert Yu, president of Video Brain Corp., claimed that consumer computers are primarily for personal problem solving, primarily in the home. The personal computer was not meant to perform menial tasks, but rather to provide consumers with expanded problem solving capability, for tasks like personal money management or investment analysis, he said.

The personal computer, Yu stressed, is not a robot or a signal controller for turning off microwave ovens. Instead, it is a tool to aid the consumer in coping with an increasingly computerized society.

Not so, Mike Cheiky, director of research at Ohio Scientific, replied. He then insulted th average consumer by saying, "People are naturally lazy and today's personal computer is not for lazy people."

The true personal computer is a home appliance, Cheiky claimed. It should be either labor-saving or entertaining. While Cheiky conceded that the consumer computer should have some logical programming capability, he said that in order to be successful — with one in every home — the personal computer has to have voice input, voice response and remote control capability.

Unfortunately, voice input is today's limitation on developing the "lazy man's" computer, he said. However, Cheiky forecast that input technology would develop relatively quickly.

Somewhere in Between

Taking a middle road, Steven Jobs, president of Apple Computer, Inc., said the personal computers on the market today are a combination of traditional and personal computers. However, he said he does not consider the personal computer a convenience device for running bath water.

Jobs described the confusion surrounding the term personal computer by saying, "It's a consumer product that happens to be a computer or it is a computer that happens to be a consumer product."

Right now the Apple president does not consider the personal computer to be a true consumer product. The personal computer, he observed, sells solutions to problems, but the real problem is convincing consumers they have problems.

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Papers Point to Future Hardware and Software

By Howard A. Karten
CW Staff

ANAHEIM, Calif.— Several papers discussing advanced projects at last week's National Computer Conference here probably will find no immediate commercial application, but appear to have significant implications for future work in hardware and software.

Samuel P. Harbison, a graduate student in computer science at Carnegie-Mellon University (CMU), delivered a paper discussing the university's research project involving a distributed data processing (DDP) system. Harrison, who co-authored the paper with the acting head of CMU's computer science department, William A. Wulf, discussed the university's C.MMP/-Hydra project, which he said has had both notable successes and notable failures.

The project involved 16 Digital Equipment Corp. PDP-11s, 16 separate memories and a special crosspoint switch the university designed to interconnect all the units. Although Harbison never referred to DDP in the paper — preferring the term "multiprocessors" — the project nevertheless appeared to give several important lessons for future trends in distributed systems.

User Application

Begun in 1971, the project was to explore multicomputers sharing a common address space. The impetus for the research was at least partially the economics of LSI technology, which the authors believe will make multi-minicomputer structures the architecture of choice for many large-scale applications.

Other attractive features of this type of architecture are the absence of a master-slave relationship among the minicomputers linked together and the ability to fail-soft, or run with significant degradation.

Kernel Environment

Another significant feature of the project — although actually a separate aspect of the work — was the Hydra operating system. According to Harbison, Hydra is a "barebones" operating system devoid of files, a command structure and even a file scheduler.

The intention was to allow Hydra to be a "kernel" or basic environment which allows users to supply the more familiar functions of an operating system.

Notable accomplishments of the project, according to Harbison, include the construction of a cost-effective, symmetric multiprocessor, the symmetric distribution of the Hydra kernel over all processors and a successful mechanism for the detection of and recovery from software and hardware errors.

An additional, important finding was the reliability of the crosspoint switch, which had initially been the subject of considerable doubt by the academic computing community.

Discussing what he saw as the failures of the project, Harbison drew applause for his statement that the 16-bit architecture proved too small for several purposes. Additional disappointments of the project were a smaller degree of hardware reliability than the research team would have liked and the problems of memory contention when using high-performance I/O devices.

Virtual Design: 'No Problems'

Another participant in the session, W.D. Strecker of DEC, discussed his work on VAX-11/780, a virtual address extension to the DEC PDP-11 family. Commenting that the design of a large virtual address minicomputer presents "no great problems," Strecker told the audience the real challenge lies in the areas of compatibility and simplicity.

Compatibility is important in preserving the investment of both end user and vendor in equipment, he said, while simplicity preserves the features that make minicomputers attractive in the first place.

Discussing the design criteria of the virtual operating system, Strecker said compatibility with the PDP-11 was a strong goal, but the designers felt an over-emphasis on absolute compatibility would limit the success of the project. Therefore, it was decided to include two modes of operation for the system: native mode, to make full use of the virtual facilities, and compatibility mode, to be able to run existing PDP-11 programs under control of the virtual operating system.

CW Photo by A. Dooley

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Couger: 'Almost Unbelievable'

DPers' Need for Socialization Found Very Low

By E. Drake Lundell Jr.
CW Staff

ANAHEIM, Calif. — Computer professionals have a strong need to grow within their profession, but their need for socialization is "so low as to be almost unbelievable," Dr. J. Daniel Couger told a session at the National Computer Conference here last week.

Couger, a computer scientist from the University of Colorado, added, however, that a job redesign for computer professionals could raise the present low levels of satisfaction among DP workers and increase productivity.

Reporting on a study of DP professionals — programmers, programmer/-analysts and systems analysts — in 25 organizations, Couger said that at present the job satisfaction level is fairly high overall among such workers. But, he added, the "signs of job dissatisfaction are growing in the computer field."

In the past and even to some extent at present, people are attracted to the field because it is exciting, he said. However, this is not enough to keep them in the business.

In order to discover how better to motivate people in DP, the study undertaken by Couger was aimed at finding whether DPers are similar to other workers — if they can be motivated in the same ways — or whether they are different and need different handling.

To find the overall satisfaction level, the survey questioned the DPers on their relative happiness with five core job areas — skill variety, task identity, task significance, task autonomy and feedback.

Overall, DPers at the analyst level rated their profession slightly better in these areas than did other professional workers, Couger noted, while programmers rated their satisfaction slightly lower than other professionals. However, the variations were so slight, they were not really statistically meaningful, he added.

For example, on a scale up to 7, systems analysts rated their profession at 5.73 in the skill variety area and programmers rated theirs at 5.16; the overall average for other professionals on the same standardized tests was 5.36.

Overall, DPers said they are generally satisfied, when directly asked whether they like their jobs; systems analysts rated them at 5.19 and programmers at 5.17, while other professionals rated them only 4.88.

Real Difference

But while there are some variations in these areas between the DPers and other professional workers, the real difference comes in the area of socialization and ability to socialize, Couger said.

On the standardized tests, on the same scale of 7, DPers rated 3.7 in this category while other professionals rated 5.65, Couger said, adding that never in the history of this testing has there ever been such a large variation from the norm.

This proves computer people are in fact different, Couger said, and have to be motivated in different ways than other professional workers in an organization.

The low showing in the social needs category, he said, was slightly offset by a high need for growth. Personnel should probably be motivated on this basis, he indicated.

One area in which there could be improvement was immediately visible from the study, Couger said, and this came in the area of feedback.

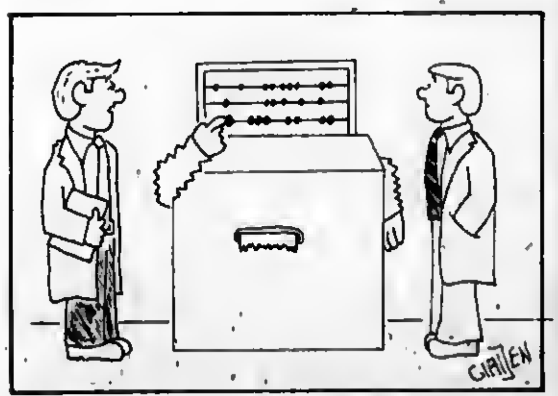
DPers as a group rated the feedback they received from management lower than did any other professional groups; they also rated the level of supervision they received lower than others, he said.

Since they show the highest ratings in needing challenge and growth within their job categories, better feedback could help them become more motivated and therefore more productive, he said.

At the same time, DPers seem to want to have projects that are larger in scope than do other professionals, he noted, adding the others seem to prefer more specialization in their tasks than do DPers.

Panelist Mayford Roark agreed on this point, noting that excessive job fragmentation may make programmers feel they have little responsibility for the finished product and therefore decrease their motivation.

Roark, who is DP manager for Ford Motor Co., also agreed about the ability of supervisors in the computer field. In an internal study, Ford found only one-third of the DP workers felt that they were getting good leadership from systems personnel who had moved into supervisory positions.



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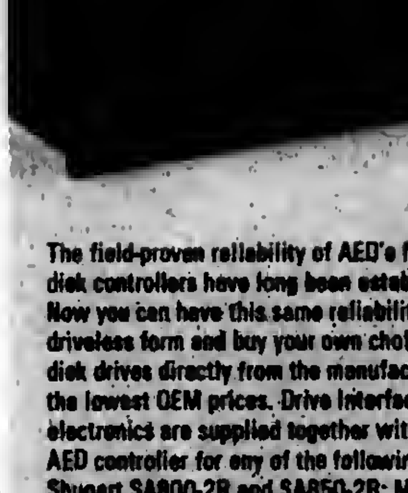

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To Simulate Energy Variables

Utilities Using Modeling for Market Strategies

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — Utility companies are turning to computer modeling to help evaluate energy considerations affecting the marketing of their product, and several speakers at last week's National Computer Conference here described how they work.

According to Dr. Allen C. Miller of Applied Decision Analysis, Inc., Michigan Consolidated Gas Co. used a Model from Miller's consulting firm to help determine what share of the market it could expect in the future based on information that natural gas prices would rise.

The Michigan utility was particularly concerned because if prices rose too much, several of their key customers — Ford Motor Co. and General Motors, for example — might switch fuels, severely impacting the gas company's market share.

Crux of Problem

The crux of the problem was finding the point at which various types of natural gas consumers would change to another type of fuel, Miller explained. Some of the "uncertainties," or variables, fed into the model included the availability or lack of gas at future dates; lags in consumer response to availability and price; consumer decision criteria; constraints on switching to various types of fuel; and conservation and regulation.

Another crucial factor the model examined was the gas customer's tendency to convert to multiple-fuel burning methods. In other words, Miller asked, when a consumer updated fuel-burning techniques, how sensitive would availability and other factors be in a decision to incorporate oil-burning capability with present gas-burning capability?

The model forecast switching behavior over a 20-year period using a dozen fuel types and a dynamic programming mode (moving backward from a prearranged result).

Surprisingly, Miller said, the model predicted that if natural gas prices exceeded oil prices even by a modest amount, large users would begin to make capital outlays to install dual- or triple-fuel burning capability in spite of the fact that this behavior would not be economically feasible at those particular increased price levels.

Availability seemed to be the motive overriding capital outlay considerations. "People want to make sure they will have the capability to have fuel if there is a shortage," Miller said.

The implication was the the Michigan utility would probably not lose business in the near future if prices rose, but because customers would be moving toward multifuel burning capability, they could switch quickly. This sudden switch would have a devastating effect on the company's market share, Miller noted.

As a result of the modeling exercise, the company has gone before the Michigan Utility Rate Commission to change its rate structure in order to make it more competitive.

Electric Peak Model

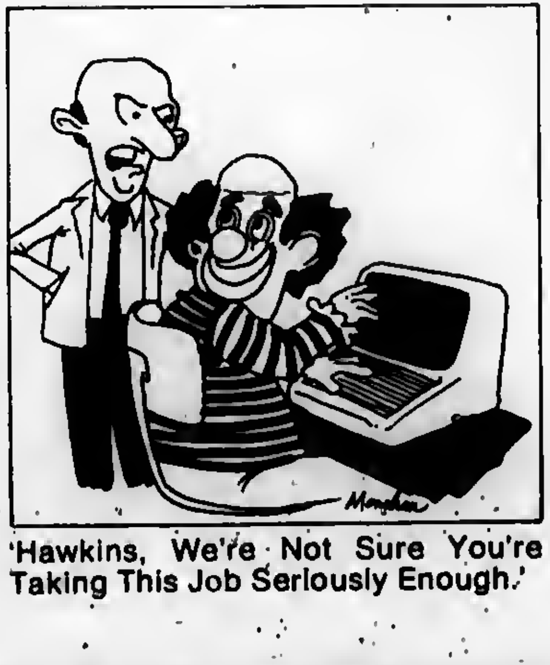
Using the computer-assisted modeling technique for a similar application, Dr. Philip F. Schweizer, an engineer with the Research and Development Center of Westinghouse Electric Corp., developed a market forecasting model for regional electric peak load growth. He noted this was the first time the center developed a model to serve as a market research tool.

The model simulated electricity usage by residential, commercial and industrial end-user sectors for nine regions of the country. Its goal was to forecast maximum electric peak load growth for each region.

This would provide Westinghouse with a strategic planning tool for managing peak load growth, a means of determining what kind of equipment it would have to use and a way to forecast the amount of capital outlay to be made, Schweizer said. Westinghouse considered the information generated by this model exceedingly important because a 1% change in the annual growth rate translated to an annual change of $8 billion in revenues.

Using the model, Westinghouse discovered that the total annual U.S. peakload growth was approximately 7.2%, just slightly over the 7.1% growth for total energy usage.

Schweizer commented that a major contribution of the model was the ability to isolate casual variables that were driving peak load growth in each region.



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Solution of Energy Problem Held 'Critically Dependent' On DP by DOE Official

By Edith Holmes
CW Staff

ANAHEIM, Calif. — "The resolution of our energy problems is crucially dependent on computing," Dr. Joel A. Snow, associate director for research policy at the U.S. Department of Energy (DOE), said here last week.

Addressing the plenary session of the 1978 National Computer Conference, Snow suggested that in the short term the U.S. will need computerized energy models to help manage the nation's and the world's diminishing fossil fuels and to locate dwindling oil and gas reserves.

In the "intermediate" term, defined as the 1990s, computers will be needed to explore the problems associated with technologies close to commercialization, such as coal gasification, magnetic fusion and enhanced oil recovery, the DOE official stated.

Learning to predict the impact of the release of carbon dioxide into the atmosphere when fossil fuels are burned will challenge our long-term computational abilities, Snow added.

Predicting that by the mid-1980s the world demand for oil will exceed the Organization of Petroleum Exporting Countries' (Opec) ability to deliver and that the world's production of "liquid gold" will reach its peak just after the year 2000, Snow said DOE believes the U.S. and the world must shift from petroleum to solar energy, nuclear reactors, nuclear fusion or a combination of these in the next, all-too-few years.

"We must make an historical transition from petroleum to 'X' or 'X plus Y plus Z' or to some nonlinear combination of energy sources," Snow stressed. "And if that combination is nonlinear, we will certainly need computers."

Fifty Big Machines

Housing in 38 major research installations approximately one-quarter of all the computers the federal government owns and leases and spending $230 million in fiscal year 1977 on them, DOE considers computing one means to the creation of a versatile array of energy technologies, Snow said.

Fifty of the Energy Department's more than 2,000 systems are large-scale, scientific machines. The size of a Control Data Corp. 7600 and larger, these CPUs are used to provide the government with three-dimensional simulations of the distribution of pollutants in the atmosphere and to track and unravel complex chemical processes, the DOE official explained.

As the complexity of our energy problems increases, the demand for improvements in the performance of the CPUs will intensify, he predicted.

Another group of mainframes is used for socioeconomic modeling at several national laboratories, Snow said.

These applications demand processors with large memories and will eventually serve the country best when they are part of distributed networks.

For this kind of modeling, improvements in data communications are at least as important as increases in raw computing power, he stated.

Business D.P., office automation and personal computing for technical professionals round out the DOE's computer requirements, Snow said. More than two-thirds of the approximately 2,000 minicomputers belonging to the Energy Department are used by individual scientists and engineers with terminal hookups to what then becomes their own personal CPU, he explained.

None of these figures include the DOE's more than 1,000 outside contractors, who each have their own computing power, Snow added.

The future will demand the big computer for such purposes as discerning the chemical effects of coal gasification or the behavior of pollutants in the atmosphere, according to the DOE official. Smaller machines will be called upon to perform humbler tasks, including the sizing of solar collectors for individual homes and the monitoring of automated furnaces, Snow said.

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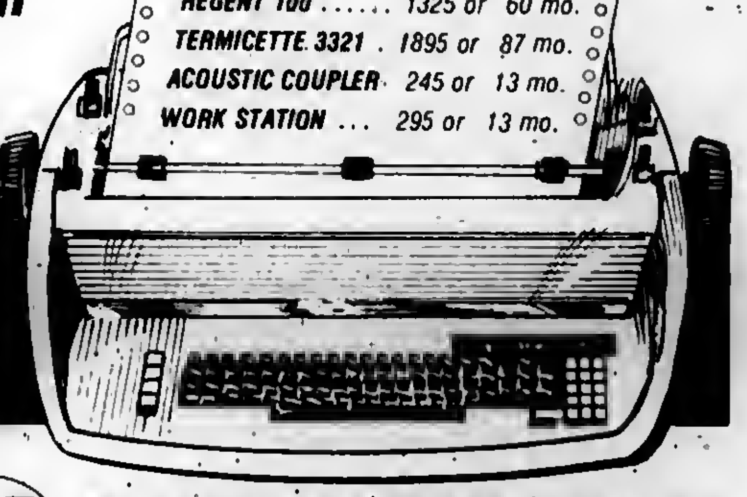

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Personal DP Making 'Now' Exciting: Isaacson

By Denise Petski
CW Staff

ANAHEIM, Calif. — "No time is more exciting than now, for now is personal computing," Portia Isaacson, computer store owner and a fellow with Electronic Data Systems, said at the National Computer Conference here last week.

The number of computer hobby clubs has grown considerably in the past few years to more than 400, she said, attributing the growth to the increasing number of resources available to the computer hobbyist.

Many hardware options are available to the hobbyist today, including terminals, voice synthesis and graphics, she said. There are also 10 or 12 personal computing magazines available to bring the hobbyist the latest available information, she added.

Describing the present competition between Radio Shack and IBM in the personal computing arena as "guerrilla warfare," Isaacson said the heart of personal computing is the retail computer store.

The retail store is essential in bringing products to the public. It offers demonstration systems for testing, sells books and magazines, services, equipment and can write computer maintenance contracts. The retail store also has software for sale and offers information and educational classes to the public. One of the best features of the retail store, according to Isaacson, is that it tries to keep the inventory on the floor, therefore avoiding several-year waits.

But stores, too, are growing and changing, she noted, and several different kinds of retail computer stores will develop to meet the demand for computer power that goes beyond hobbyists to small business and industrial process control applications.

Only about 20% of the personal computing market is made up of hobbyists, she said. Process control, education and business applications must also be included in what is considered to be the personal computing market.

Isaacson also addressed the size and cost of these computers, saying the personal computer need not be extremely small in size and a small business computer can be run on $5 a day, which is economically justifiable.

Isaacson also noted that there should not be much of a decrease in hardware costs over the next few years, but there should be enormously increased capabilities. Predicting that every home will have several computers, Isaacson noted that virtually everyone at some time will know how to program a computer. Computers in the home will be used mainly for entertainment and education. Children will someday be tutored by computer and their parents will be able to simulate stock market activities.

The future of the economy will also be affected by the personal computing industry. Since most personal computers cost less than $10,000 and are very easy to use, some jobs in the DP center may be eliminated. The "automated office" will also eliminate the secretarial function, she added.

Computer education will also be very common. With virtually everyone knowing how to program, entry-level programmers may be in oversupply. The entire country will be computer-literate, according to Isaacson.

Low-cost computers will have an effect on small businesses, leaving little demand for clerical help. According to Isaacson, labor organizations are already fighting against the automated office.

Negative Aspects

There are also some negative aspects to the personal computing phenomenon, Isaacson said. For example, any device can be used for data collection in a surveillance or criminal operation. According to Isaacson, theives have been known to use personal computers as inventory control devices for stolen materials.

On the other hand, personal computing will have many positive effects. Scientists will no longer be tied to university computers, they will use their own. There will also be advantages for the handicapped and in the entertainment and educational fields.

Panel chairman Jim C. Warren, editorial adviser for *Dr. Dobbs' Journal of Computer Calisthenics and Orthodontia*, cited several projects currently under way that will make the difference between fact and fantasy in personal computing.

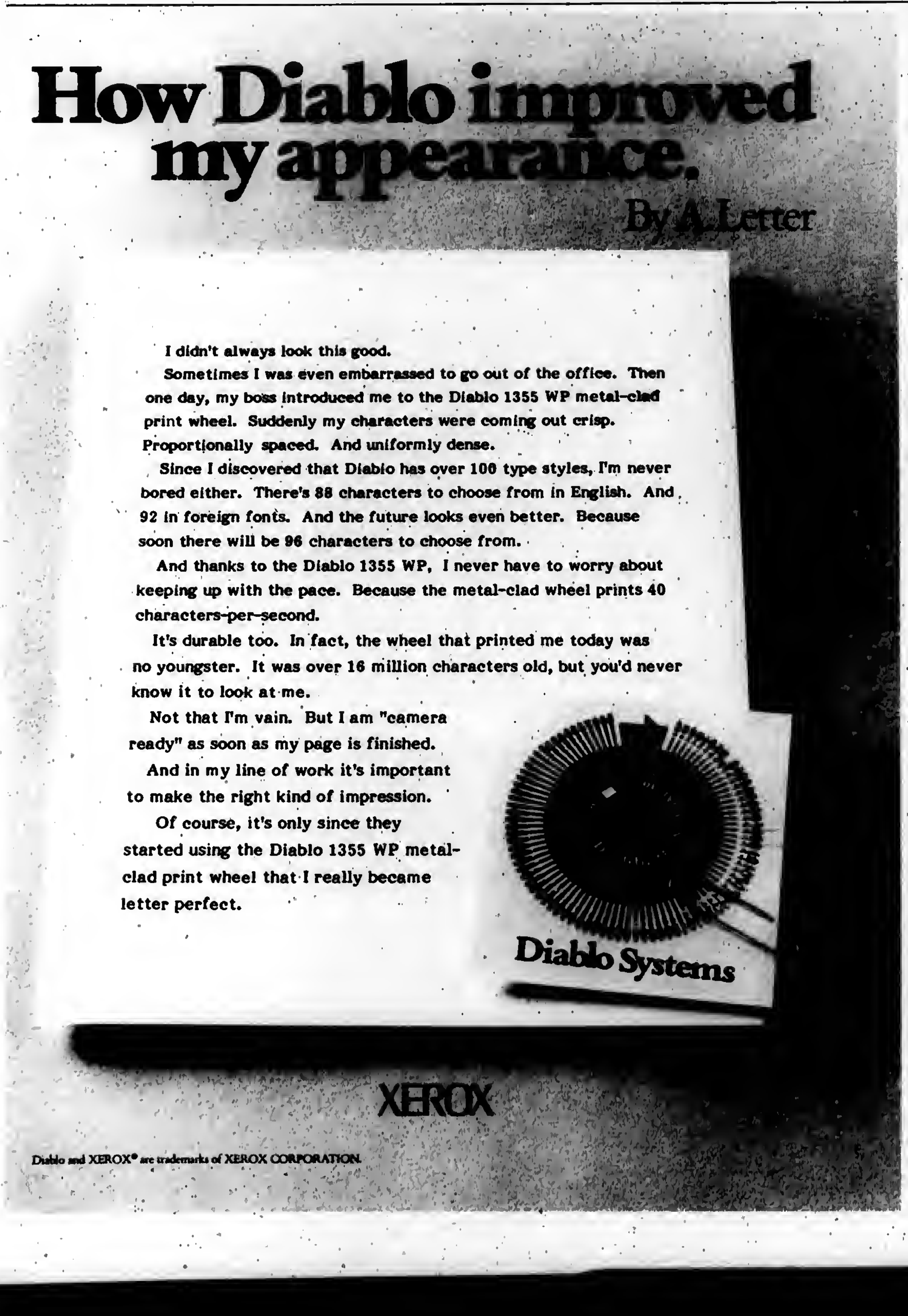
One is his digicasting project, which transmits digitally encoded information on an FM radio subcarrier. This service will transmit local and regional newswires, he said.

Panelist Dan Engels, a member of Xerox Corp.'s Palo Alto Research Center, and Ted Nelson, a DP consultant, also discussed projects which would turn fantasy into fact in the area of personal computing.

Dan Engels, who is in charge of the Small Talk Operation at Xerox, said he is disappointed in the way people are shackled with history. There is nothing small about the home computer, he said, and there is a need for the best in software in home computing.

Nelson predicted there will be 10,000 home computers within the next 1-1/2 years. If the production isn't available, the demand will still be there.

All panelists agreed that home and hobby computing is the way of the future. In isaacsons's words, "We are incredibly lucky to be present at the dawn of personal computing. May the force be with you."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Software, Documentation Hurting Personal DP

By Tim Scannell
CW Staff

ANAHEIM, Calif. — Poor software and incomplete documentation are the two major handicaps existing today in personal computing, a panel of speakers at the National Computer Conference agreed here last week.

Software documentation, as it is presented to the average user, is confusing because it usually lacks the necessary specifics, Jeff Raskin of Apple Computer, Inc: stated. These specifics, left out by various manufacturers, consist of everything from descriptions of listed code to instructions to the user on how to turn on the microcomputer.

Manufacturers routinely sell software that isn't free from program "bugs" or, in several cases, doesn't work at all, Baskin said. Because of this lack of quality, the software aspect of the industry is sometimes regarded as the "seamy underside of computers," he said.

Vendors have sacrificed the clarity and readability of microcomputing programs to attain additional memory space and faster execution speeds, Raskin continued. As a result, people are "turned off" to personal computers in general.

Competent Writers Absent

The bulk of the software problem lies in the fact that the vendors fail to use competent documentation writers. Languages have become more and more simplified as the industry has grown, and manufacturers have mistakingly done away with "literate" software writers in favor of people who fail to successfully convey the essence of computer programs, Raskin contended.

There are three ways to effectively write software documentation, according to Raskin. The first is to test the programs using "nonprogramming" people. A user shouldn't need any previous training to run a successfully written program, Raskin pointed out.

Second, the programs should be tested by people who are very critical, such as other programmers.

Finally, the programs should be tested by the documentation writer himself. The "old way" to document programs was for the writer to "add a few head notes to the program and send it off to a typist." Writers should take the time to sit down with the software, run the program and write down everything that is done, step-by-step, Raskin said.

This practice is basically a simple one, but unfortunately "almost never done," he added.

The reason for this, Raskin explained, is that "management, in general, doesn't know how to manage documentation efforts." Management doesn't realize that without well documented software, the manufacturers "won't have products going out to the celebrated consumer in the street at all."

Difficult Job

Louis Frenzel, representing the Heath Co., agreed with Raskin on the poor state of microcomputing software but noted the manufacturers have a difficult job because they have to implement the things that hobbyists "dream up."

The microcomputing industry has matured, Frenzel said, but it is dominated by fairly small companies that do not have the financial stability to improve faulty software.

The microcomputing industry, Frenzel continued, has broken down into four different groups: the hobbyists, small businesses, education and the consumer appliance market.

Hobbyists are composed of a "mixed bag" of individuals, Frenzel said, "many of whose interest is sustained by building equipment and adding on to their systems." These "hardware jocks" are more interested in the size and capabilities of their equipment and, as a result, software is considered secondary in nature.

Subsequently, Frenzel continued, a huge used equipment market is developing because hobbyists want to own better machines.

Best Potential Market

The small business market is considered by the manufacturers to have the greatest potential "dollarwise," Frenzel said. This type of user is even "less knowledgeable" than microcomputing beginners and considerably more naive, limiting his interest in microcomputing to "knowing he needs a computer and realizing he can't afford it," Frenzel explained.

"Some of these users aren't even aware of the necessity of software," he noted.

Computer stores are in the best position to act as an interface between the small business user and the microcomputer manufacturer because the stores can supply the local support that the user needs, he added.

In the area of education, microcomputers are basically used as an extension of the audiovisual department or as a "disperser of material."

Computer-aided instruction (CAI), although practiced by a few colleges and even fewer high schools, is still in its infancy, Frenzel stated, and has a considerable way to go before it is accepted as a normal part of the curriculum.

The belief that personal computers will be successful on the consumer level is simply "a lot of baloney," Frenzel declared. It is "ridiculous in every way to believe that homes will someday have a computer."

Consumers Not Ready

The average consumer isn't ready for the implementation of a home computer, Frenzel said, let alone ready to bother with computer programs and system trouble shooting.

Manufacturers would have to supply software that is geared toward teaching the consumer how to run the machine, Frenzel stated.

The current trend is for "all-in-the-box" technology in microcomputer design and the software and related documentation will have to follow suit if personal computer manufacturers want to win consumer acceptance.

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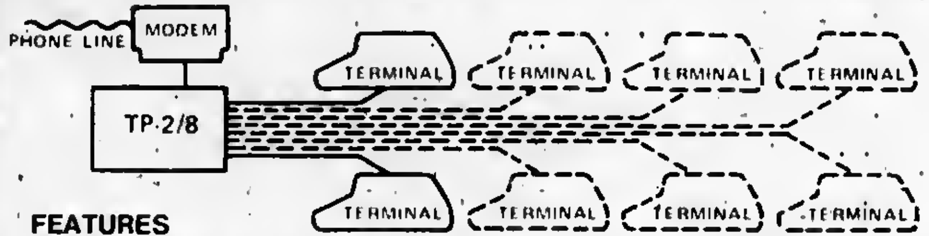

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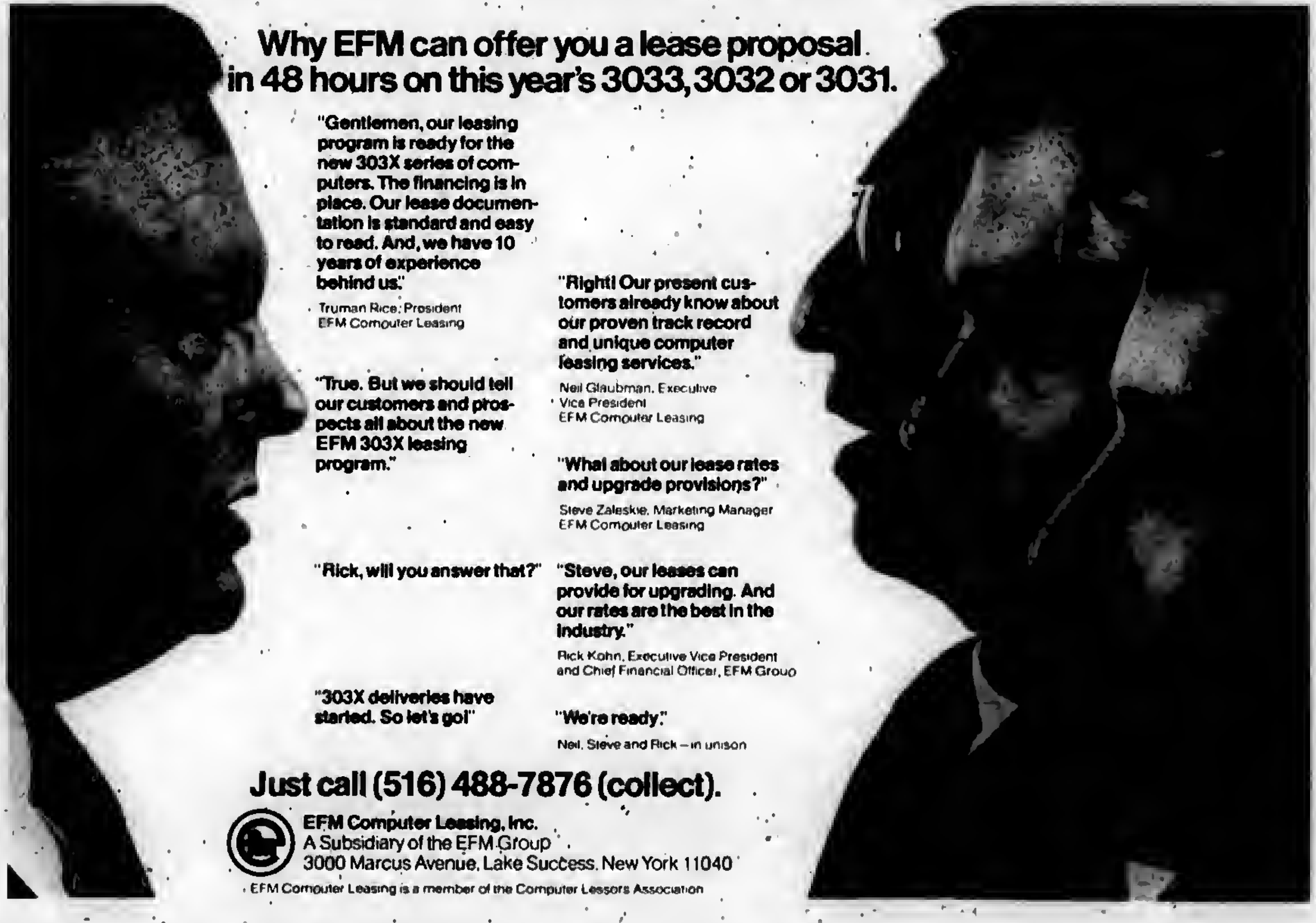
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Mismanagement of Time Blamed on Work Habits Rather Than Other Factors

By Nancy French
CW Staff

ANAHEIM, Calif. — People tend to blame outside factors and other people for wasted time instead of examining their own work habits to see where the real blame lies, James F. Towsen of Towsen and Associates told a packed room at the National Computer Conference here last week.

Towsen, who credited Alex McKinsey, author of *The Time Trap*, for the ideas presented in his session, described the solution to the time problem as "identifying the activities that waste your time and then controlling them."

Towsen suggested DPers monitor their activities by writing down everything they do for three or four weeks, then analyzing those activities to see what can be eliminated, delegated or handled more effectively.

Towsen focused on 15 key problem areas, of which ineffective delegation of authority was one. "Perhaps you really are trying to do too much yourself," he told the session attendees. "Assign certain jobs to other people and them make sure they have the authority they need to carry them out.

"Perhaps your desk is so cluttered you waste time trying to find the papers you need. If it's Friday and Monday's work is piled on top of Tuesday's work and both are covering Friday's work, you are not going to be very efficient," Towsen said.

Sometimes people spend too much time "putting out fires" and "managing crises." This sort of activity is born out of poor communication, meetings without objectives, tasks left unfinished and simple personal disorganization, he said.

Towsen suggested planning very few meetings; when meetings are scheduled, there should be an announced agenda and only the necessary people should be invited to attend. Minutes of the meeting should be sent out within three days to every person who participated and others whose responsibilities will be affected by the meeting.

If the time management problem stems from inaccurate or delayed information, one person within an organization who has good communication skills should be made responsible for writing all procedures, instructions and memoranda. These should be kept brief, Towsen said, especially memos.

Cut out everything but "the meat" and put that information "right in the first paragraph so it hits your readers right between the eyes," he urged, adding memos be limited to one page.

Another suggestion Towsen made was to limit computer-generated reports because "management can't possibly digest all that stuff." Instead, the Harrisburg, Pa., consultant urged attendees to report by exception. Data processing can be especially helpful in finding those exceptions, he indicated.

In the area of mail, Towsen urged his audience to handle it once wherever possible. Make decisions on it quickly — either pass it on, act on it or "use the wastebasket," he said, calling the wastebasket and the dictating machine the two "most valuable tools" in the office.

Procrastination and indecision were also identified by Towsen as common time wasters. "If you have the authority, make the decision," he said. There's no need for most decisions to take more than about three days.

Finally, Towsen told attendees to "learn to say 'No' and then say it." In addition, he recommended cutting down on chit-chat during phone conversations and coming directly to the point with a caller.

If necessary, he added, lie to get off the phone: "Say the home office or your boss is calling and suggest that your caller call again later. Most of the time he won't," Towsen said, which clearly indicates how unimportant the call really was.

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County Clerk Sued

Entry Error Provokes False Arrest

By Marguerite Zientara
CW Staff

PALM BEACH, Fla. — A Palm Beach welder is seeking damages "in excess of $2,500" in the case of a computer-related error that provoked his unwarranted arrest and near-incarceration.

Lawrence Leeb claimed in a recently filed civil suit that County Clerk John Dunkle's IBM 370/138 erroneously reported that he failed to pay $500 in court costs stemming from a marijuana case. Leeb paid the $500 fee in May 1976 under the name "Larry Leeb," and the payment was duly recorded in the computer.

However, on Jan. 11, 1977, a sheriff's deputy arrested Leeb while he was on the job, "in front of his coworkers and employer," handcuffed him and took him to the county jail for nonpayment of the $500.

Attorney Nelson Bailey, who represented Leeb in the marijuana case, said Leeb was in the process of being booked into the county jail when a deputy clerk, confronted by Bailey's insistence that Leeb had paid the fine, searched for and found a copy of the cash receipt. A judge then cancelled the arrest.

According to Jim Groth, Palm Beach County DP manager, the problem was one of data entry. "The computer did not recognize that Larry Leeb was also Lawrence Leeb." The computer, according to Groth, is used to store criminal information on misdemeanors, traffic violations and felonies.

The suit, filed May 11 on Leeb's behalf by attorney Thomas Hoadley, stated: "Defendant's computer at all times . . . was an agent or employee of defendant [Dunkle] and had a duty to act faithfully in the performance of its duties and employment . . . Defendant's computer did not, in fact act faithfully and was, in fact, negligent because said computer advised the clerk's office . . . Larry Leeb had not paid the court costs of $500."

The suit claimed Leeb deserved damages because he "had to spend money to correct this error, to free himself from the Palm Beach County Jail, and therefore there has been an improper infringement upon . . . Larry Leeb's peace of mind, reputation, his job, his finances and most important, his liberty."

No date has been set for a hearing.

NBS/ACM Slate Meet Keynoter

WASHINGTON, D.C. — White House staff member Richard M. Harden will deliver the keynote address at the symposium on "Tools for Improved Computing in the '80s," to be held at the National Bureau of Standards (NBS), Gaithersburg, Md., on June 15.

Harden will speak on "Sharing Information for Decision Making in the Federal Government." He is a special assistant to the President for information management and director of the Office of Administration in the Executive Office of the President.

The symposium is the 17th annual technical meeting of the Association for Computing Machinery (ACM) Washington, D.C., chapter and the NBS Institute for Computer Sciences and Technology. It will include sessions on "supercomputers," software engineering, programming languages, microprocessor software, status of the President's DP reorganization project, hardware architectures, management issues, software tools, and optimization tools.

For additional details, contact Stan Lichtenstein at 301-921-3181.

Calendar

July 28, Toronto — **Paper/Printer Industry Conference**, sponsored by Dataquest, Inc. Contact: Ronald I. Miller, Dataquest, 3000 Sand Hill Road, Menlo Park, Calif. 94025.

July 30-Aug. 2, Hershey, Pa. — **OCR: A Matured Technology and Its Impact on Future Applications**, sponsored by Optical Character Recognition Users Association (OCRUA). Contact: OCRUA, 10 Banta Place, Hackensack, N.J. 07601.

July 31-Aug. 11, Santa Cruz, Calif. — **Computer Graphics**, sponsored by University of California Extension. Contact: Joleen Kelsey, University of California Extension, Santa Cruz, Calif. 95064.

July 26-28, New York — **Marketing Through Industrial Distributors**, sponsored by American Management Associations. Contact: American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

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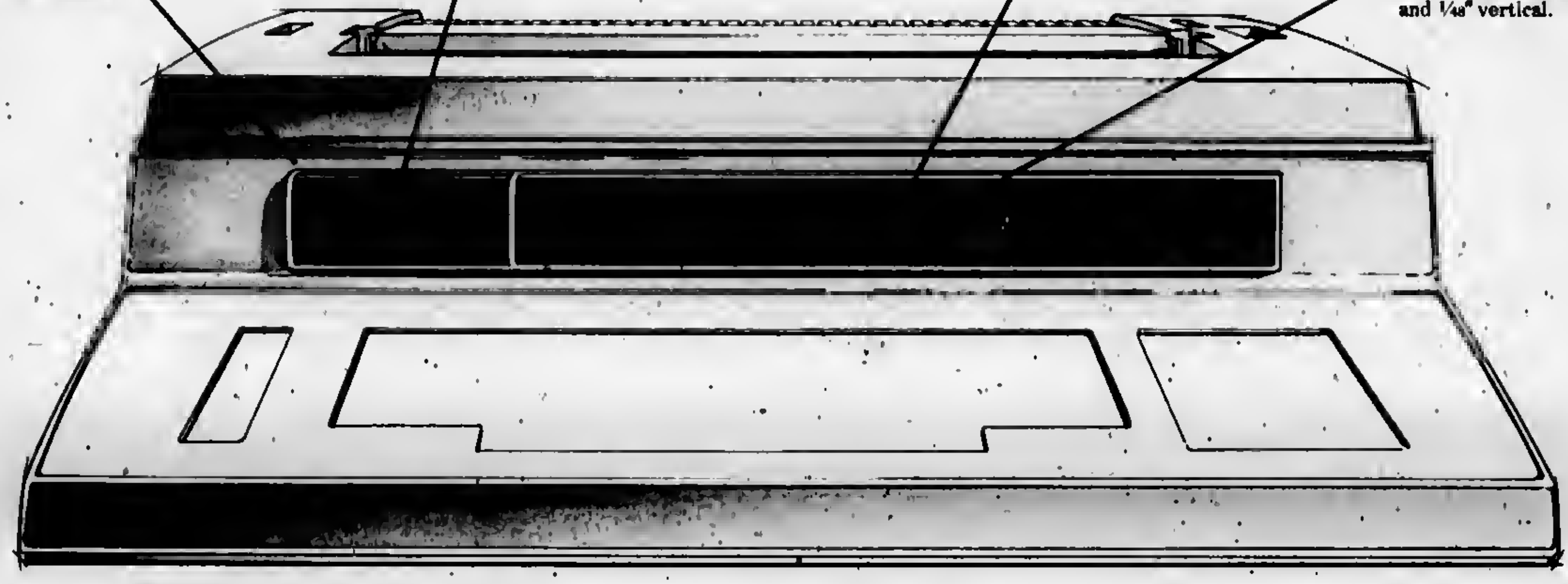

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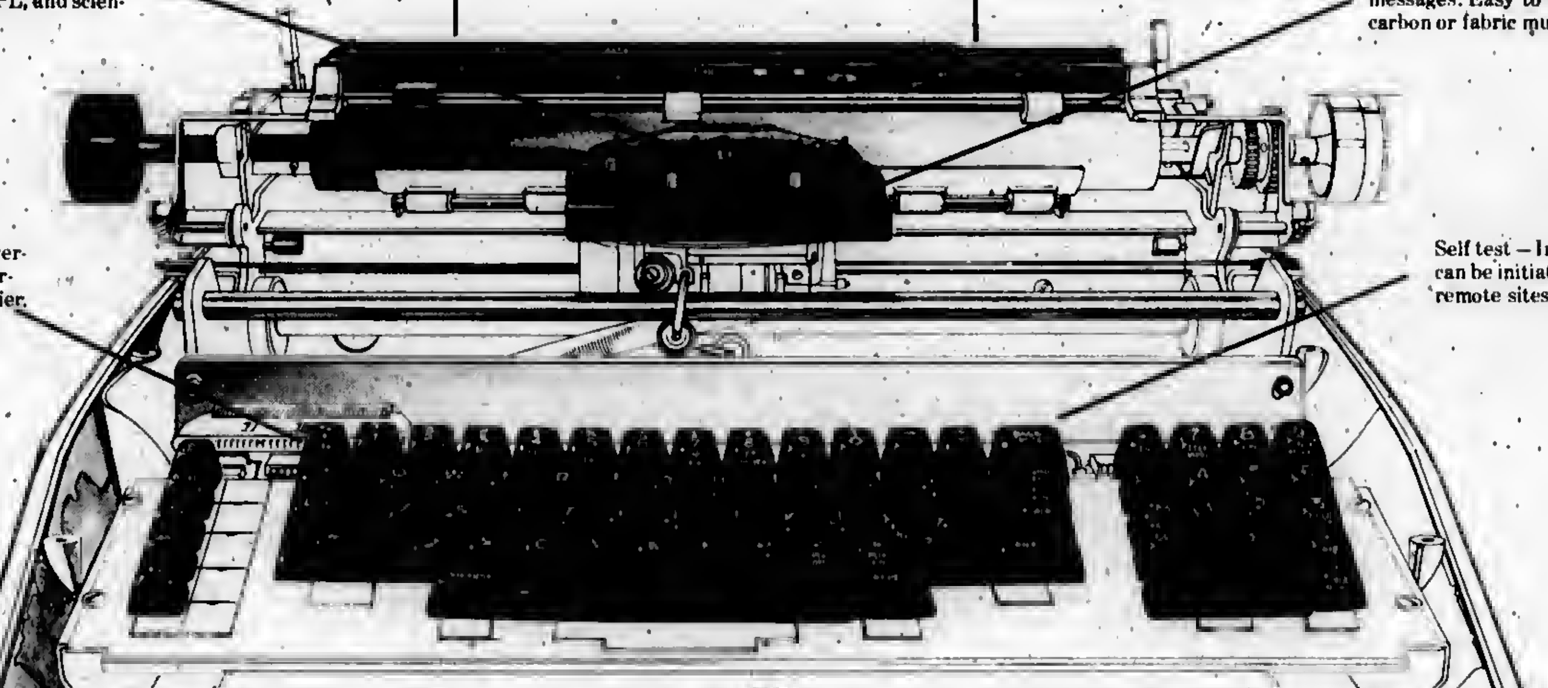

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Program Error Causes Faulty Federal Payments

By Ann Dooley
CW Staff

HOUSTON — A programming mistake caused numerous payment errors in checks issued to individuals who participated in federally financed manpower programs here, underpaying some and overpaying others.

The individuals involved were receiving unemployment insurance and Aid to Families With Dependent Children (AFDC) and were thus eligible for the special programs.

The payment errors occurred in 1975 and 1976. They were discovered by the end of fiscal year 1976, but no attempt has been made to determine the correct payments for those affected since "it is next to impossible to figure out the back payments for each welfare recipient," according to Richard Flores, the Labor Department's associate regional administrator here.

It has been projected, however, that an estimated $1.05 million in pay was withheld for the fiscal years of 1975 and 1976. The same programming error caused overpayments during that same period to workers in the Comprehensive Employment and Training Act (CETA) program totaling an estimated $257,000.

Switch to Service

The mistakes occurred during a changeover in 1975 from an in-house processing system to a service bureau, Houston Ceta Director John Brown said.

The city programmers who prepared the software for use by the service bureau failed to program the system to update changes in activity or status for those in the Ceta program, he explained.

The system should have altered the pay of Ceta beneficiaries when they changed jobs or classes, Flores said. The programming was never reviewed and therefore the error was not caught until a routine check.

Once the error was discovered, it was corrected immediately, Flores said, adding no attempt was made to determine who was responsible for the oversight in programming.

Total allocations for those years were $18.7 million for programs that involved 17,398 persons in the city of Houston.

Although it is not known how many people received incorrect payments, it is known that those affected were receiving vocational training and many were welfare mothers, according to Flores.

A sample audit was made to examine four payrolls out of 20 in fiscal year 1975 and 11 out of 32 payrolls in fiscal year 1976. These payroll figures projected the estimated over- and underpayments and are all there is to go by, officials said.

The dollar figures are somewhat misleading, however, according to Flores, who explained that anyone receiving AFDC or unemployment funds who was enrolled in a Ceta program also received a small allowance as an incentive for being in the program.

Problems arose when a person moved into an activity which called for payment of a wage. The system was programmed to ignore the status change and so continued paying the allowance instead of the hourly wage.

In this sense, each recipient was underpaid, Flores said, but once a person earned a wage, his AFDC or unemployment payments would have been reduced or dropped, he noted. Since the recipient's welfare check was not reduced, he was not being shortchanged as much as was thought at first, Flores claimed.

Although the error was discovered and corrected soon after fiscal year 1976 ended, the error was not generally known until the Department of Labor made an overall investigation of Houston's Ceta program. The investigation was spurred by various other problems in the city-run program as well as a poor performance record, officials said.

The actual net dollar affect of the mistake was minimal, according to Brown.

The people affected by the programming error were not officially notified at the time about the mispayments, but even after the mistake was made public, there were no complaints or requests for repayment by those directly involved, he claimed.

Dartmouth Faculty OKs Master's in DP

HANOVER, N.H. — A proposed program for a master's degree in computer and information science was approved by the faculty of arts and sciences at Dartmouth College here recently. The proposal will go before the board of trustees of Dartmouth at its meeting here this month.

The master's program start would be contingent upon raising of funds external to the regular academic budget to cover the costs of the program.

The focus of the master's program would be on the design, implementation and management of complex information systems and on the social issues surrounding their use. The program would come within the faculty of arts and sciences and would be coordinated with the department of mathematics and the Kiewit Computation Center at Dartmouth.

The faculty vote authorized the master of science program for five years and stipulated that it be reviewed, both academically and financially, in its fourth year.

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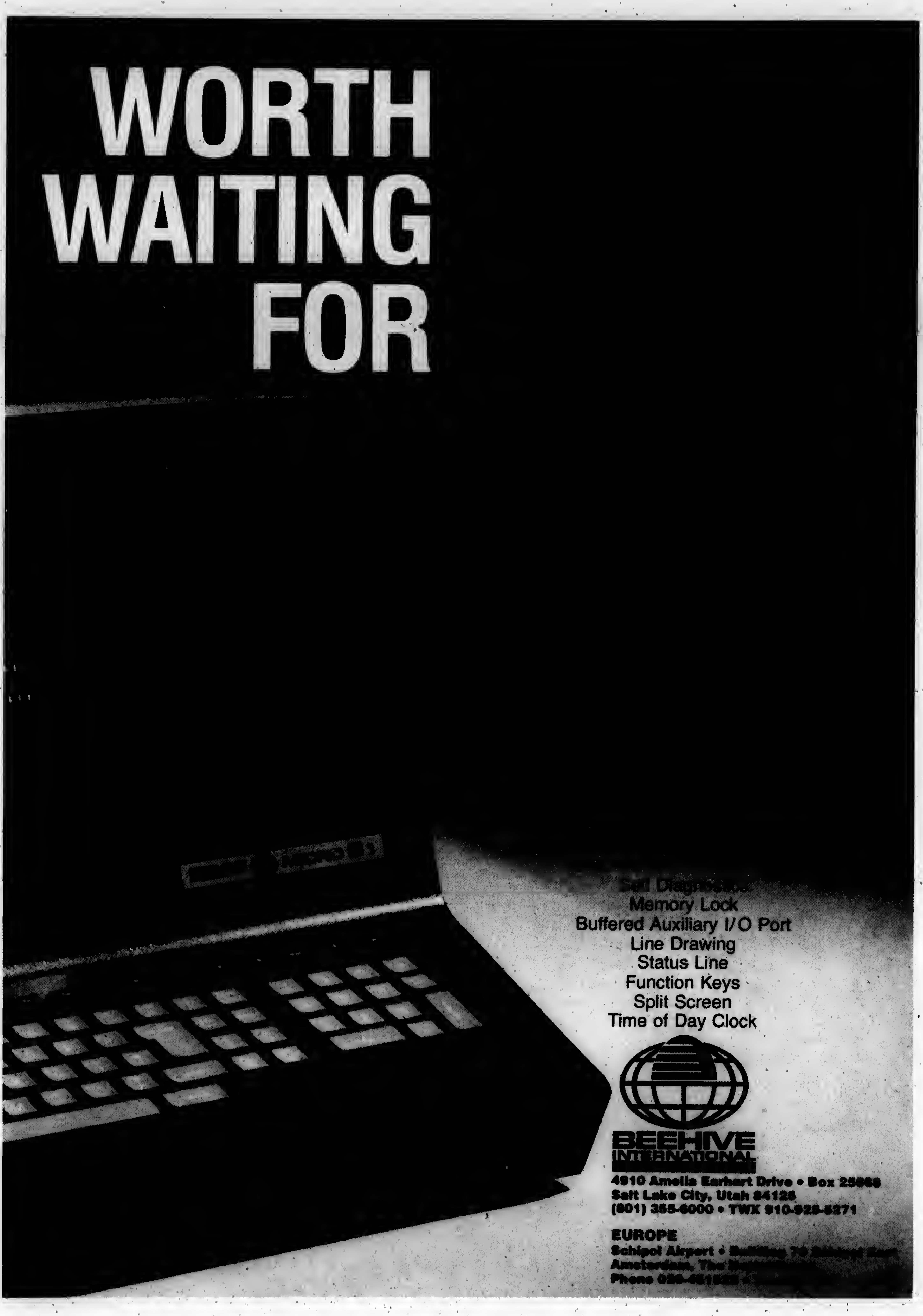

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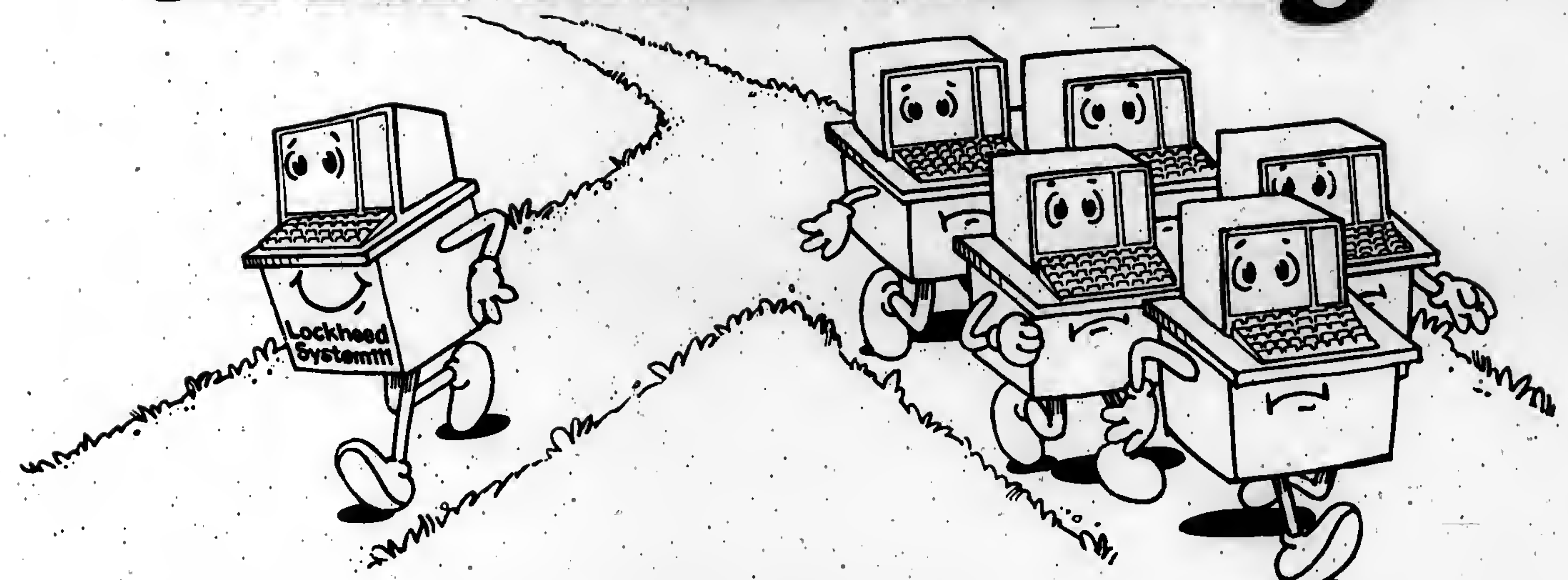
The contrary theory of business computer design and marketing.



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But Local Operational Control

Central Rules Urged for Dispersed Data Bases

By Brad Schultz
CW Staff

WOBURN, Mass. — An organization should not distribute its data bases unless its central management implements powerful guiding procedures to support this effort, a recent Computer Expo 78 workshop audience was told here.

Moreover, data bases should not be distributed unless data access requirements are also distributed or unless appropriate expertise and resources are available to support their implementation, according to Don R. St. Clair, a senior consultant with the Chicago accounting firm of Deloitte Haskins & Sells.

St. Clair, a specialist in data base management and data integrity and security, said the best approach to distributed data base administration is local operational control with central procedural control:

Powerful guidelines from central management should be adopted by the entire organization, St. Clair told the gathering of DP users. Otherwise, he explained, member installations will probably become incompatible in a distributed data base environment.

Data base access requirements should be distributed along with the data bases so the extent of security violations can be minimized, he continued, pointing out that unless security requirements are localized, a breach at one site could mean infiltration of the network's other data bases.

Further, an organization attempting data base distribution should understand the scope of such an undertaking and be prepared to furnish the expertise and resources demanded by such an effort, St. Clair said.

Three Control Options

Distributed data base administration can be approached via local control, central control or the local operational control/central procedural control mix, St. Clair said.

The chief risk of local control is incompatibility between member installations; central control risks becoming, in a sense, too bureaucratic, he indicated.

With central control, it is possible for central management to order a completely inappropriate operating system for a member installation. The member facility may have implemented certain applications software which could crash the assigned system, resulting in a significant loss of money and resources for the entire network.

In such a case, central management would be acting in ignorance of developments at the local level within the network, he said. In the case of incompatibility among network members, at least one member would act in ignorance of developments at the central level.

Local operational control with central procedural control yields the best of both situations, St. Clair maintained. Local operational control confines security problems, he said, while central procedural control ensures harmony throughout the network.

Benefits, Disadvantages

The main benefits of distributed data bases include satisfaction of local system requirements, enhancement of overall reliability and security through containment of local problems, modularity in growth and a reduction in communications transacted, St. Clair said.

Drawbacks include a limitation of commercial software available to the user, a large commitment of resources and an increased demand for "strong administrative methods and procedures," he said.

Call for Papers

1979 NATIONAL COMPUTER CONVENTION, New York City, June 4-7, 1979.

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Send six copies of a short (2,000 word) or long (5,000-word) paper with six copies of a title page containing a 150-word abstract, four to six keywords, affiliation, address and telephone number to Or. Richard E. Marwin, Box 32222, Washington, O.C. 20007 by Nov. 1.

1978 COMPUTER NETWORKING SYMPOSIUM, Gaithersburg, Md., Dec. 13, 1978.

Papers are requested on practical and research experiences concerning both computer and communications networks. Topics include architecture, authentication techniques, measurement, protocols and standards.

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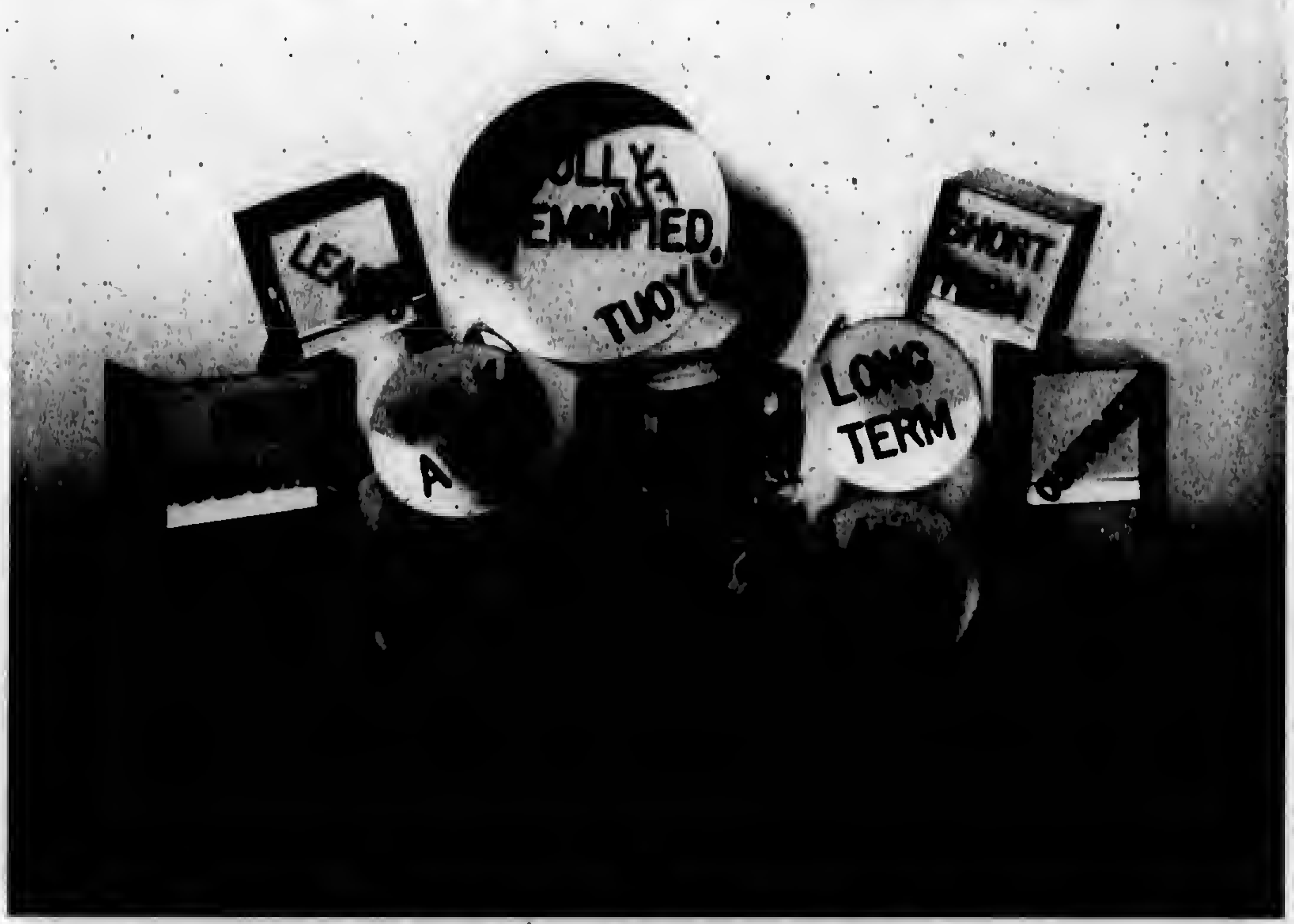

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Aboard Orbiting Observatory

Parallel Processor Pointing to X-Rays in Space

BLOOMINGTON, Minn. — A four-pound orbiting computer is aiding a scientific search for X-ray emissions from the planet earth and extragalactic sources.

The computer is the Control Data Corp. Model 469 R², which is used in on-board spacecraft control. The system, which measures four inches by five inches, was designed and built by CDC's Digital Image Systems group here and is part of the High Energy Astronomy Observatory (HEAO) project which began last year.

HEAO is studying cosmic rays, gamma rays, and X-ray sources in deep space, with a concentration on neutron stars, pulsars and the mysterious "black holes." The black holes are believed by scientists to be the remnants of collapsed stars so dense that light cannot escape them.

The Model 469 R² is a 16-bit parallel processor with two 8K-byte plated wire memories. The computer is controlled through an IBM 360/65 on the ground at the National Aeronautics and Space Administration (Nasa) Goddard Space Flight Center near Washington, D.C.

TRW, Inc. designers of the spacecraft used in the HEAO project, programmed the computer through a subcontract from CDC.

Scientists at Goddard loaded the memory on the computer aboard the spacecraft. The computer is programmed to determine the direction in which the spacecraft is drifting so it can tell scientists which way to point the craft to study selected objects in the sky.

Two of the CDC computers are aboard the spacecraft, one serving as a backup to the primary system.

Two Stars Discovered

The computer has thus far helped the observatory to discover two stars far from the earth that are exchanging clouds of gas so hot that they are 10,000 times stronger than all the combined radiation from the sun.

Because the observatories are located in space, a long-term study is possible, freeing the scientist from haze and atmospheric disturbances that disrupt his vision when the study is attempted from earth.

The HEAO project will also attempt an analysis of quasars, which scientists believe to be the most remote of visible objects in the universe. If the distance is as great as many scientists believe, the total amount of energy emitted by a quasar in one second would supply all the earth's electrical energy needs for a billion years.

Scientists hope the study will provide a better understanding of the processes in which X-rays are emitted in space.

Two more orbiting laboratories are scheduled to be launched during the next two years.

Hatch Elected By Insyte Users

DALLAS — Dick Hatch of Sterling Computers in Houston was elected president and chairman of the board of Insyte Users Group, Inc. at the recent fourth annual Insyte Datacom Users Conference here.

Insyte Datacom Corp. is a Dallas-based international vendor of proprietary data base, data communications and related data management systems software.

Other officers elected, also with Sterling Computers, included Chip Hull, vice-president; Cindy Pursley, secretary and treasurer; and L.S. Bayer, board member.

Regional coordinators elected were Bob Blum of Ore-Ida Foods, Boise, Idaho (West); Al Malioriello of United Stationers Supply, Forest Park, Ill. (Central); and Doug Kanz of Empire Detroit Steel, Mansfield, Ohio (East).

Brochure Describes Contract Services

NEW YORK — A brochure entitled "Computer Contract Negotiation and Evaluation" is available free of charge from the Brandon Consulting Group, Inc. here.

The brochure describes the following services:

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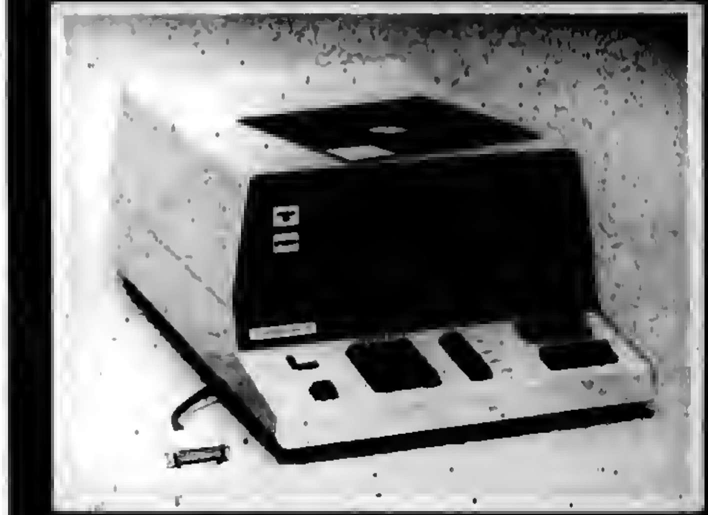
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By Charles P. Lecht

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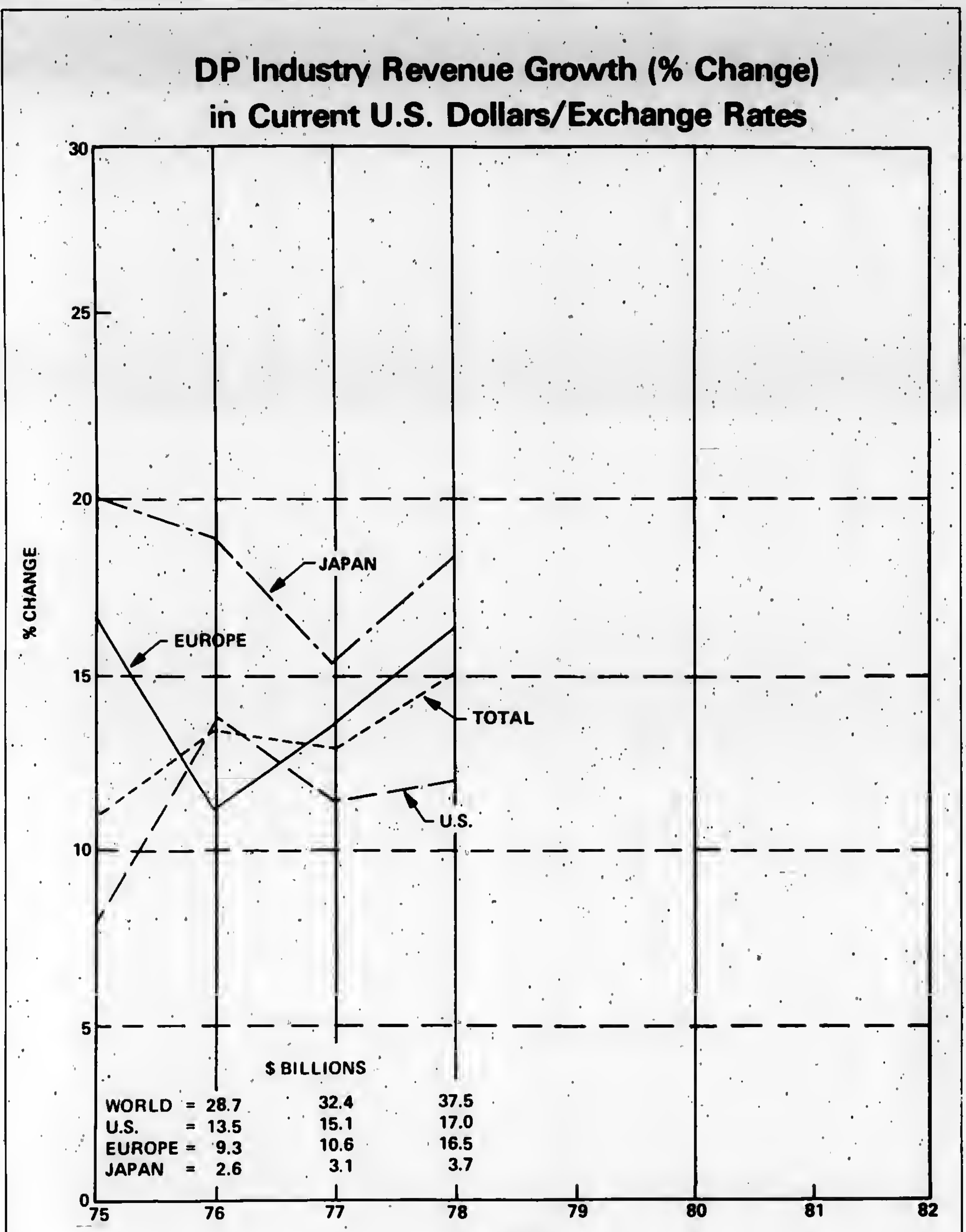


		76	77	78
WORLD	=	28.7	32.4	37.5
U.S.	=	13.5	15.1	17.0
EUROPE	=	9.3	10.6	16.5
JAPAN	=	2.6	3.1	3.7

Figure III-8

CHAPTER III
Part 2

Rising U.S. concern over our continuously eroding world computer systems development and sales leadership has been a recurrent theme in our news media in 1977-78. Prominent newspapers like the *Wall Street Journal*, the *New York Times*, the *Washington Post* and magazines like *Business Week*, *Fortune* and *Forbes* as well as virtually all computer field publications have printed alarming stories of inequities arising from our foreign trade policies, policies that clearly serve us poorly.

With most coverage focusing our attention on Japan, one might be tempted to conclude that if we resolved our difficulties in dealing with that country, we could stem further erosion of our leadership — even, possibly, reverse it. This is unfortunately not true for, as we have seen, while Japan's takeover of its own computer systems marketplace occurred before our very own eyes with dazzling speed, Germany has been preparing for the takeover of its own in a relatively unnoticed way.

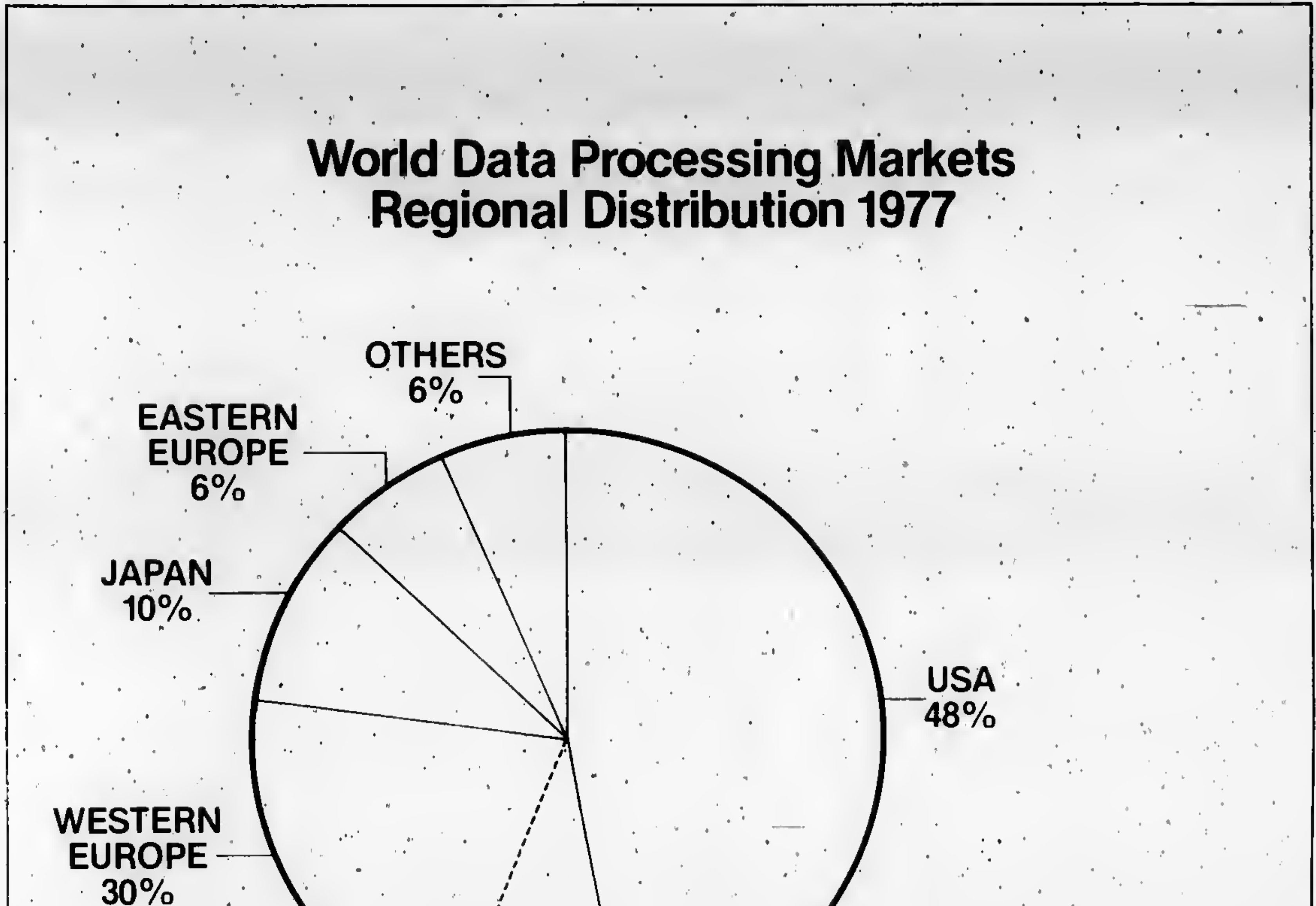
With little or no Japanese competitive threat in Europe until the recently announced Siemens/Fujitsu deal, U.S. manufacturers taken as a group have seen their Western European marketplace control diminish. Thus, in 1977, U.S. vendors still controlled more than 65% of the general-purpose Western European marketplace (by installed value) and 70% of the German marketplace. But this is down substantially from the mid-'60s.

Not that the absolute value of the U.S.-owned computer business in Western Europe in general and Germany in particular has diminished. Indeed, the estimated $37.5 billion world marketplace in 1978 will yield yet increased revenue for U.S. manufacturers who will continue to dominate it (more than 65% of the world marketplace is U.S.-controlled).

However, the steep growth rate in Europe (most of which is in Western countries) is being matched only in Japan, with growth in the U.S. marketplace relatively slow; less than $2 billion as opposed to Europe's $6 billion. (see Figure III-8). Since most of the U.S. manufacturers receive half or more of their revenues from abroad, the loss in market share which is being experienced in Japan and Europe is serious.

Earlier in this chapter, I noted that a loss of U.S. market share in Western Europe could in part be attributed to factors not directly related to competition. The continually unfolding definition of the marketplace caused by introduction of a sea of new devices employing microcomputer technology, as well as the lowering of the cost of developing computer systems in general, has stimulated the business of heretofore cash-poor contestants. Also, shifts in intercompany relationships, alliances with non-U.S. manufacturers and outright sale of U.S. high technology assets is contributing to the U.S. loss of market share.

That our market share loss is in any significant way related to the emer-



SOURCE SIEMENS—UPDATED BY ACT/TAG

Figure III-9

gence of superior or equally competitive products or an outgrowth of U.S. corporate weakness is not the case, however tempting it may be to explain it this way. The less ruggedly individualistic are wont to place blame for loss of market share on *both* U.S. corporate ineptitude and government foul-ups. They argue that, as the computer industry grew, governmental and private industry entities jointly took full credit, whether or not they deserved it; now, as it diminishes, they must take the credit on the same basis.

Tsunami's thesis supports the most conservative of positions on this matter; namely, that whatever blame may be placed on the U.S. computer industry for not maintaining its momentum worldwide, governmental policy, or the lack thereof, is the overriding cause. Now that the European marketplace may equal that of the U.S. in size by the end of this decade, a marketplace which as we have stated earlier is growing at a lesser rate, it is indeed serious that we are losing ground in the former.

If in our examination of the reasons underlying our loss of West European market share we set aside the factors beyond our power to control, we may notice that German-based (though not primarily German-owned) manufacturers offer the greatest threat to our home-based/home-owned manufacturers in Germany and Western Europe. These, along with French, English and Italian-based manufacturing organizations, are, minimally, siphoning off jobs from the North American continent to Western European countries (U.S. industry manufacturing in Western Europe accounts for the majority of the $16.5 billion 1978 computer systems marketplace).

With Siemens, Nixdorf and other German-owned/German-based manufacturers increasing their share in the largest Western European marketplace — namely Germany — and German-based (though not necessarily German-owned) industry commanding $5 billion or approximately 30% of the Western European marketplace, we can conclude that any replacement of U.S. ownership of manufacture and support so essential to sales in Germany will erode U.S. leadership in Western Europe.

Such replacement may in fact occur for reasons other than increasing technological capability; the currency value imbalance between Germany and the U.S. is also a contributing factor. While the strength of the deutsche mark against the dollar benefits U.S. imports to Germany, it also increases the need to move operations home again, or elsewhere.

With marketplace opportunities swiftly increasing in Western Europe as we withdraw our manufacturing to, say, U.S. soil again, I cannot help but believe that any gains to be made through our now lower manufacturing costs will be offset through our mere lack of presence where the action is. Those who argue possible gains

(Continued on Page 48)

(Continued from Page 47)

through currency considerations may indeed be right in the very short term; as the U.S. once did, German companies are now looking to the U.S. these days for a cheap labor pool of which to take advantage. In the long term, however, the brutal reality of relocating a plant, its personnel, technology, etc. and the loss of sociopolitical status in the local manufacturing theater will have a severely negative net effect on U.S. companies. And with French- and English-controlled and government-supported industry increasing their ownership of their own marketplaces, evaluated at 18% and 20% of the Western European marketplace respectively, the trend is for European companies to break the yoke of U.S. control of the computer industries in Europe, as has already happened in Japan.

Figure III-9 presents a picture of the role of Western Europe in the world market. It shows that Western Europe is indeed the second largest marketplace in the world (30% vs. 48% for the U.S. by if-sold value today).

No Alternatives Lacking

At first blush, Germany appears to be a still less significant marketplace than Japan, 9% vs. 10% respectively. But the self-contained character of Japan's marketplace has made it a particularly difficult one to service by anyone lacking the extraordinary resources required to do so and, thus far, only the U.S. can satisfy the still-growing Japanese need for foreign technology. Indeed, we have seen that the growth of an indigenous Japanese computer industry was traceable in part to an absence of alternative sources.

Germany, on the contrary, suffers no such lack. Thus every emerging or potential competitor that is based in the European Economic Community (EEC) and every current EEC-based electronics company would together be able to fill the void that the loss of U.S. industry leadership in Germany would leave.

And a loss of control of the German marketplace would mean the loss of Western Europe; losing Japan would have no such important impact in the Far East.

While British-owned and French-owned manufacturers maintain a significant presence in their domestic marketplaces, and Germany increases

(Continued on Page 49)

SIEMENS

Siemens is the leading West German manufacturer of electrical and electronic products. The company markets most of its products (but not DP systems) in nearly every country of the world.

Siemens' corporate revenues totaled about 25 billion deutsche marks — about $12.5 billion — in the fiscal year ending Sept. 30, 1977; however, its DP division accounted for only 5% of this total. In the past, computer systems were more or less viewed by Siemens as a means of reinforcing its image as Germany's leading electronics company.

However, Siemens is now a more aggressive participant in the DP industry. The DP division currently operates unprofitably with an estimated net loss in the last fiscal year of about $75 million (although Siemens is subsidized by the German government to the tune of approximately $50 million per year, an agreement scheduled to expire by 1980).

The Siemens sales policy is primarily oriented to improving its market share (which increased from 5% in 1965 to 20% in 1977). Therefore, Siemens is usually very flexible with regard to pricing, contractual conditions and manpower/conversion commitments.

To increase market shares, Siemens aggressively attacks the IBM customer base. To be successful in that market, the company usually imitates — as far as possible — many of IBM's marketing activities and usually offers higher performance systems at lower cost (10% to 15%). However, the company does not imitate IBM in its software philosophy: It does not use IBM systems control programs.

With a market share in the Federal Republic of Germany of about 20% by value, Siemens is next to IBM (58%) in the "general-purpose" computer rankings in Germany. Belgium and France are the company's second and third largest markets outside Germany. Siemens' European market share is approximately 7%, but its worldwide market share is only approximately 2.1% (by value).

According to German market watchers, the profit situation of the Siemens DP division may become worse in 1978 because of the price reductions Siemens was forced to make in 1976, 1977 and early 1978 to compete with IBM's 370/138, 148 and 158 and 3031 price adjustments. Obviously a Fujitsu/-Amdahl deal may improve the profit picture by 1979-80 as larger, more profitable systems are shipped.

The company is planning to exploit the U.S. DP market more fully by 1979-80, probably focusing its product strategy at the low-end, small business system, mini/microcomputers, terminals and/or office systems.

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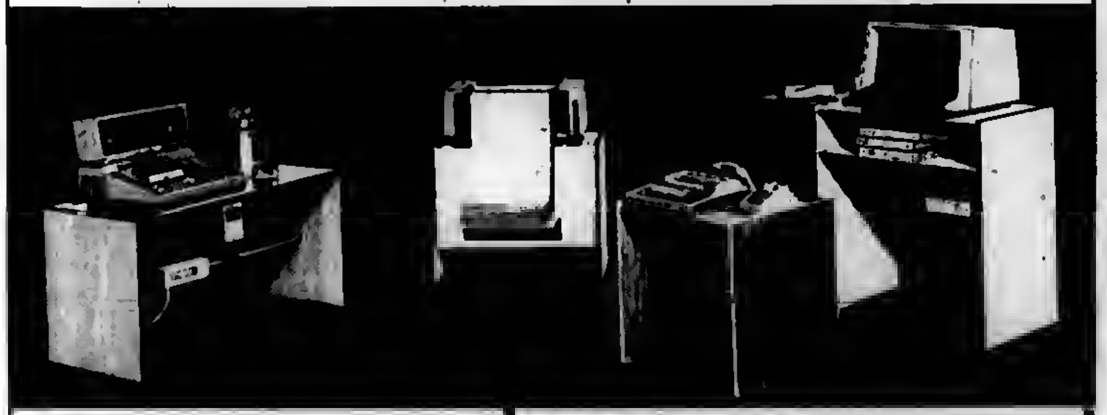

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IBM-GERMANY

The Federal Republic of Germany (FRG) represents IBM's second most important market, with 1977 sales of about 6.38 billion deutsche marks ($3.19 billion), up by 7.1% over 1976 or nearly 18% of total corporate revenues of $18.1 billion.

IBM/Deutschland employs 25,000 people and is a major exporter for Germany. It currently controls nearly 58% of the FRG market (down from 72% in 1965). Europe accounts for over $6 billion of IBM's gross income, with the FRG therefore representing about 50%.

IBM has major research and manufacturing facilities in the FRG, where it is reportedly developing its "E series" (entry-level systems to replace the 370/115 through 148 systems). In fact, the original 370/115 and 125 systems were also developed in Germany.

Some of IBM's competitors claim IBM's applications software is too generalized and very expensive. IBM's lack of process control expertise and limited data communications experience have also been noted.

The current FRG shift in market interest toward small business systems, minicomputers and distributed intelligent terminal systems may have impacted IBM's growth in the FRG. However, the forthcoming E series and other distributed terminal products (e.g., enhanced and improved versions of the 3790) may correct this current weakness.

(Continued from Page 48)

its ownership of its own, the conclusion seems inescapable that the heretofore discounted threat of European-based/European-owned encroachment on the U.S. diminished (but still effectively controlling) share of the European marketplace will be raised from within Germany. In this bid, the Germans will no doubt have access to Japanese help.

Figure III-10 shows a distribution of market shares in Germany among the major contenders. The information is presented in terms of units as well as by if-sold value.

From these charts we can see that German-owned manufacturers command approximately 18% in units and over 20% in if-sold value. Thus, if taken as a group, these companies fulfill significant internal German requirements in a manner only exceeded by IBM.

Since Siemens controls more than 18% of the installed (if-sold value) base, the developing German thrust to control its own marketplace first, the West European second and onward from there is manifested mainly through Siemens. As Fujitsu's large processor technology flows into Germany through Siemens to combat the U.S. manufacturer offerings, and with the inevitable entrance of Amdahl Corp. (and possibly the son of Amdahl, otherwise known as Magnuson Systems Corp.), Siemens' hopes are significantly brightened.

Since Siemens and Fujitsu are the single most important forces shoring up the nearly 20% world market share enjoyed by Germany and Japan, companies like Univac and Honeywell Information Systems, Inc. not to speak of other worthy U.S.-based leaders, are facing across-the-board competition from two companies whose total assets favorably compare with the cumulative resources of U.S. DP manufacturers, save IBM. Not that I believe their cumulative resources, if brought to bear more fully on advancing their computer industries, would necessarily unseat our computer industry's second-echelon leadership. Both RCA and General Electric learned money alone would not work.

Seasoned technologists working hand-in-glove with marketing and administrative champions (e.g., Amdahl's situation) are indispensible ingredients. But all such things being equal, money really helps.

Direct Subsidies

Direct subsidy of Siemens and Fujitsu by their respective governments could well be the factor which determines whether those companies, and others like them, succeed or fail in further reducing US. control of the DP market. Indeed, that is what *Tsunami* is all about.

These contenders for the lion's share of the Western European market bring the resources of their governments to bear upon the problem of wresting market share away from their competitors in a far more targeted way than do the U.S. companies, whose access to direct government assistance tends to be significantly more circumscribed, both in terms of scope and "conditions" of use.

Some might claim that Siemens and Fujitsu themselves enjoy a sort of U.S.

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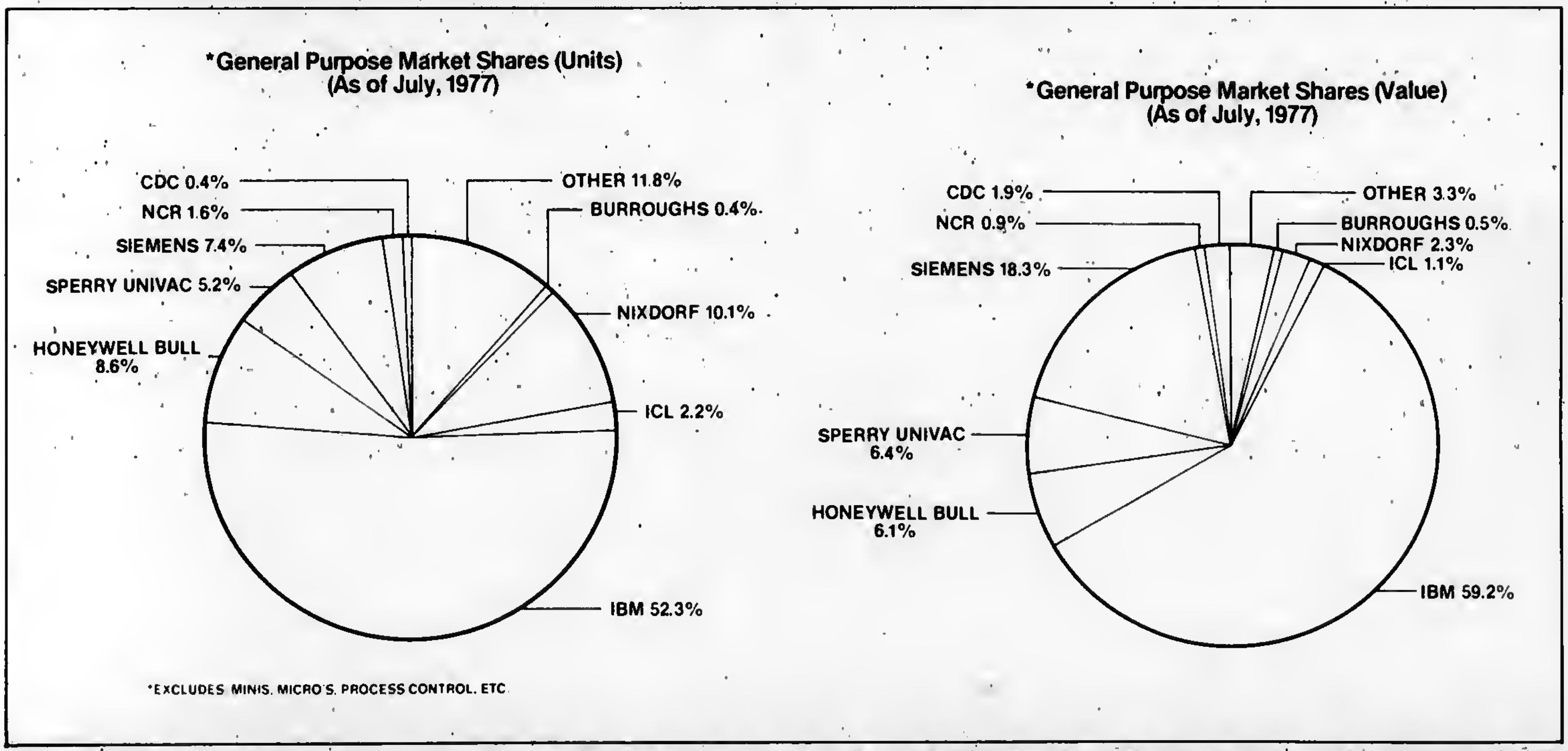

Figure III-10. This figure excludes minicomputers, process control systems, terminals and other special-purpose systems. In these product categories, the market shares (by value) are approximately as follows: Nixdorf, 25% to 30%; Kienzle, 12% to 15%; Philips, 10% to 12%; Olivetti, 10% to 12%; Triumph-Adler, 8% to 10%; and IBM-Germany, only 8% to 10% but rising sharply as a result of its recent System/34 and Series/1 activity.

TRIUMPH-ADLER

Triumph-Adler (TA), historically a manufacturer of both mechanical and electric typewriters, made a serious bid for a share of the DP market through office computers in 1969. The entry vehicle was the TA 100 series. This achieved a respectable degree of acceptance, consistent, perhaps, with the conservative cast of both its price and performance characteristics.

In 1972, TA abandoned its conservative image and practices with the so-called "volkscomputer," the TA 10 programmable office accounting machine. Its basic price of $5,000, exceptionally low for that time, made it extremely attractive in the West German market. Ten thousand units were sold within two years of its introduction, and substantial orders from abroad soon followed. Perhaps the most important effect of this development was to mark TA as a DP market contender with whom to reckon.

Corporate revenues for 1977 were 680 million deutsche marks ($340 million), 30% of which were attributable to office computers. Accounting for this strong performance were the TA 20 office computer, the low-priced ($4,450 entry-level) successor to the TA 10, and the order for 4,000 specially engineered TA 1000 intelligent terminals placed by the German Federal Railways.

The TA 20 utilizes U.S. technology (the Motorola M6800 microprocessor), and is machine-code upward-compatible with the TA 1000, a large office computer (priced from $9,000) with 4K to 40K bytes of addressable main memory.

The TA 1000, incidentally, is of some historical interest, inasmuch as it was the first West German office computer to offer a full CRT display as an option. Further, it was the brainchild of Nixdorf's former chief designer, Ing Muller; the man responsible for Nixdorf's 820 and 900 processors, elements fundamental to the success of a number of Nixdorf (and other company) products.

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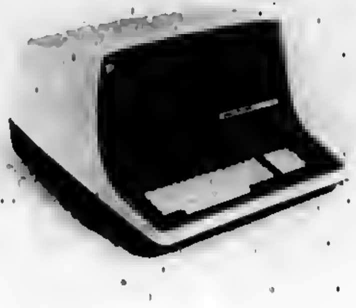

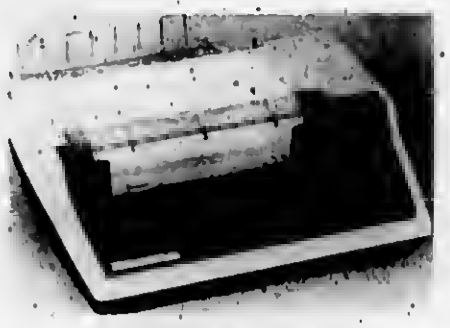

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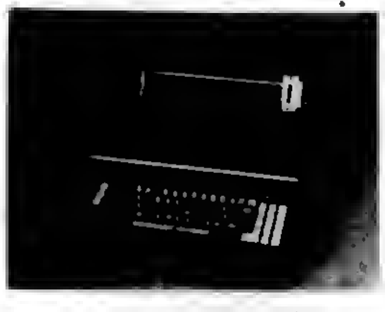

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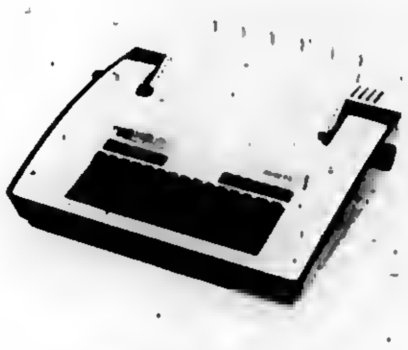

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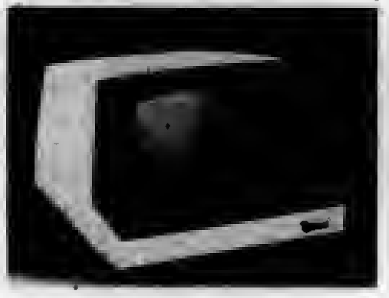

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(Continued from Page 49)

government subsidy, albeit an indirect one. For, as we have said elsewhere, the uncontrolled transfer of U.S. technology to other nations (presumed to be friendly) has led to the stimulation of non-U.S. competition in marketplaces which, if the various figures we see are to be believed, are expanding more dramatically than our own, domestic market.

That I associate the lack of a U.S. policy to guard our leadership position against preventable decline with a "subsidy" to, say, German industry speaks more to the net effect of our position than to its underlying purpose. Inhibiting the progress of foreign technology is not our goal; what we need is a coherent statement of the "rules of the game" so that we do not wind up imposing too grave a handicap upon ourselves — through sheer inadvertence.

This point of view is underscored by Frank T. Cary and John R. Opel in IBM's Jan. 31, 1978 "10-K Report," wherein they state: "The current proposal to repeal the present system of U.S. taxation of foreign earnings would put U.S. corporations operating overseas at a serious disadvantage by raising their tax costs significantly relative to foreign competitors. Today, no foreign government imposes such tax handicaps on its own companies competing abroad. In fact, most foreign governments help those companies in a variety of ways, even including direct subsidies. Restrictive U.S. tax measures not only make American companies less competitive, they also reduce U.S. jobs that depend on exports.

"IBM and many other businesses have a great deal riding on the success of the current negotiations under the auspices of the General Agreement on Tariffs and Trade (Gatt) that would reduce both tariff and non-tariff trade barriers. Some 40 countries have duty rates on data processing equipment at least twice as high as those of the U.S.— a disparity that we hope the Gatt negotiations will reduce."

Balance of Power Equation

Domination of the Western European marketplace by indigenous industry has far-reaching implications in the balance-of-power equation. At present, the U.S. controls only the export of technology to unfriendly powers, whose ability to threaten us we thus presumably limit.

At that, these potential adversaries find it all too easy to circumvent our strictures on direct export, having discovered that "comparable" (i.e., the same) technology can be acquired from other, cheaper sources. The waves of change are indeed active everywhere.

Germany has the fourth highest computer density (exclusive of minicomputers and other special-purpose devices) in terms of the ratio of the value of its installed general-purpose computer base to its gross national product. It is also surrounded by countries

(Continued on Page 52)

NIXDORF

Prior to 1968, Nixdorf restricted its activity to development and manufacturing for other vendors, such as Honeywell and Wanderer. (In fact, Nixdorf built the Logatronic office machine for Wanderer, which subsequently became the basis for Nixdorf's own, popular 820 series).

Today, Nixdorf is a very aggressive worldwide development, manufacturing and marketing company with a product line spanning the 65,000 to 250,000 deutsche mark (DM) range ($33,000 to $125,000). With about 60,000 small systems and terminals installed, the company claims to hold nearly 35% of the Federal Republic of Germany (FRG) market (representing the installed value of small business systems and minis in a price range up to DM250,000).

Nixdorf announced many (if not most) of its new products during the 1975-76 period, so more than 75% of all systems shipped to date are only two to three years old. These products include the 8864 banking terminal (with an order backlog of DM250 million at year-end), the new, highly modularized 8811 Datatel terminal and communications system (this very advanced product includes its own modem on a single chip), the 8815 word processing system and the Model 880 series disk-oriented and workstation systems.

The recent acquisition of Entrex in the U.S. reinforced Nixdorf's strong position in the intelligent data entry and small business systems market.

Company worldwide revenues in 1977 were DM839 million (about $420 million), up more than 22% from 1976, with nearly 55% of sales originating from within the FRG and 45% generated abroad. Nixdorf is proud of the fact that its revenue per employee — about $50,000 — is one of the highest in the industry for a company of its size (8,668 employees).

Nixdorf's primary product thrust is centered upon user (workstation)-oriented DP systems, and the company sees itself as a "pioneer" in the drive for acceptance of "the desktop computer in the normal office."

Nixdorf works very closely with a number of German software houses. Company spokesmen point out that Nixdorf is the first indigenous computer company to have given its partners their own booth at the Hannover Fair. This, they feel, dramatizes both their seriousness about software and their willingness to acquire needed skills wherever they are to be found.

Languages currently supported by Nixdorf systems products include Basic, RPG and Cobol. The company also supplies its own, highly modular application programs such as the Comet software package, a parameter-driven or user dialogue system.

Nixdorf's targeted markets are banking, retail, manufacturing (the company has "close connections with Ford and GM in the U.S.") and government agencies. In geographical terms, Nixdorf's No. 1 market is the FRG, followed by the U.S. (the company is considered to be one of the few "foreign" vendors thus far to have achieved a significant measure of success in the U.S. small business systems market) and France (with about 5,000 installations).

Government R&D support amounts to approximately DM20 million to DM25 million annually, with major development activity focused on bubble storage device applications (currently using a 40,000-byte chip), microprocessor-based workstations and point-of-sale terminals. After a long battle, Nixdorf recently received the FRG government's provisional approval to attach the Datatel terminal to the postal, telephone and telegraph (PTT) network.

(Continued from Page 51)

which have yet to achieve mean density status (see Figure III-11).

A vibrant, well-managed German-owned computer industry within the EEC has every chance to one day rule that marketplace. Its privileged access is guaranteed twice over — by EEC law and by distance considerations. Tariffs and support costs are representative of these.

However, we should note that Germany's "easy" achievement of Western European leadership via either its home-owned or home-based industries would still require an intense effort. This is because its marketing methods and the image the support of those methods may have internationally both cry out for improvement.

Lufthansa's "Red Baron" campaign suggests the way, although the implicit offensiveness of this military image illustrates what many non-Germans could reasonably view as the sinister side of the otherwise endearing German sense of humor. The DP industry has problems enough in the popular mind without surrounding its products with smiling Prussian officers. Perhaps a Siemens "Little Red Riding Hood" or a Kienzle Schwarzwalder elf would be more effective.

We are joking a bit, of course, but the need of German industry to soften its image in order to increase its acceptance cannot be ignored, and should figure in its planning.

Germany's data processing-related expenditures represent about 25% of all of Europe's with an estimated 55,000 or more general-purpose systems installed as of 1977. Figure III-12 presents a breakdown of the German marketplace by product class.

The almost $1.5 billion net marketplace in 1977 (defined by local production plus imports minus exports) showed a surprising resiliency in its recovery from the 1975 recession. Of the 1977 total, add-on memories and peripherals accounted for almost half, mainframes totalled about 25% and minis, along with special devices, made up the remainder.

In Germany's installed base (valued at nearly $16 billion in 1977), special-purpose minis and process control computers constitute about 50% of the units and general-purpose systems the remainder. In the special-purpose category, Digital Equipment Corp. is the leader with an estimated 25% of the to-

(Continued on Page 53)

KIENZLE

Kienzle Apparate GmBh, a family-owned company based in Villingen in southwest Germany, has long enjoyed an excellent reputation for achievement in high-precision, fine mechanical engineering. Starting from instrumentation and industrial clocks, and later tachographs, it expanded its operations via office accounting machines into the office computer market in a manner that recalled the growth of Burroughs Corp. Like Burroughs, in fact, it was the leading supplier of keyboard accounting machines to banks in the local market.

Kienzle products fall chiefly within the $20,000 to $75,000 price range and include the 2000 family, competitors of the IBM System/32 and System/34; the Model 6100, in the same class as IBM's System/3 Model 15; the Model 1200, functionally comparable to the IBM 5110; and the Model 3700 banking terminal, a near-equivalent of IBM's 3600 series.

Kienzle initially showed some reluctance to abandon the electromechanical accounting machines upon which much of its earliest success had been based. However, in 1975, it introduced the 2000 entry-level office computer mentioned above and made not inconsiderable inroads into the DP market with it.

The System 3000 banking terminals also earned a credible market position for Kienzle; the banking community, with which Kienzle had a longstanding relationship, placed large orders for members of this family and contributed to its financial viability.

Kienzle has approximately 15,000 systems installed, with about 90% of them in Western Europe and 10% of the base in Japan and other countries. Single and multistation (multiuser) systems represents 50% to 60% of total sales, followed by terminal products with 15% to 30% and data capture equipment contributing another 10% to 15% of total Data Systems Division sales, which were 500 million deutsche marks (DM), or $250 million, in 1977.

Nearly 55% of this total revenue was from the Federal Republic of Germany (FRG), with the remaining share coming from Europe, Japan and other areas. The latest statistics suggest Kienzle has about 12% to 13% of the FRG "mini" market by value.

Unlike IBM's "general-purpose" product thrust, Kienzle's marketing emphasis is on tailored packaging of hardware and software for very specific markets.

Future company product direction will include the "total" office environment, with Kienzle providing products for data, word, image and voice processing and a wider range of more general-purpose minicomputers with generalized software tools for easier development of specific market applications. With these products and strategies, the company hopes to double its revenue base during the next five years.

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(Continued from Page 52)

tal 17,000 or so units installed.

Siemens/Telefunken is next with nearly 18%, Texas Instruments, Inc. has 7% and Hewlett-Packard Co. and Data General Corp., have 6% each. AEG Telefunken and Dietz both have more than 5%.

All other domestic and foreign manufacturers comprise the remaining 27% of installed units. General-purpose shares are as shown in Figure III-10.

Applications that utilize advanced technology to support industry and social affairs seem more widespread in areas relating to process control than in the white-collar arena, although the usual banking, manufacturing, delivery, etc. success stories are there for the citing; one has only to read the annual reports and other literature issued by German companies to be impressed by their achievements in these fields.

But in the process control and related areas, German skill is unexcelled. From plant automation to medical science, Germans have excercised world leadership in metering technology, feedback control systems and others which demand a well-planned man/machine symbiosis, a skill which should pay off handsomely in the future. For the long-term promise of high technology is not augmentation of machine technology by further machines, but in our rededication to augmentation of human capability by machines — to extend our abilities to be free and more productive.

Post Office Moves

Germany, through its Federal Post Office (FPO), operates Europe's most expensive and reliable voice-grade telephone system. However, the technology employed is, as in most of the advanced, developed nations of the world, suffering from electromechanical obsolescence, however brilliantly maintained it may be.

With more than adequate capacity, Germany's FPO frowned on the leasing of dedicated long lines; until 1973, it was virtually impossible to obtain such lines for speech (as distinct from data).

The German FPO, like our AT&T, was and still is faced with the prospect of premature retirement of equipment in order to accommodate the sudden emergence of a new computer systems requirement for integration into its networks.

In 1973, apparently hoping to avoid the problem of technology stumble caused by the swift introduction of new, much cheaper replacement technology, the FPO decided to develop a separate data network. The FPO's decision to implement its Electronic Data System (EDS), an all-digital data network time-division multiplexer multiplexed over trunk routes under computer-stored program control equipment made by Siemens, followed its implementation of the Datex 200 service (1967).

The latter provided an overlay Telex network boosted to 200 bit/sec and able to run Ascii-8 bit streams. As the EDS network goes into service (Mannheim went live in August of 1976), new, improved Datex services continually emerge (Datex 2400 in 1976, Datex 300, 4800 and 9600 in 1978).

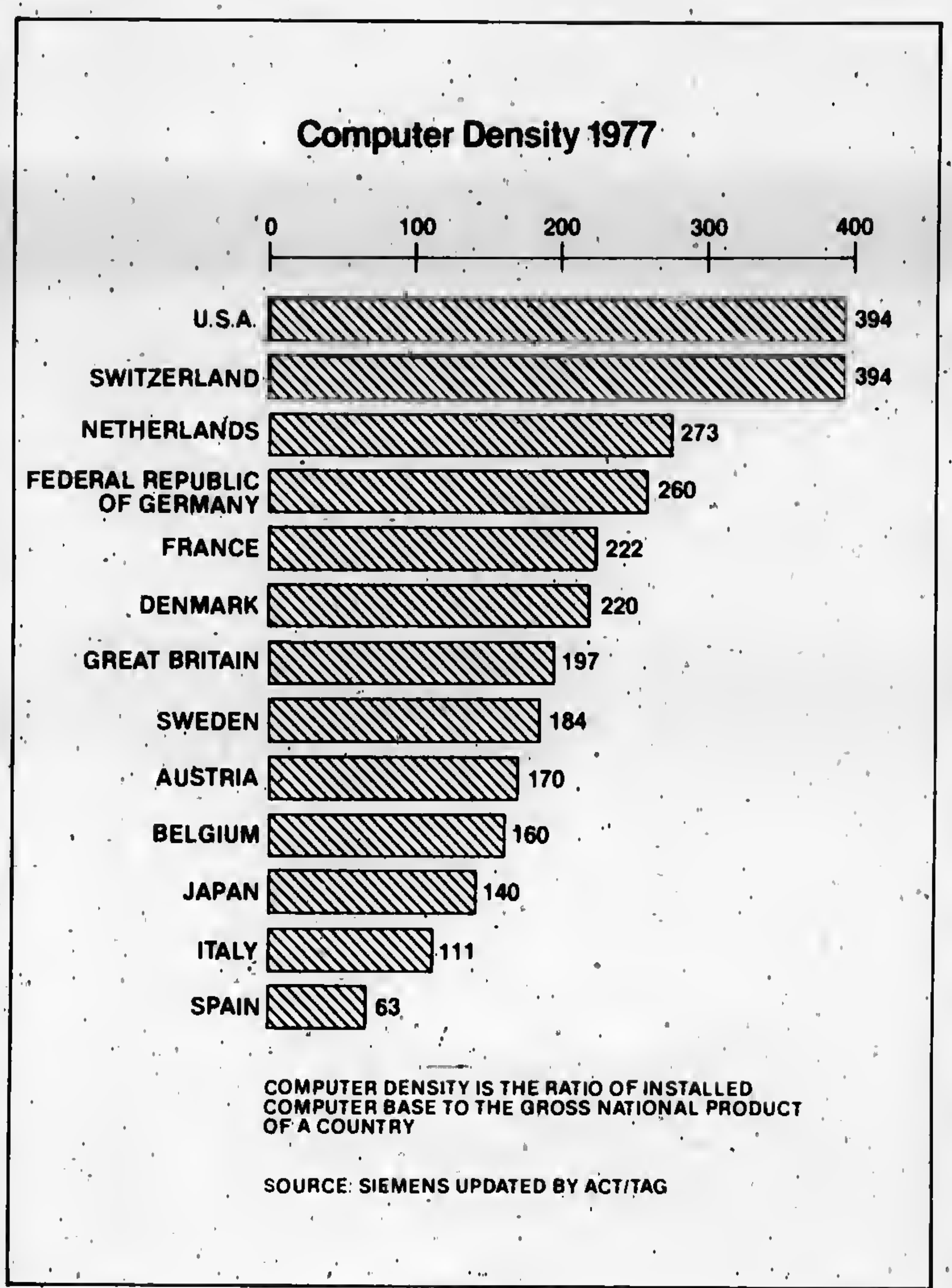
Datex 2400, 4800 and 9600 are full-duplex synchronous services, while Datex 300 is a new character start-stop service slated to take over asynchronous traffic from the old analog-switched Datex 200. Telex services are also being transferred to EDS.

The Datex services are all-digital, circuit-switched services in the manner of AT&T's DDS, and not packet-switched services, although the Siemens EDS exchanges have the facility to be programmed for packet switching if required.

In addition, a form of leased line facility, called the "Direct Call Network," is also available on EDS, but again only for digital data. Data circularizing on a single call, abbreviated dialing codes, closed user groups and auto-dial by computer are all available under Datex, but only for digital data.

The FPO pursues a fairly liberal

(Continued on Page 55)



COMPUTER DENSITY IS THE RATIO OF INSTALLED COMPUTER BASE TO THE GROSS NATIONAL PRODUCT OF A COUNTRY

SOURCE: SIEMENS UPDATED BY ACT/TAG

Figure III-11

Still squeezing data through the old-fashioned way?

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(Continued from Page 53)

"post-Carterfone" line attachment policy. Users may obtain telephone handsets, teleprinters and PABXs of any size either from the FPO or from private manufacturers. But the FPO makes an exception for modems, which must be obtained from the FPO. The reason for this may be to use a high modem rental to divert digital data users to the new and slightly cheaper Datex services.

One can only conclude that the headlong rush of computer systems and communications systems technologies will be "handled" in Germany, but the master plan (if one exists) for doing so itself requires modernization. Hobbled by bureaucracy, the government-owned FPO will find it hard to implement the kinds of private-sector facilities being readied by the IBM/Aetna/Comsat group's Satellite Business Systems (SBS, or the Service Bureau in the Sky.).

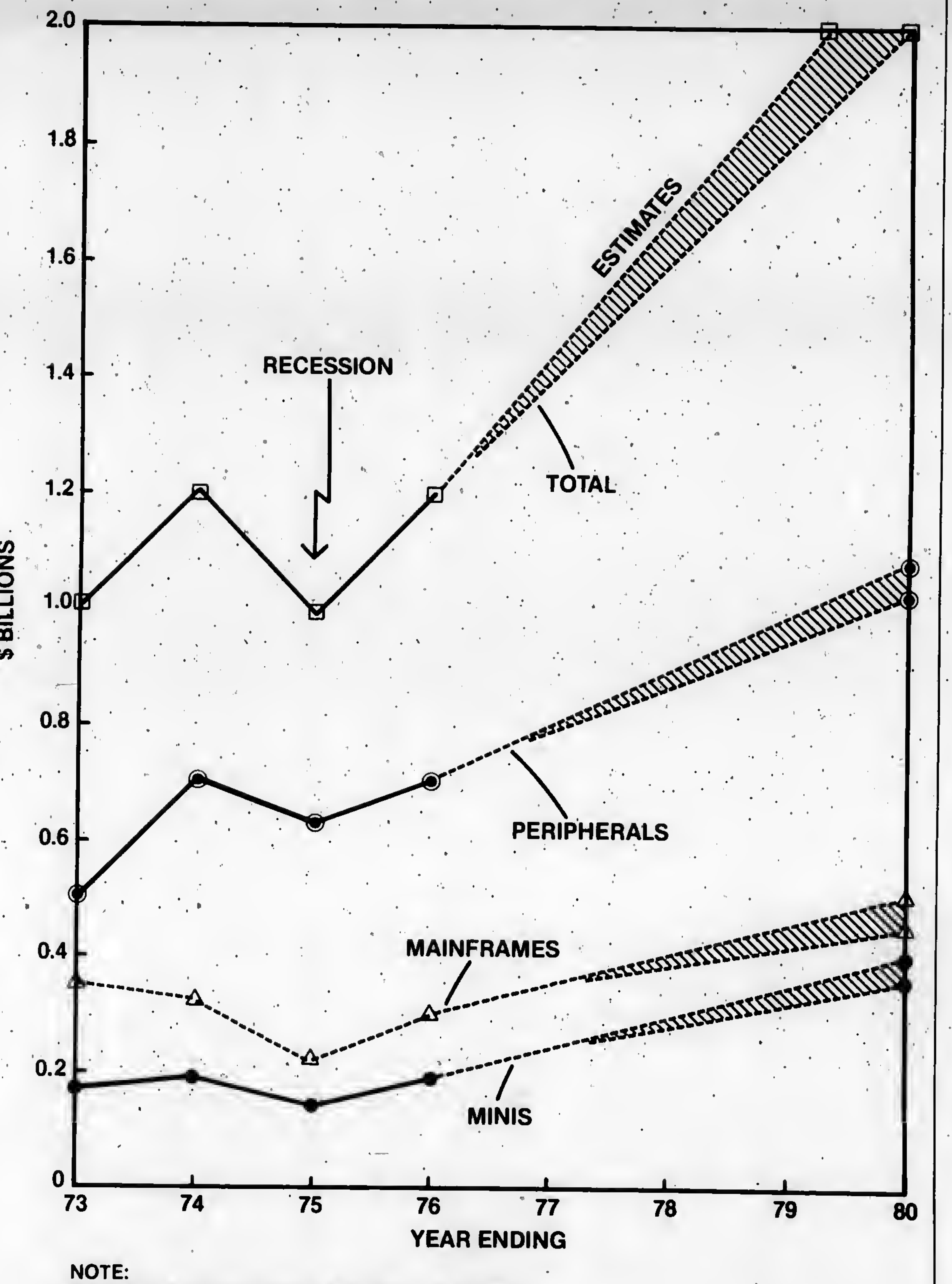
For that matter, with AT&T's Advanced Communication Systems (ACS) preparing its programmed future alongside SBS's, FPO officials may just have decided the current success of the German computer industry should continue to be based upon yesterday's strategy of cautious, watchful waiting.

Piggybacking and leapfrogging on and over U.S. investments in communications and computer technology, the German FPO and German computer industry have been eagles sleeping with one eye open.

Lecht is the author of five previous books on computer-related matters; The Programmer's Fortran II and IV, The Programmer's Algol, The Programer's PL/I *and* The Management of Computer Programming Projects *and most recently,* The Waves of Change.

He is president of Advanced Computer Techniques Corp., which he founded in 1962, and has lectured widely for such groups as the Association for Computing Machinery, American Management Association, American Society for Information Science; and Data Processing Management Association.

German Net Market Size & Trends



NOTE:
MARKET = PRODUCTION + IMPORTS – EXPORTS
SOURCE: ACT/TAG DERIVED FROM U.S. DEPT. OF COMM. (APRIL '76)

Figure III-12

Sperry Univac minis are doing

In Portland, Oregon, Sperry Univac minis help the Police Bureau come to the rescue hundreds of times a day.

Because Boeing Computer Services has computerized all of Portland's emergency services with Sperry Univac Series 77 minis.

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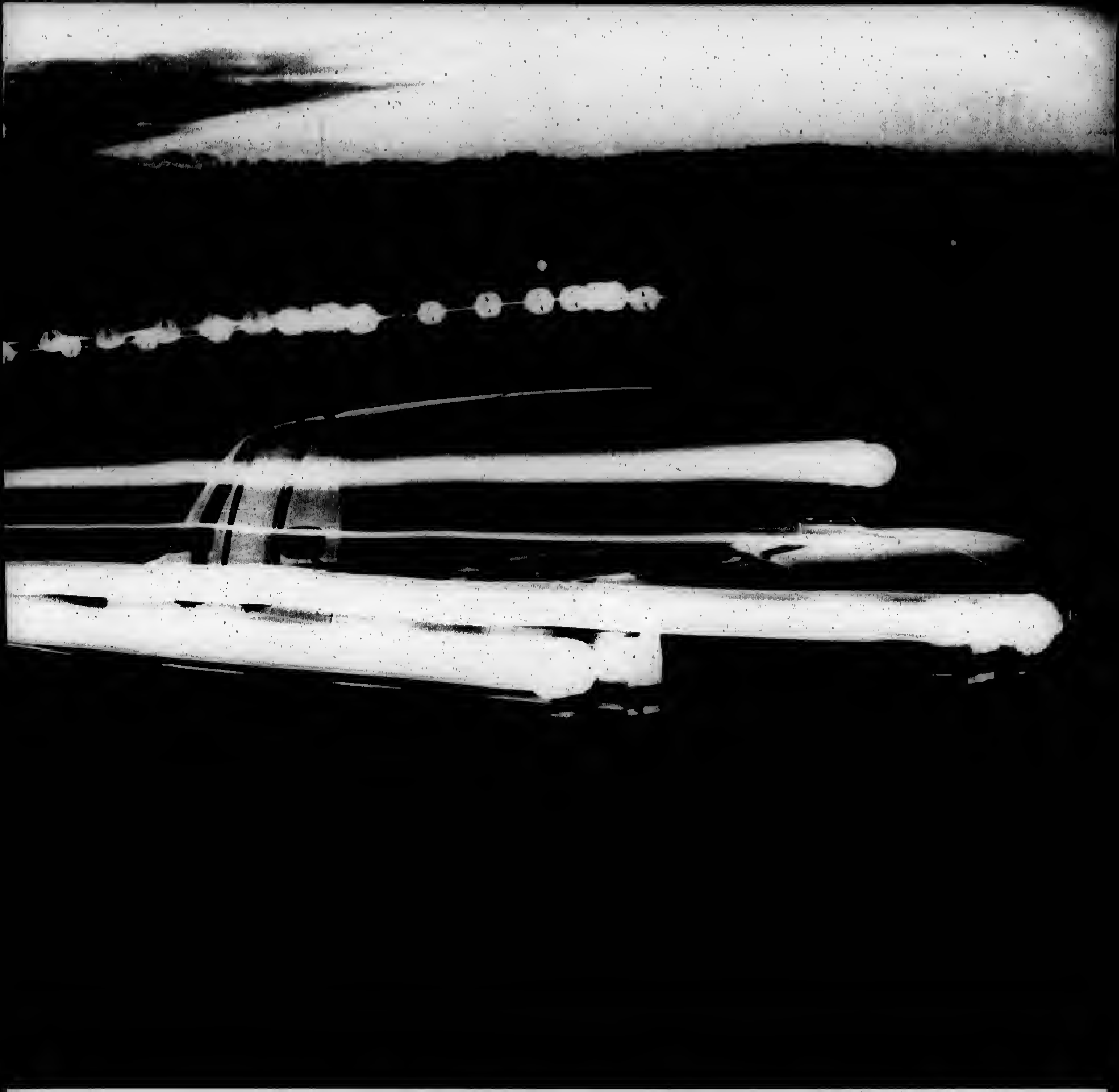

alarming things in Portland.

ing, scientific, instrument control, or data communications.

For more information, write to us at Sperry Univac Mini-Computer Operations, 2722 Michelson Drive, Irvine, California 92713. Or call (714) 833-2400.

In Europe, write Headquarters, Mini-Computer Operations, London NW10 8LS, England.

We'd like to hear from you. Even if your system application isn't as arresting as the one in Portland.

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Editorial

Sign of Progress to Come

The largest National Computer Conference ever blew through Anaheim last week and the showmanship on the exhibit floor would have made Walt Disney proud.

The size and enthusiasm of the exhibitors and show attendees showed the health and robust spirit coursing through the computer industry today and indicated that next year could be even better than this for the economic state of the industry.

Only the cynics point out that the same attitude moved throughout the industry and computer using community in the late 1960s before the Nixon recession put an end to the growth days.

But things are far different today. The exhibit floor here was crowded with innovative products that had solid technical foundation rather than the pie-in-the-sky products (typified by Viatron's $99/mo computer system) that abounded in the late 1960s.

The exhibitors went all out on the display this year, probably spending an aggregate of $8 million to $10 million on the display booths and equipment alone.

But while the display was massive — probably the most impressive ever in the computer business — it was not excessively marred by circus-type showmanship.

In fact, most of the exhibitors took the opposite approach, trying to tell their sales story through elaborate audio-visual presentations that actually had some educational content in addition to commercial messages.

The overwhelming display was worth waiting for — but in too many cases the wait was too long. Thousands poured into the exhibit hall on opening day, jamming the registration lines which at times might have stretched a mile long, out of the convention center and down the road next to the parking lot.

And while the exhibit was unbelievably impressive, less can he said for the technical program. There were moments of real brilliance in these sessions and many have to be classed as excellent. But at the same time, there were also more than a few sessions that were overly detailed and of little application to the general DP user.

The NCC should always be a showcase for computer science papers, and there is no quarrel with those sessions which were generally well attended and educational.

However, some of the applications sessions were too limited in scope and interest. For example, the show had a major theme of computers and energy, but this program was generally devoted to very dry applications primarily of interest to petroleum companies. One of these sessions on Monday had only 75 attendees and was quickly followed by another which only drew 30.

But quibbling about the program and the crush of people does not detract from the overall ambience and mood of the exhibit hall. If NCC '78 is a precursor, the computer community is only going to get larger.

CONGRESSIONAL HEARINGS... ON A NEW COMMUNICATIONS BILL
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Computerworld

'I Ask You, Gentlemen, How Can You Even Contemplale Separating This Innocent Child From Her Devoted Mother, Who Has Tenderly Nurtured Her From Infancy? . . .'

Letters to the Editor

Teaching DP Applications

The May 22 editorial "A Sad State of Confusion," regarding computer science programs in universities, is a start in the right direction. That there is a distinction between computer science and applied DP should be evident, but perhaps is not in some circumstances. Furthermore, major organizations, such as the one with which I am associated, do have elaborate educational facilities and programs that train people from all walks of life including college grads and computer science majors.

I believe that what is needed is your suggestion of "programs that teach DP as part of a more general discipline such as business, medicine, law or even liberal arts."

To be sure, many such disciplines in many institutions already provide such offerings. Their weakness or ineffectiveness stems from the fact that such programs are simply made available and in a fragmented manner.

Fawzi H. Hermes

Omaha, Nebraska

'Minor Flaw' Crept in Later

In a letter to the editor in the May 29 issue of Computer*world*, David R. Cummings correctly pointed out that the "i" in Erisa stands for "income" rather than "insurance." This "minor flaw" did not appear in the originally submitted manuscript for "Technician vs. User" [CW, May 15].

Rita Shoor

Wilmette, Ill.

Computers Used to Be Human

The note "Clearly Not a DP Error" [CW, May 8] deserves some elaboration.

You may be interested to observe that some 50 years ago, "computers" denoted people who perform computations. Indeed, computers were "very human" at that time.

To be more specific, let me add that Karl Pearson, the great English statistician, used "computers" in the original sense of this word, as evidenced by his publication "Tracts for Computers," No. I of which appeared in 1919. In this context, I refer to *A Computer Perspective*; Harvard University Press, 1973, Page 71.

Tore Dalenius

Brown University
Providence, R.I.

False Statement

In the May 8 edition of Computer*world*, the description of Ralph Leatherman's testimony in the Memorex Corp. vs. IBM case said:

"Some members of the government's trial team in New York privately claim that Leatherman has been coached by IBM to testify to a 'party line' and his recent deposition in that case was a cause for dispute because of his seeming lapses of memory when answering government questions."

That statement is false. No such dispute occurred and there were no lapses of memory, seeming or otherwise. Whoever the members of the "trial team" were either didn't know what they were talking about or didn't care about the truth.

I cannot believe that the "members" were lawyers, because such misrepresentations by lawyers are prohibited by the Code of Professional Responsibility and would be subject to disciplinary action.

Thomas D. Barr

Cravath, Swaine & Moore
New York, N.Y.

Data Past

Eight Years Ago
June 17, 1970

LOS ANGELES — Users seemed to be waiting until they could more fully appraise the effects of unbundling before making a decision on the use of IBM's "for-a-fee" educational services, as well as on the use of any other outside services. Industry sources said IBM and its competitors found themselves below quota in this area.

— — —

WASHINGTON, D.C. — In a complaint before the Federal Communications Commission, Bunker-Ramo Corp. charged that Western Union was expanding its DP services in violation of existing tariffs, while allowing the deterioration of its common carrier services. The complaint charged that the carrier had favored users of its Securities Industry Communications System (Sicom) service at the expense of Bunker-Ramo's customers.

Five Years Ago
June 13, 1973

NEW YORK — The largest mainframe system operating at the National Computer Conference was an independently enhanced IBM 360/30 with 512K of storage called the Phoenix system and demonstrated by Greyhound Computer Corp. The Phoenix was said to better the performance of a 370/125 by 370%.

— — —

NEW YORK — Because of the success of its "new kind of meeting," the American Federation of Information Processing Societies (Afips) reaffirmed its decision to continue holding National Computer Conferences in the "population centers" of the country rather than in the traditional "convention cities."

Reader Commentary

Students Good at Writing Have Future With DP

By Joseph T. Rigo
Special to CW

Prof. David Carson has a mission. He wants to make tech writers rich.

Carson is a former air force jet pilot, a retired colonel, who now runs the graduate program in technical writing at Rensselaer Polytechnic Institute (RPI) in Troy, N.Y. Carson has done a number of things to spice up the RPI program, but mainly he is forcing students to get acquainted with computers.

Every graduate student has to take a one-semester computer course that was designed especially for writers. It covers some of the basic concepts. Every student learns to do a few simple programs in PL/I and to design a small function for a text editor.

The RPI program also includes a course in graphics. And, of course, students have to do a great deal of writing.

The net effect is that this year's master's degree graduates are getting job offers from places like IBM and Bell Labs with starting salaries of $18,000 and $19,000. Who says MBAs have all the fun?

RPI also has a doctoral program. Now we may all agree that a Ph.D. in tech writing has got to be a joke, but one of the computer manufacturers will pay $25,000 a year if you have one. Not bad for a kid just out of school.

Two Basic Approaches

Carson talked about it a few weeks ago. The occasion was a meeting at RPI for about two dozen tech writing teachers from colleges around the country.

Carson loaded the agenda with speakers on computer writing topics, and he made his point. By the end of the first day, several of the assembled professors were asking how they could get summer jobs that would help them learn more about data processing.

They indicated that most schools put their tech writing courses in the English department, which is probably as good a place as any. It appears they have two basic approaches to training writers.

One approach emphasizes standard English courses with a lot of technical jargon thrown in. Students turn out an endless stream of papers about business and technical subjects. They are not required to take science courses or to specialize in any one area of interest.

For the most part, these students are trained to be editors. They will work with an engineer. The engineer will write the paper, and the tech writing graduate will review it for spelling, punctuation and grammar.

The second approach exposes students to an assortment of science topics. They go through a series of one-semester courses in biology, physics, chemistry, etc. They learn some of the basic concepts and the technical jargon in each area. The computer course at RPI belongs here.

Again, there is no specialization. A graduate may go into data processing or medical writing or become a science writer for a magazine.

For better or worse, both of these approaches put their emphasis on writing for a general audience. Students do most of their work for the English professor.

The professor may become knowledgeable in several science topics over the years, but he can't be an expert in everything. There is no way that he can know whether a student's description of an I/O command will make sense to an experienced programmer. The situation puts a severe limit on what can be covered in the writing courses.

Meanwhile, over in the university computer center, one or two computer science majors have part-time jobs as librarians or consultants. They document the center's own systems, prepare user guides and help other students solve programming problems.

These students are not part of any tech writing program, but they are getting first-rate experience in writing about technical subjects for a technical audience. Many of them become tech writers.

I would like to see more of the tech writing majors working in the

(Continued on Page 60)

The Human Connection

MIS Consultants Seek State-of-the-Art Image

By Jack Stone
Special to CW

I am taking this occasion to write about a very slowly growing new marketplace for the industry, one which is, to be sure, extremely customized, narrowly specialized, generally unprofitable, but very significant. This marketplace meets the needs for "motor-yacht-based-small-business-systems-for-MIS-consultants."

You see, consultants employ public relations as part of their selling armamentarium, as do major corporations. But since most consultants don't advertise, they must turn to other means of conducting their PR programs.

My particular strategy is to design, develop, construct, install, operate and maintain the world's first floating, all-computerized management information systems (MIS) consultant's office. My aspiration is to incorporate all the hardware and software necessary to demonstrate how the successful independent MIS consultant uses his talents in-house. Let me relate my progress toward this goal thus far.

I started my project last fall, when I acquired the "Artemis," a 1956, 54-foot, all-wood Chris Craft motor yacht. Already installed was a Gemtronics ship-to-shore VHF voice communications facility. This was fine until I received extravagant charges on my phone bill. It seems the phone company bills VHF calls on the "operator-assist" basis, plus a surcharge. So now I limit use of the facility to emergency calls.

I had also intended to use It for facsimile transmission — that was why I acquired a Qwip Systems facsimile machine, but I found that the microphone was incompatible with the Qwip interface unit.

My first encounter with an advanced electronics image having failed, I installed a conventional telephone (but it is a "Trimline") for dockside-only operation. The Qwip works OK on the phone, but is impractical for me because it takes too long to send a large volume of paper over the voice network.

So I brought on board my Texas Instruments, Inc. Model 56 calculator. (You may recall that I wrote about how it was grossly impacted by TI's 58 announcement at the National Computer Conference last year.) It turns out that the absence of hard copy drove me crazy when I tried to balance my books. So I retired the 56 and bought a Unitrex calculator with LED numeric display and plain paper copier. But, as my luck would have it, it's nonprogrammable. Also the paper feed is really hokey.

Word-Processing Capability

For preparing short pieces and correspondence, my on-board IBM correcting typewriter is neat, but since I am now committed to writing two books for Prentice-Hall, the "cutting and pasting", of volume typed manuscripts really demands a word-processing capability.

Besides, a micro-based business system installed in my after cabin would be just the thing to gain the attention of business prospects. So, to be sure I'm at the leading edge of small business technology (small meaning under $5,000 purchase price), I called on retail vendors to buy a machine to support my text editing and small business applications needs.

The Commodore Pet is a very clever machine, but the vendor stated that it had a few slight limitations for small business, no applications software, 40-character line on the tube and no disks!

Radio Shack has a 32K-byte "business system," an expanded TRS-80. The company provides some very basic applications, but the company rep said the firm is holding off on general business system software "until it has an established market" (which I translate into letting the OEM software vendors handle the software headache). No interest here!

The Sol System by Processor Technology was very impressive. I saw it drive a Diablo printer and produce camera-ready copy. Its performance and price far exceeded my needs, so I disqualified it. Further, there was no vendor-supported

(Continued on Page 60)

The Taylor Report

Insurance Policies Need Clearer Coverage Forms

By Alan Taylor
Special to CW

The procedure for getting insurance on data processing and data processors has never been particularly well organized and it is nice to see that some companies, like the St. Paul Companies, Inc., do offer errors and omissions coverage.

St. Paul deals mainly in the commercial area, and it leads in the fight for more clearly written policies. However, the company told me that actually only three of its many policies have been revised for purposes of clarification and that it will be a year before its DPers' errors and omissions policy will be reviewed. So what can be done in the meantime?

I recently read about the coverage offered in the DP areas and wondered how it could be explained in understandable English. Then I came across the solution right in the St. Paul production guide for agents. The guide's description of the coverage is much clearer than the definition in the policy. Whether the independent agents (or St. Paul) would like to see the policy bring out quite so clearly what the system does not cover is perhaps debatable — it might reduce their market. However, a prospective buyer would certainly want to know.

The two different summaries of the coverage appear in the accompanying boxes. The key words turn out not to be on the front page in the section marked "Coverage," but on the back page, where the definition of "data processing services" is provided. The restriction, hidden in the front-page phrase "as defined herein," includes the specification that the processing must be by "the insured's computer operator."

The St. Paul company thinks this definition eliminates a great deal of liability, and I'm inclined to agree. Expressing the policy terms in clear English would bring out this elimination of liability and put it up front in the coverage section. The exclusion of the on-line time-sharing system (which is now so common) and other matters that are involved would be immediately seen.

In fact, the coverage provided by the St. Paul policy seems to be quite limited. Looking down the list of exclusions, for instance, I see an exclusion of coverage to the liability of others "assumed by the insured under any contract or agreement." I

(Continued on Page 60)

Insurance Forms Need More Clarity

(Continued from Page 59)

wonder how much is excluded, or rather is still included, in this policy?

Most service bureau work is under contract, and it is normal for processing to create more of a potential liability to a third person than to the actual recipient of the work. This is particularly so when there is a required deductible of $1,000 (which is enough to cover most rerun type costs).

And there is another exclusion for libel, slander, defamation of character or invasion of privacy. In many DP situations, this is exactly why I would want an errors and omissions policy.

The production guide is also interesting in that it notes that although the policy as written seems to apply to anyone who is doing any type of DP, in fact the St. Paul policy is designed for those firms doing primarily accounting DP. The guide comments that simulating techniques and engineering or scientific applications are excluded — as is facilities management.

The insurance is also not intended to cover people with some form of an ownership interest or a parent or a subsidiary relationship.

It appears, then, that as a temporary method, while St. Paul is getting to the problem of rewriting its DP policies into understandable English and carrying on its leadership in this manner, copies of the production guide could be distributed to policy buyers. The guide gives a lot of interesting information not made obvious in the policy itself.

Policy Definition . . .

'The Company will pay on behalf of the Insured all sums which the Insured shall become legally obligated to pay as damages arising out of data processing services as defined herein, for others and caused by any negligent act, error or omission of the Insured and the Company shall have the right and duty to defend in his name and behalf any suit against the Insured alleging damages, even if such suit is groundless, false or fraudulent, and may make such investigation and settlement of any claim or suit as it deems expedient, but the Company shall not be obligated to pay any claim or judgment or to defend any suit after the applicable limit of the Company's liability has been exhausted by payment of judgments or settlements.'

. . . vs. Agents' Summary

'It is our intent to cover negligent acts, errors or omissions arising only out of data capture, computer processing or malfunction of equipment. We accomplish this through our definition of data processing services and exclusions. By specifying that the processing must be "by the Insured's computer operator," we eliminate the on-line time-sharing system operation. An on-line time-sharing system is deemed to be rental of computer time no different than if the client would send its own employees to the premises of the Insured to operate and activate the computer. The processing must be done for others.'

Writing Skills Needed

(Continued from Page 59)

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In either case, I think that writers who are going into data processing should take more computer courses and forget about biology.

John Abbott does not agree. John is publications manager for Data General Corp. He helped RPI develop its computer course, and he was one of the speakers at Dave Carson's meeting. He encouraged the professors to keep their emphasis on tough writing courses. In effect, he said one computer course is enough.

It is possible that John and I are both right. He works for a large company with an ample supply of computer expertise to help train new employees. I work for a small company with minimum facilities for formal training.

That is, a large company needs employees with one kind of background. A small company has a different set of requirements. With luck, the professors will figure out how to keep all of us happy.

Either way, the RPI meeting made it clear that opportunities are good for college students who like computers and who like to write.

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Consultants Seek Image

(Continued from Page 59)

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TONE 3

TSO for VS1

CHECK THESE FEATURES

- Edit with full screen capability
- Internal reader job submit
- Output retrieval with RES support
- System maintenance
- Program development
- Data entry
- System debugging
- Text editing
- Performance monitoring support
- User command interface
- [illegible]
- Operator console support
- Dataset maintenance
- Catalog management
- Standard IBM TSO command set
- Enhanced 3270 capability
- Full ASCII terminal support
- No user SVC support
- No TCAM
- No VS 2 overhead

TONE

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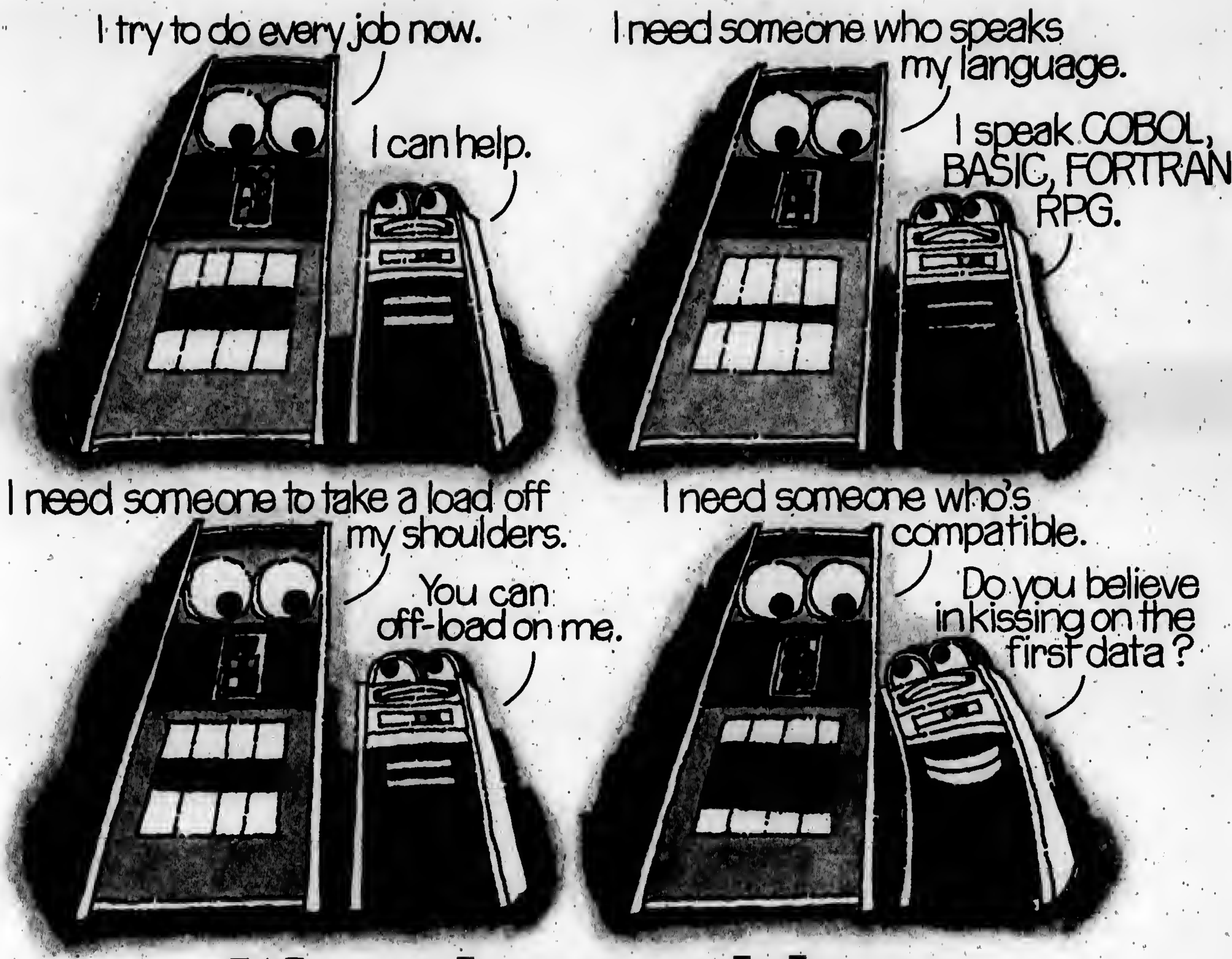
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I can help.
I need someone who speaks my language.
I speak COBOL, BASIC, FORTRAN, RPG.
I need someone to take a load off my shoulders.
You can off-load on me.
I need someone who's compatible.
Do you believe in kissing on the first data?

We solve problems without creating new ones.

Some computers can create more problems than they solve. Especially if they mean new ways to work. New languages to learn. And new staff to train.

Digital's interactive Datasystems are different. They're designed to work with you and your big systems. They're mainframe compatible, and they offer high-level software capabilities you're already used to. Such as COBOL, BASIC, FORTRAN, RPG, SORT, QUERY, and multi-key ISAM. All executing simultaneously. They also offer industry-compatible communications. As well as data base management capability, transaction processing capability and distributed data processing capability.

Using our tools, you can get maximum performance with a minimum of staff retraining. You can get a system that can communicate with the systems you already have in place. You can get high throughput at a low cost of conversion. You can do all this. And more.

And since Digital offers a broad range of systems, you can select the right combination of both hardware and software for your application. No matter whether it's transaction processing, general-purpose computing or performance-tuned applications.

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Meet NCR's Migration Path Engineering concept for computer system

It means you don't pay a penalty for success.

Too many EDP systems prove to be blind alleys for their owners. When the need for additional power and versatility outgrows their system's capacity, they discover that the change to more capable hardware will entail sweeping software changes, too. Rewriting programming that has become obsolete overnight takes time, costs money and can disrupt their entire operation.

Not so for owners of an NCR 8000 series system. You'll pay no penalty for success. NCR's Migration Path Engineering insures that current programs can be transferred to a more advanced configuration without revision. No need to sacrifice your current programming to gain increased EDP capabilities; your software can move up right along with you.

Avoid the pitfalls of a dead-end system. The NCR 8000 series includes a state-of-the-art system designed to meet all your current EDP needs. As your requirements grow, the ease of your eventual transition to a more powerful configuration in the series is assured. And each of

NCR's continuing additions to
series will include the far-sighte
advantages of Migration Path
Engineering.

For more information about NC
Migration Path Engineering an
NCR's 8000 series systems, ca
your local NCR representative.
write to EDP systems, NCR Co
ration, Box 606, Dayton, Ohio
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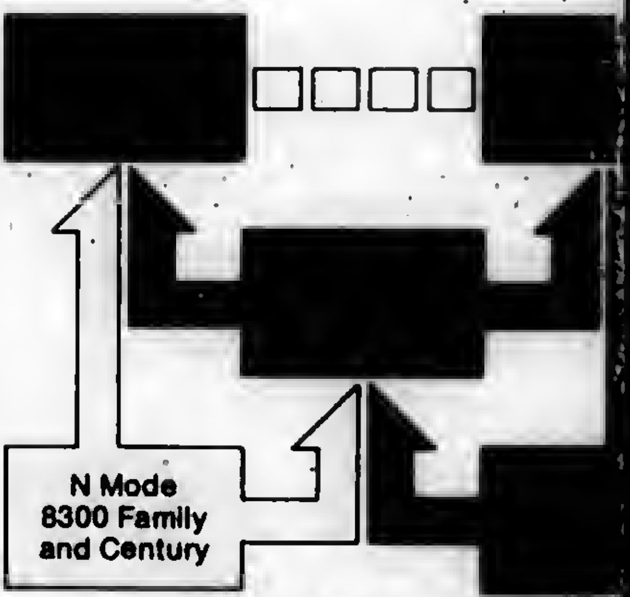

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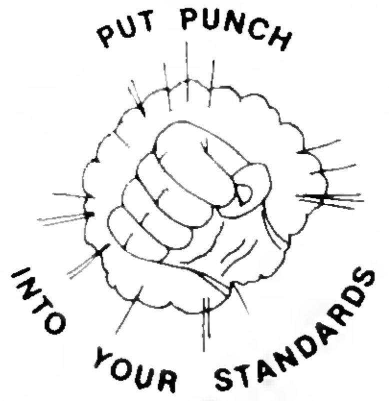

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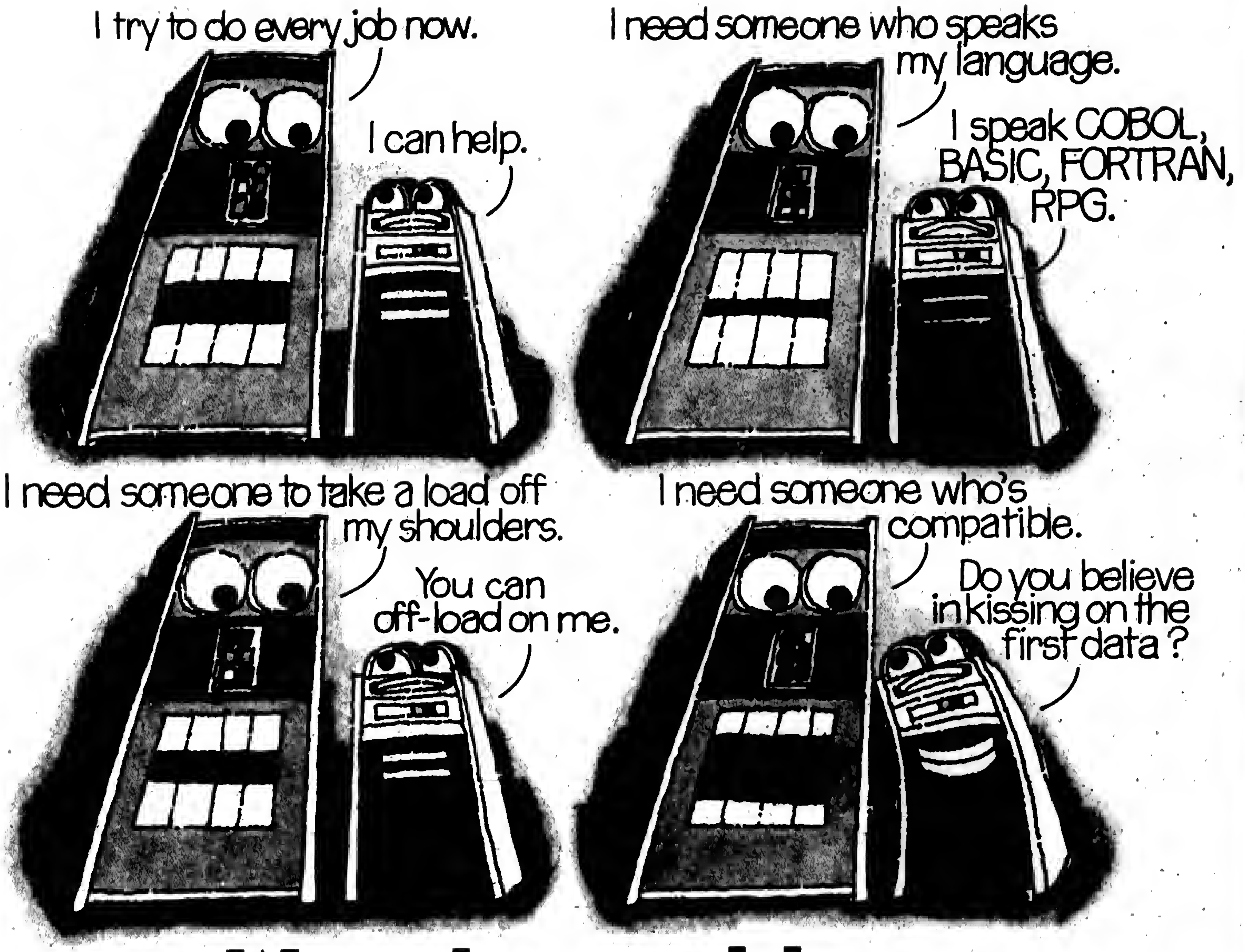
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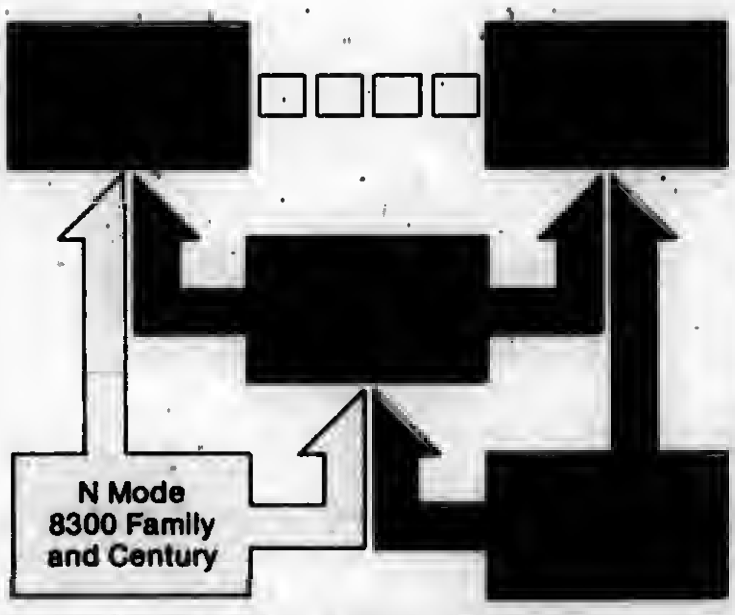


MIGRATION PATH ENGINEERING Insures that, whatever the requirements of your expanding business, the hardware, firmware and software created for each family of NCR's 8000 series facilitates your progress toward greater EDP versatility and processing power.

Won't Work With 3300-11s

IBM Shop Upgrades—But Not Compiler

By Don Leavitt
CW Staff

DALLAS — The DP manager of a medium-scale installation here thought he could save his company $65 or $75 a month when it moved to an IBM 370/145 by using the Cobol compiler that had worked well in the previous 360 environment.

But Hank Berkley of Union Standard Insurance Co. isn't so sure of the real savings anymore, even though his company is no longer paying even for the older DOS-oriented ANS Cobol, IBM's program product 5736.

The problem, he explained recently, is that the compiler simply won't work with the IBM 3330-11-type disk drives from California Computer Products, Inc. that Union Standard brought in when it got the 370/145. The IBM documentation on the compiler indicates it works with 3330-type mass storage devices, but that hasn't happened in Berkley's shop.

The company is using Release 34 of DOS/VS, which supports 3330s, both Model 1s and Model 11s, so Berkley is convinced the problem is in the compiler. He acknowledged, however, that the compiler worked all right with the 3330-11-style units when the company had earlier releases of DOS/VS in place.

One problem, apparently, is that Release 34 distinguishes between the 3330 models, whereas the earlier operating systems did not. Berkley has also had access to the source code of the compiler and has found what he feels are the "10 or 12 instructions" that need to be added to solve the problem.

But IBM won't make the changes, and when Union Standard stopped payment on the compiler in October — "under terms of the licensing agreement, the product is guaranteed to work up to specifications and it doesn't. So we stopped paying for it" — the local IBMers apparently turned the problem over to legal counsel for some sort of ruling.

"In effect, we're getting all involved in bureaucracy, instead of getting someone to sit down and code the changes," Berkley said with frustration in his voice.

Meanwhile, the company is continuing to use the compiler with the Calcomp 2314-type disks it acquired when it had the 360. The compilations are much slower than Berkley would like — the channel time of the 370/145 is three times as fast to a 3330-11 as to a 2314, he said — but it does work.

The 3330-11s are being used for much of the company's production work, but they're "just plain inoperative" for compilations, the manager said.

He noted he might well be able to alter the source code of the 5736 compiler to work with the 3330-11s, but if he made any changes in it, IBM would be within its right to say the changes caused the problem and to withdraw all support for the product.

Limping along, as Union Standard is now doing, isn't the way Berkley expected to be operating, but he seems resigned to making do without paying for the compiler until IBM comes up with the logic that will allow it to work in the 3330-11 enviroment. Or perhaps provides a different compiler at the same cost.

Then Berkley will be able to claim the savings he expected to have all along.

Transaction Processing System Stretches Across HIS Level 6

WALTHAM, Mass. — The Gcos 6 MOD 200 entry-level transaction processing system from Honeywell Information Systems, Inc. is intended primarily for the company's newly announced Level 6 Model 23 minicomputer (see related story on Page 83), but it can be used on any of the Level 6 minis, according to a spokesman.

The software is capable of supporting a Level 6 CPU as a stand-alone system or as a multifunctional intelligent terminal in a communications network. Gcos 6 MOD 200 combines a rewritten executive and transaction components with the language processors and file systems previously available with Gcos 6, he said.

It permits simultaneous processing of on-line, interactive transaction applications; batch applications; program development; and remote job entry via the Hasp multileaving facility [CW, June 5].

Transactions can be written in standard Gcos 6 Cobol or in Transaction Control Language (TCL). Reentrant terminal management, invoked by TCL or application program Call statements, provides "an extensive data format, verification and editing facility and interactive screen form creation/definition," the spokesman added.

The ability to design and — if need be — redesign CRT screen formats from the terminal, without requiring recompilation of programs, makes the software easy to use by both a system builder and nonskilled clerks or production workers who are prospective end users, he said.

User access to transactions, files, forms and programs is controlled by administrator-assigned keys. A 16-ring security mechanism, said to be patterned after HIS' large-scale Multics systems, is used to separate access levels under a MOD 200 environment.

Gcos 6 MOD 200 is available in two separate packages. The Program Development System, including the system executive, CRT screen manager and Gcos 6 Sort and entry-level Cobol compiler, costs $5,050. Once that package is in place, other Level 6s need only have their own copies of the executive and the screen manager, for $1,900, HIS said.

Univac Extends 'DMS 1100'

ROSEVILLE, Minn. — Enhanced security and improved data independence are the main features of the Level 7 release of DMS 1100, the data management system for Univac 1100 systems, according to a company spokesman.

Access control down to the item level has been built into the data definition language. The data base administrator can tie authorized use of a data item, or the instruction needed to perform any given operation, to the user's access code or a screening performed by an installation-specific subroutine, the spokesman said.

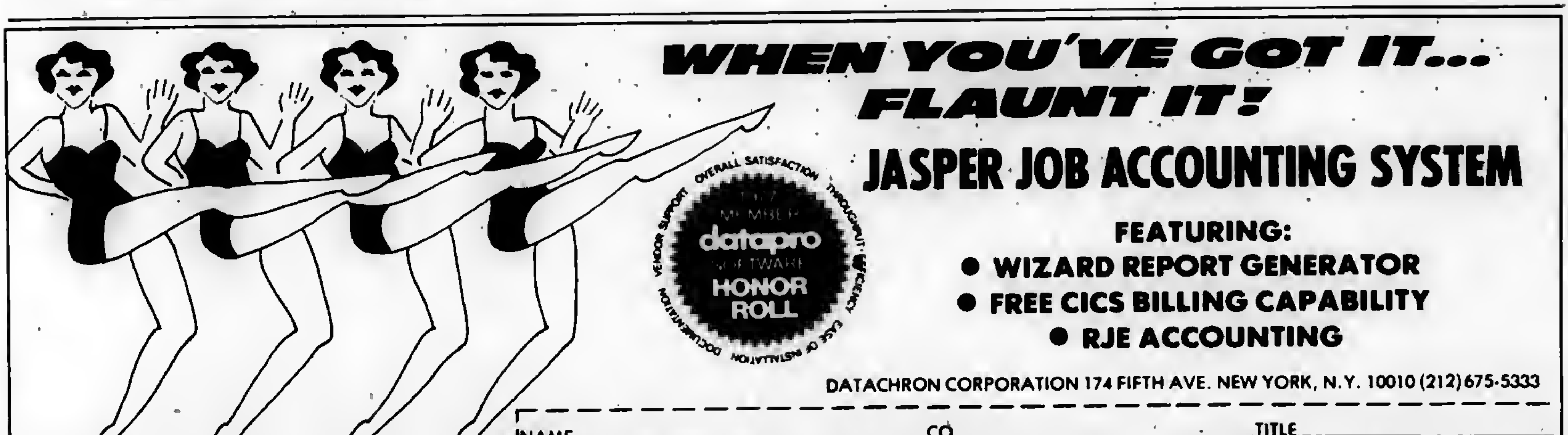
Validity checking of data every time it is entered or modified in any way can also be mandated by the system under this release, he added.

Encryption and compaction facilities at the record level are also provided in the update and these, too, can be triggered by the presence of the appropriate user code or by checking through a screening subroutine, he said.

The DMS 1100 subschema facilities are also expanded. The subsetting of all data base objects, down to the item level, provides greater data independence because application programs are bound to their view of the data base (schema), he explained.

The program is therefore insulated from changes that are made to those portions of the data base not in its view. A greater degree of privacy is also provided because users are cognizant of only those objects that are of interest to them, the spokesman claimed.

DMS 1100 is available at no charge as part of the 1100 series operating system software.



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'Dfast/VS' Update Manages 3330-11, 3350

NEWPORT BEACH, Calif. — Support for IBM 3330-11 and 3350 disk systems even under versions of DOS/VS prior to Release 34 is said to be one of the highlights of Version 4.0 Dfast/VS, the disk management from Tower Systems, Inc. (TSI).

Generic device independence, allowing the user to change a tape file to a disk file, or vice versa, with no change in the problem program, is built into the update, according to a spokesman. This eases the development of tape-oriented programs, he said, since testing can proceed using disk space, which is more often easily available, until the run goes into production.

Automatic data encryption external to the user's program will scramble data written to disk. This "obviously" can be used to protect sensitive data and is particularly useful since it requires no program changes, he said.

A fourth enhancement, allocation by logical records, is said to allow the user to request allocation of Direct Access Storage Device (Dasd) area by the number of anticipated logical records. The user need not be concerned with device-dependent capacity calculations as the hardware environment changes, the spokesman noted.

Finally, an automatic secondary extent generation facility is provided to handle dynamic allocation of more disk space when an output file exceeds its original extent allocation. This feature requires no changes to existing JCL, the vendor noted.

Dfast/VS can be used in conjunction with IBM's DOS/VS, Software Pursuits' DOS/MVT or The Computer Software Co.'s EDOS environment, according to the spokesman.

The basic package costs $5,200 or $125/mo on a one-year lease, but typical implementations cost more since many of the facilities — device independence, automatic volume recognition and public space management, for example — are separately priced.

Tower is at 3901 MacArthur Blvd., Newport Beach, Calif. 92660.

Sycor Operating System Enhances 445 Performance

ANN ARBOR, Mich. — A multifunctional operating system that is said to significantly enhance the performance of Sycor, Inc. top-of-the-line 445 distributed data entry and processing systems has been introduced by the firm.

Called Omni, the operating system is highlighted by new memory mapping techniques which utilize the 445's 256,000 bytes of main memory to offer users a variety of capabilities for virtually any application, according to a Sycor spokesman.

"With our Omni operating system, the 445 will be one of the most comprehensive, efficient and flexible distributed processing systems available to users," the spokesman added.

"The Omni system allows the 445 user to concurrently run eight foreground and eight background tasks in virtually any combination of data entry, data communications and data processing. These 16 tasks can be running in Cobol, Basic and TAL 2000 (Sycor's own terminal application language), IBM 3270 emulation and utility programs," he said.

With Omni, a 445 system is said to be able to incorporate up to eight display units which may be under the control of different systems programs. Economy of memory usage is achieved by systems programs being shared by display units with no duplication of interpreters, and application programs can be shared by multiple Data Stations, further conserving memory, according to Sycor.

Users can reportedly run their application programs in any of the three supported systems languages. The operator simply requests the application program which is automatically turned over to the appropriate systems program for execution, Sycor continued.

Sycor will provide the Omni multifunctional operating system to users at no cost, the firm said from 100 Phoenix Drive, Ann Arbor, Mich. 48104.

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Librarian for IBM Users Adds Monitor Independence

GERMANTOWN, Tenn. — IBM DOS and DOS/VS users have another software supplier to consider. Pycco Computer Systems has just introduced Marian, an on-line librarian package that is said to work with any teleprocessing monitor, and a compression routine for IBM 3270 output screens that may save up to 50% of a user's transmission costs.

Marian's monitor independence is useful, a spokesman explained, because there are times when teleprocessing software may be changed to accommodate a new operating environment; such a change shouldn't have to impact the development staff, which should be concerned strictly with the applications it is building for others, he said.

Marian also has a date option feature that in effect time-stamps each modification to the stored library, as well as "all the other features of any good online library package," he said.

Since the library package was designed to work with a CRT terminal, it gives programmers a direct means of entering, reviewing, updating and retrieving data, JCL or source code without hard-copy input or output. That speeds the development and saves paper, the spokesman noted.

Marian permits all source code to be accessible for review by project leaders and managers; therefore, it also allows enforcement of uniform programming standards, he claimed.

Described as easy to use, Marian is available now for $3,000.

The compression routine was developed as an adjunct to Marian, but is available as a separate product. It can be called by any application program after that program has built an output screen.

The compression routine costs $54. Pycco is at 1806 Malabar Drive, Germantown, Tenn. 38138.

Service Supports Analysis Jobs

WELLESLEY, Mass. — Described as an integration of large-scale computing capability, advanced and complete software and the help of a staff of expert consultants, the SDL Statistical services supports researchers and others with complex data analysis problem through the remote computing facilities of SDL International Inc.

The SDL service utilizes the company's IBM 370/168AP-based data center in Ottawa and provides, as a starting point, access to several software systems already established and recognized for their general capabilities. These include BMDP, SAS, Osiris 111 and SPSS/SCSS, a spokesman noted.

A number of software packages developed by SDL to support more specific statistical problem areas are also available through the service, he said, citing SDL/Bras, a biased regression analysis system, as one such offering.

Others include SDL/MDSA, which handles Multidimensional Scaling Analysis; and SDL/SES, a Structure Equation System. A Time Series Modeling System (SDL/TSMS) and an Analysis of Contingency Tables System (SDL/Acts) are also available.

The systems can be processed in either a batch or interactive mode. The operating system is an MVS/MVT multiprocessing environment.

The software/hardware facilities are supported by a staff of specialists in the field of applied statistics and a telephone "hot line."

Although SDL has a $60/mo minimum fee for use of the facilities, actual costs are based on resource use only. There is no inital fee nor monthly charge for the statistical support "unless the client contracts for a major analytical effort," the spokesman added from 2 Sun Life Executive Park, Wellesley Hills, Mass. 02181.

IBM Eases Use of 'PCF'

WHITE PLAINS, N.Y. — The encoding/decoding capabilities of IBM's Programmed Cryptographic Facility (PCF) software [CW, Dec. 12] are easier to work with now, especially in terms of creating secure data sets of sensitive data, with the availability of the Access Method Services Cryptographic Option (AMS/CO), according to an IBM spokesman.

PCF enables users to work with data, he acknowledged, but it has been rather heavily oriented toward protecting data going out over communications lines, rather than data being stored for reuse at the originating site or at a site which receives the storage media physically.

AMS/CO differs from the basic PCF in that the user of an AMS/CO encoded data set must know the 56-bit key used to encrypt it, in order to decrypt the stored data into usable, clear text. With its communications orientation, PCF and its related facilities passes the key with the transmitted data and the file is converted to clear text automatically, after which the key is erased, the spokesman said.

A version of the AMS/CO that works with IBM's OS/MVS is expected to be ready for distribution this month; another version, for OS/VS1 installations, is scheduled for release in August.

The monthly license fee of AMS/CO is $50, the spokesman said. PCF costs $250/mo.

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Definition of 'DBMS' a Matter of Personal Ideas

By Stephen L. Robinson
Special to CW

Data Base Corner

Having started a bit of a controversy with the "Data Base Corner" on what constitutes a data base management system (DBMS) [CW, April 17], it is necessary to indicate what *I* feel constitutes a DBMS.

"It is clear there is no universal set of characteristics which define a DBMS. The following is a very personal view of DBMS characterisics.

It is not an Ansi standard or even a static standard (I tend to change my own mind about various criteria when confronted with sufficient argument contrary to my original view).

Like it or not, the bulk of programming today is done in Cobol and Fortran. Most companies have a rather large investment in systems developed with these languages and a rather large investment in the education of programmer/analysts who are skilled in the use of compiler languages.

Unless someone develops a DBMS which has a self-contained programming language (in the broadest sense; this might be a procedural language, another compiler language, etc.) that is so superior to Cobol and Fortran that everyone is willing to switch, I believe a DBMS must have an effective interface to compiler languages.

Such an interface might be via a CALL mechanism or via an embedded language which is processed by a precompiler (such as Codasyl).

Intrafile Relationships

Intrafile record relationships are, in my mind, the single most important characteristic of a DBMS. A DBMS should possess the ability to employ a field (element, whatever) as the criteria to create a key (descriptor, linkpath, etc.). Once established as a key field, that field may be used to select records with a particular value.

Such selection should allow at least for the selection of a "first" record that meets the search criteria physically first on the disk, logically first by order of addition to the file or by some other criterion) and the subsequent retrieval of "next" records that possess the search criteria. The DBMS package should detect the "end" of such a sequence and dutifully report it to the application program.

Notice that nothing has been said here about the mechanism for creating a key. It may be pointers embedded in the records themselves or a table external to the records. What is important is that such extraction be accomplished without looking at every record in the file.

Clearly the DBMS should be responsible for maintaining the relationship, however implemented. Desirable, but not absolutely necessary, are the following additional criteria:

- The ability to perform logical sequential processing based on the values of a key field.
- The ability to build intrafile record relationships based on information exogenous to the records; that is, not to have fields in the records which "support" the relationship. This is a characteristic of the Codasyl DBMS.
- The ability to impose ordering on such relationships. (*Unnecessary* ordering of such relationships is one of the major design errors in list structured systems.)
- The ability to create — and destroy — such relationships while the file is up and available for processing by other users. (This is presently restricted to inverted systems.)
- The ability to have the package perform Boolean searches on such relationships. This should be possible from compiler-level application programs and query languages (or report writers).
- The ability to distinguish, without special encoding, between a missing numeric field and a field with a value of zero (analogously, for alpha fields and blanks).

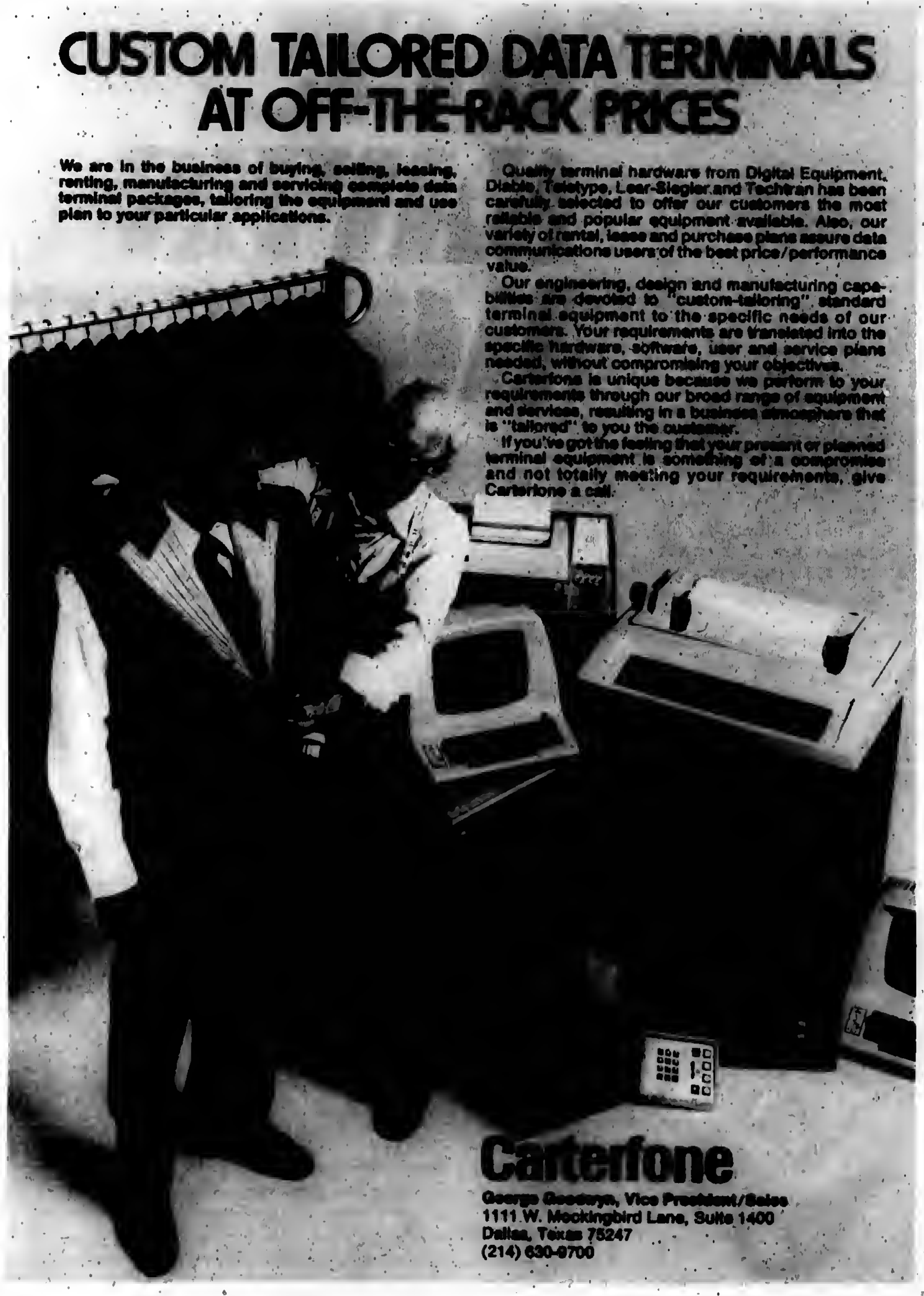
Interfile Relationship

Interfile record relationships are somewhat less important than intrafile relationships, since most activities that can be done with formal interfile relationships can also be done by multiple file searches. There are, however, two major reasons for having such a facility.

- First, program logic is simplified. As it is, far too much of the code in application programs that utilize a data base package is devoted to nonapplication logic. Multiple file retrievals and the associated search logic can be difficult to debug and even more difficult to read (for maintenance purposes for example).
- Secondly, the efficiency of multiple file searches, without a formal relationship, can be so poor as to cast doubt on the rationale for performing the search.

An interfile record relationship

(Continued on Page 70)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Cobol Record Layouts Backed

SPRINGFIELD, Va. – The Recflow processor from Thorne Data, Inc. constructs record layouts for any size Cobol-based records. These records may be contained in files or may be any 01 level data structure in an ANS Cobol program, the vendor said.

Recflow graphically presents data fields and logically portrays levels regardless of programmer-assigned levels, a spokesman explained. The resulting layouts, produced on the user's line printer, are tailored in width and depth to fit programmer-assigned field and data name sizes.

Input to the processor may be a complete Cobol program or a series of programs, file descriptions, selected 01 level data structures or any combination of these possibilities. In all cases, the input must be syntactically correct Cobol free of basic diagnostics, the spokesman said.

Recflow will draw layouts for any 01 levels it receives until Working Storage/Linkage Section or Procedure Division entries are encountered.

Recflow operates through a standard line printer with 132-print positions. It was designed for most hardware systems, requiring as little as 64K bytes of storage and no changes in the user's system software.

The package costs $1,200 and can be ordered from Thorne Data at Tower Building Suite 500, 6320 Augusta Drive, Springfield, Va. 22150.

Definition of 'DBMS' A Fluid, Personal Matter

(Continued from Page 66)

should be maintained automatically by the DBMS or, optionally, should be under the direct control of the application program (i.e., take record number 17 in File A and "tie" it to records 146 and 273 in File B). The former is appropriate if fields in both files are used to provide the logic for coupling the files; the latter is appropriate for linkages which are not represented by fields in the records (e.g., Codasyl owner-member linkages).

If the DBMS has a subschema or logical data base capability, there should be simple, intelligible rules covering an application program whose view of the data base encompasses only one of a pair of linked files.

Desirable, but not necessary, aspects of interfile record relations include:

- The ability to couple and uncouple two files without having to unload and reload them.
- The ability to have application programs use two files while they are being linked or unlinked.
- The ability to link two files on subsets of all the records in the files. (This can greatly reduce the overhead in maintaining the linking pointers or tables.)

Record Storage

The criteria for record storage is deceptively simple. Certainly a DBMS should be able to store records. Isam stores records, Bdam stores records, Qsam stores records. What should a DBMS do that a simple access method doesn't do?

First, let me state that I view the only necessary DBMS capability as simply the ability to store records so they can be efficiently retreived. Desirable are the following:

- Ability for the DBMS to handle different rules for record storage for different files. For example, IMS offers a plethora (arguably, too many) of options for record storage.
- The establishment and retransmittal to the application program of the address where a record can be found. Such an address might be as direct as a disk address or as indirect as a relative record number, internal sequence number or page and line number. All of the preceding are easily translatable to a disk address (like a simple table link-up).

Since write-only data bases are not particularly useful, the DBMS should provide capabilities to retrieve records via all of the mechanism below which are "appropriate" for the DBMS:

- Retrieval of records by a disk order.
- Retrieval of records in at least one logical sequence.
- Retrieval of records by intrafile relationship.
- Retrieval of records in one file that are related to a given record in another file.
- Retrieval of records by a disk address or a logical address.
- Retrieval of records by a field value that has been used in the record placement (i.e., through randomizing or sequential placement.)

As with subsequent columns in this series, I would welcome additions, deletions and modifications to the criteria discussed here, but please provide a commentary with each suggested change.

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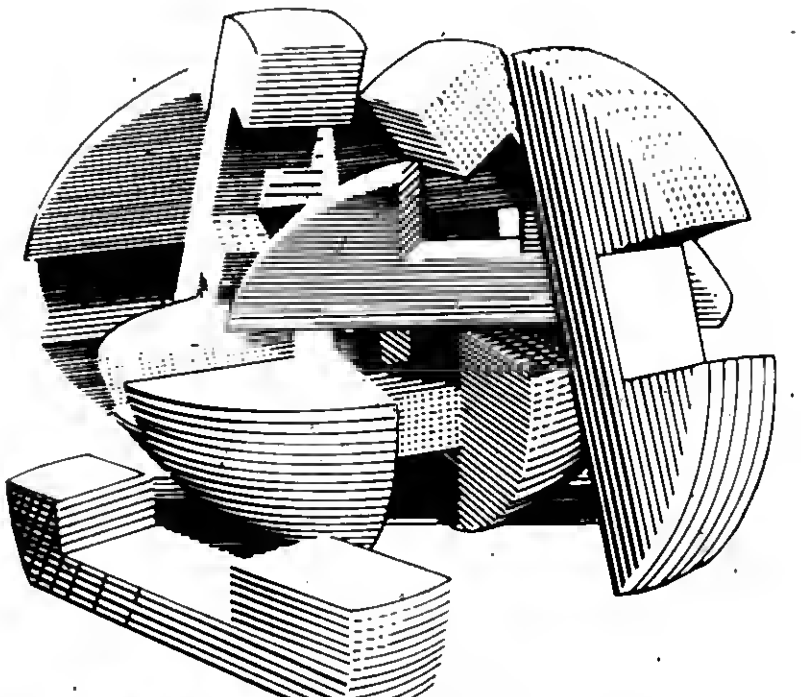

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In New Wave of Global Offerings

RCA Packet Service to Aid Smaller User

By Ronald A. Frank
CW Staff

NEW YORK — When RCA begins an X.25 packet service in about a month, it will signal the start of a new type of data offering designed for the smaller user.

Tentatively called Remote Global Computer Access Service (RGCAS), the offering will be priced at about $21/hour, which makes it considerably cheaper than existing data services offered by the international record carriers (IRC), according to Paul Silverman, manager of data services marketing at RCA Global Communications, Inc.

The final name of the service will be released when a tariff is filed with the Federal Communications Commission within the next few weeks.

Existing data services such as Datel cost $240/hour and the rates for switched network facilities are somewhat lower but still much higher than the new X.25 service, Silverman explained.

The RCA data service will be the first permanently tariffed offering to come out of a one-year experiment that has been conducted by the three major IRCs including RCA, ITT and Western Union International. Most of these interim services were authorized as a test to determine the demand for international public data offerings.

Analysis

Some industry sources looked on the interim services as the first indications of an organized effort by the IRCs and other carriers to eliminate private-line flat-rate services. These sources saw the X.25-type offerings based on volume-sensitive rates as a threat to major users of existing international private-line facilities. The international time-sharing firms were among those that perceived the data services as a threat to be blocked.

The opposition pointed out that although the interim services were designed to test user demand, the results showed limited interest. In fact, the interim offering drew mostly inbound traffic to the U.S. with virtually no outbound traffic to overseas points.

Proponents of the newer data services say there is a high demand for inbound-only traffic because the major hosts and data bases are located in the U.S. These sources believe that in time, multinational firms will establish data bases in Europe, the Far East and other worldwide points, and when that happens, the demand for outbound data services will increase.

Allows Limited Utilization

The RCA service is significant because it offers the smaller international user a service that allows limited utilization, according to Silverman. Rather than replacing the existing flat-rate services, he sees the RGCAS serving users who now are unable to afford the cost of overseas data links.

The RCA offering is also important in that it establishes the framework for interconnecting public packet networks from one country to another. Initially, it will not use the recently adopted X.75 protocol, but that will be implemented later, an RCA spokesman said.

RGCAS will allow users to transmit at 2,400, 4,800 and 9,600 bit/sec, using the X.25 packet-switching protocol. Initially, RCA will accept traffic from Tymnet and Telenet users in the U.S. to connect with the EPSS packet-switch network of the British Post Office (BPO). Interconnection with other packet nets such as Transpac in France will follow.

Smart CRTs Help Firm Tackle Tailored Savings & Loan Work

FRESNO, Calif. — A savings and loan computer services company here is using intelligent CRT terminals to implement client-tailored program improvements and to send critical program changes to remote client teller-operators within minutes after those changes are completed.

Reportedly one of the largest companies of its kind, Gesco Corp. provides on-line, real-time transaction and bookkeeping DP services to its parent institution, Guarantee Savings and Loan, as well as to 14 other nonaffiliated savings and loan associations in California, Colorado, Nevada and Oregon.

Using an IBM 370/158 mainframe, soon to be joined by a second CPU, and a network of client-resident intelligent teller-terminal systems, modems and leased communications lines, the company processes and transmits a full range of period financial reports to clients and gives special-report generation and data-base access privileges on an as-needed, real-time basis.

"Both in our regular periodic reporting and in our real-time custom-report service, called Gesco Management Information Service (GMIS), we strive to give the client wide report flexibility while at the same time keeping accuracy high and response time fast," marketing manager Chuck Yeates

(Continued on Page 74)

AT&T Data Net Debut Near?

By Ronald A. Frank
CW Staff

NEWTON, Mass. — AT&T appears ready to announce its full-service data network which could move the telephone company squarely into the teleprocessing area if the necessary regulatory approvals are granted by the Federal Communications Commission.

Reports persist that AT&T plans call for a mid-year unveiling of the Advanced Communications System (ACS) previously called the Bell Data Network.

Although the name of the offering may change again, details of the network service are coming from several sources that claim to have firsthand knowledge of the service. Reportedly AT&T will characterize the service as a turnkey offering for larger data network users, and some of these potential customers have been given previews of the service, industry sources report.

Analysis

It is not clear whether ACS will be offered as an alternative to large private-line nets,

(Continued on Page 72)

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AT&T Close to Announcement of ACS Net

(Continued from Page 71)

but apparently AT&T will include the capability to provide network diagnostics as part of its turnkey capabilities, according to consultant Dr. Dixon Doll. This would be important to larger users who have invested large sums in in-house technical control centers, he added.

AT&T personnel reportedly are being trained in the sales aspects of the new network so that the management aspects of the service can be stressed to potential users soon after it is announced.

Speculation on Protocols

In a recent seminar in New York, James Martin predicted that one of the ACS access protocols will be X.25. If Martin is correct, it is unlikely that ACS would implement its X.25 capability through the Decnet communications software available from Digital Equipment Corp.

DEC is currently testing the compatibility of its Decnet structure with the Canadian Datapac network and this type of an interface would be some months off if it proves to be technically practical, according to a source at DEC.

But Bell Labs is known to be a user of DEC hardware and Bell has the capability to develop the necessary X.25 or other protocol software for DEC or any other processors that will be used in the ACS network.

One of the key questions about ACS is whether it will be compatible with IBM's Systems Network Architecture (SNA). But Doll believes that neither IBM nor AT&T is interested in making its systems too interchangeable. Up to now, IBM has made limited X.25 RPQ announcements for 3270 CRTs operating under SNA and Series/1 CPUs. Neither of these products is available in the U.S., and it is possible that IBM wants to see whether ACS embraces X.25 before it decides how far to go with an X.25 capability for its users.

Most sources now believe that ACS is scheduled for a June introduction. Some believe Bell will have full-scale press conferences to coincide with the filing of its ACS tariff. As another possibility, AT&T may merely file the tariff without a formal announcement.

Whether IBM will intervene to object to ACS before the FCC acts will depend on how much DP-type capability is included.

Teller Terminal Handles Range Of Transactions

DAYTON, Ohio — NCR Corp. has announced an electronic teller terminal for financial institutions which reportedly can handle most transactions at teller windows, including the printing of passbooks, ledger cards and other inserted documents.

The microprocessor-based NCR 2251 complements the current line of NCR terminal systems for financial institutions and can operate as a free-standing system or can be upgraded for on-line communications and data-capture capabilities at a later date, according to a company spokesman.

Programs tailoring the terminal's functions to the specific requirements of both commercial banks and thrift institutions can be entered using the terminal keyboard. If the terminal is on-line, the programs can be loaded through a CPU or cassette unit, the spokesman said.

In addition to standard teller-transaction functions provided by free-standing terminals, the 2251 calculates interest as a by-product of normal transaction processing.

The inserted-forms station used for passbooks and printing on various inserted documents includes a 90-column matrix printer.

The terminal is priced at $6,950.

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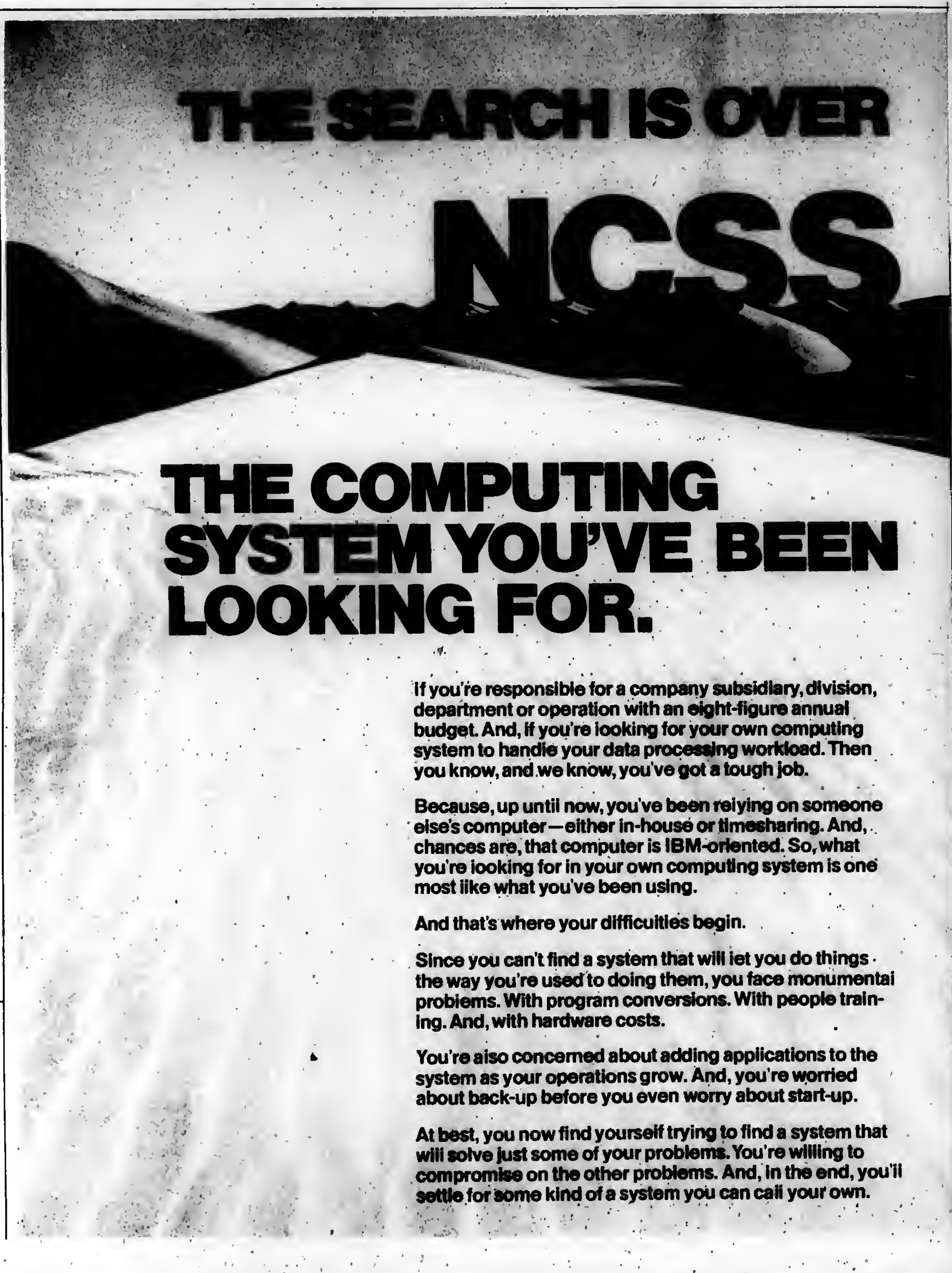
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At best, you now find yourself trying to find a system that will solve just some of your problems. You're willing to compromise on the other problems. And, in the end, you'll settle for some kind of a system you can call your own.

Perkin-Elmer Debuts Include CRT/Printer Duo

RANDOLPH, N.J. — Perkin-Elmer Corp. has announced four items including a CRT/printer configuration which it claimed offers a better price/performance ratio than previous systems. The combination package includes a Model 1100 CRT and 100 char./sec Model 650 Pussycat CRT page printer or a Model Owl-1200 CRT.

In addition, the firm announced a double-buffering option to allow older CRTs with unbuffered printer ports to use its Model 650 page printer, seven international character sets and an acoustic coupler for use with the Model 1100 and Owl-1200 CRTS.

The character sets are adaptable to the firm's Model 650 page printer, a spokesman noted.

When printing is requested of the CRT/printer package, the Model 650 printer sets the Model 1100 free to resume dialogue with the host after 2 sec because of its full page buffer and 9,600 bit/sec transfer rate, according to the company.

The package allows the operator to print only summary results rather than wasting paper for messages to and from the host computer, the firm said. There are no fans in either the CRT or printer.

For those desiring extensive editing, block transmission and form drawing, the package is available with the Owl-1200 instead of the Model 1100. The forms-drawing set for the Owl-1200 and Model 650 consists of 31 linear, intersection and special monetary system symbols that can be used to depict bar graphs and commercial forms, according to the company.

The 650 printer can also print the CRT inverse video fields for generating elaborate forms and bar graphs.

The optional second buffer for older CRTs allows the Model 650 page printer to accept a continuous stream of data, printing one page of screen information while storing the next, the firm said.

Many of the older CRTs have a "wye" connection between the communication line and printer terminal instead of buffered CRT printer ports, the spokesman said. To print a CRT screen, the information is returned to the host and retransmitted with a printer line control character.

Messages are typically saved in the host and printed at the end of the session, making it necessary for the printer to accept a continuous stream of several screens full of data, the spokesman added.

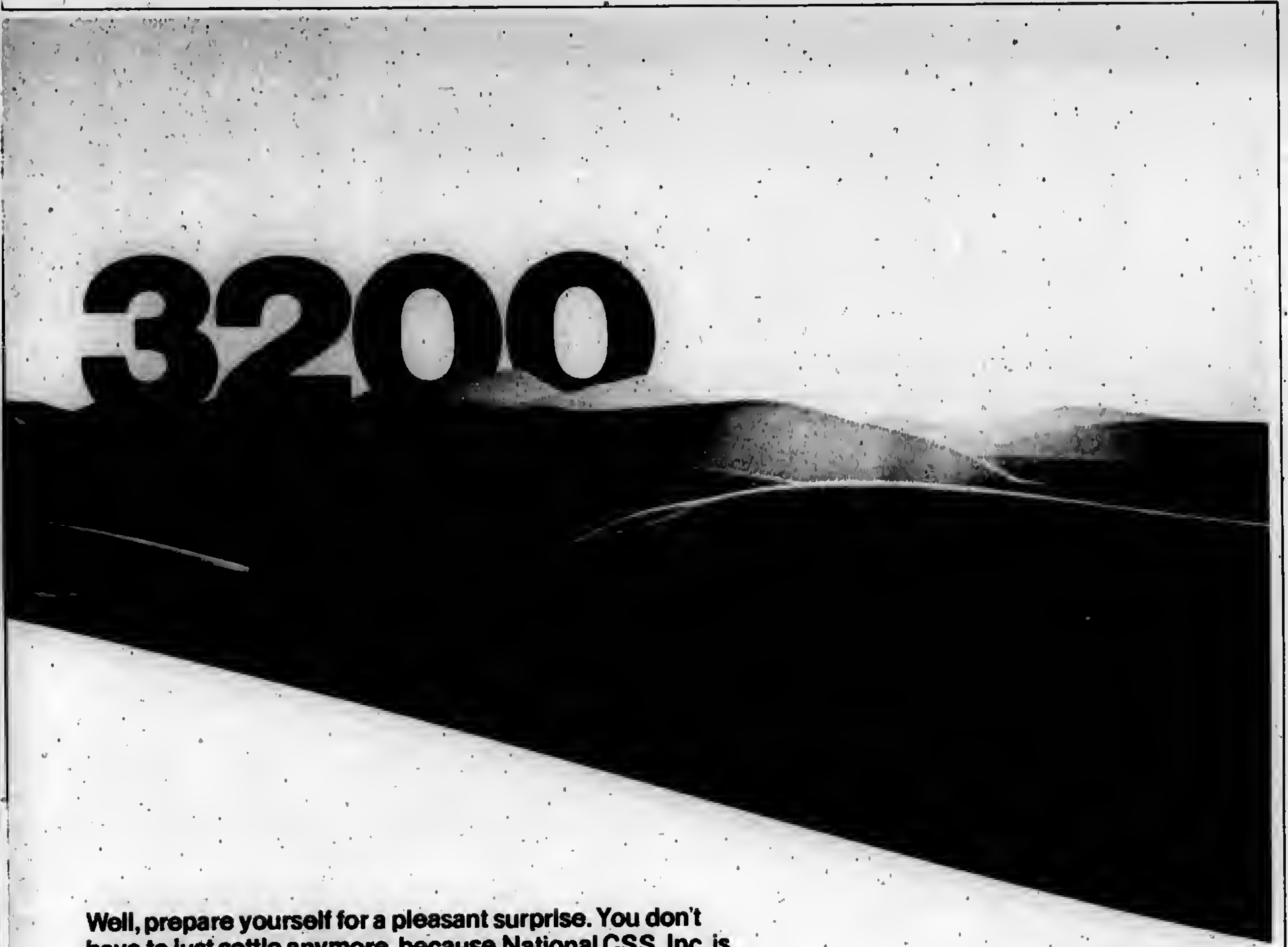
The seven character sets announced include British, Germany, French, Danish/Norwegian, Swedish, Spanish and Cyrillic languages.

The Model 50 acoustic coupler draws its power from the CRT terminals by the same cable used for data, eliminating the need for a separate power supply, the firm said. The coupler operates at 300 bit/sec.

The CRT/printer package including the Model 1100 CRT and Model 650 Pussycat page printer costs $2,795. The price for the package with the Owl-1200 CRT instead of the Model 1100 is $3,695.

The second buffer option is priced at $150. The basic Model 650 page printer lists at $1,262. International character sets are available for $100. The Model 50 acoustic coupler sells for $365.

Perkin-Elmer Corp. is located at Randolph Park West, Rt. 10 & Emery Ave., Randolph, N.J. 07801.



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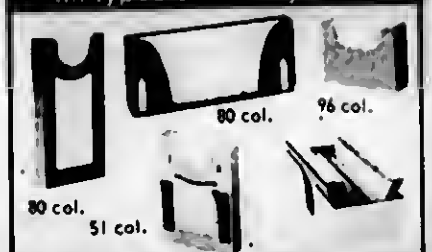

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Smart CRTs Help Service Tackle Finance Work

(Continued from Page 71)

said.

"Not only do we constantly improve and upgrade all programs that make regular, periodic use of the client's five master files — savings accounts, real-estate loans, collection accounts, consumer loans and general ledger — we also have to respond quickly to legislative changes with appropriate programming changes or new programs, since savings and loan institutions must adhere to new regulations within the legal time limits.

"Furthermore, we offer clients a report-generation service that lets them create and format any kind of special report they need, then transmit it to us for immediate, real-time production," Yeates said.

"We currently control nearly two million individual master accounts and we stay on top of all of them by maintaining close personal contact with our clients as well as keeping records up-to-date and fully accurate," he said.

Gesco's 15 savings and loan clients — many with multiple branch offices — use a variety of self-selected intelligent terminal systems and leased communications lines of 1,200, 2,400, 4,800 and 9,600 bit/sec to access the Fresno 370/158 master files. Among those terminal systems are PTS-100 from Raytheon Data Systems Co.

Gesco also uses the PTS-100s for internal program development and modification work. The terminals are located in the company's programmer "testing room," and are in direct communication with the 370.

"With programmable terminals, the savings and loan association gets greater response and flexibility because we, the ones who actually perform that programming, can better adapt system changes to the clients' needs," according to Laird Gilbert, technical adviser at Gesco. "It allows us to make program improvements at both ends of the phone line, not just at the host.

"In fact, the Raytheon terminal's flexibility, in terms of user programming, programmable keyboard features and remote program load capability, represented our first selection criterion," Gilbert said.

"After that, we chose the PTS-100s for their availability, reliability and cost advantages," he said. "Reliability is especially important for our development work, because we can't be hindered by any problems in the terminal systems we use.

"We put the terminals' programmability to use when we created GMIS. To produce and request such a report, the client uses the terminal's CRT screen to create the report format most appropriate for the job at hand," Gilbert explained. Gesco previously programmed the parameters for the custom report format and also programmed error-checking mechanisms into the formatting program that can catch errors as they are input. As a result, the firm has control over data accuracy because of its checking programs, but the client also has control over the report format, the technical adviser noted.

Once the report is formatted, it is transmitted to Gesco's 370/158 via leased lines. The report request can access information from any or all of the client's master files and is completed and returned to the client in minutes, he added.

Remote program loading facilitates sending regular program updates and noncritical new programs to clients as well, Gilbert said, because the client can work interactively with Gesco to make sure the program is correct.

Without this capability, any additional program changes involve extra transportation and time delays between the client and Gesco. Remote program loading and terminal programmability in general enable the Gesco-client relationship to "improve with age" by letting Gesco make continual refinements and improvements in the client's system in a day-to-day working environment, he said.

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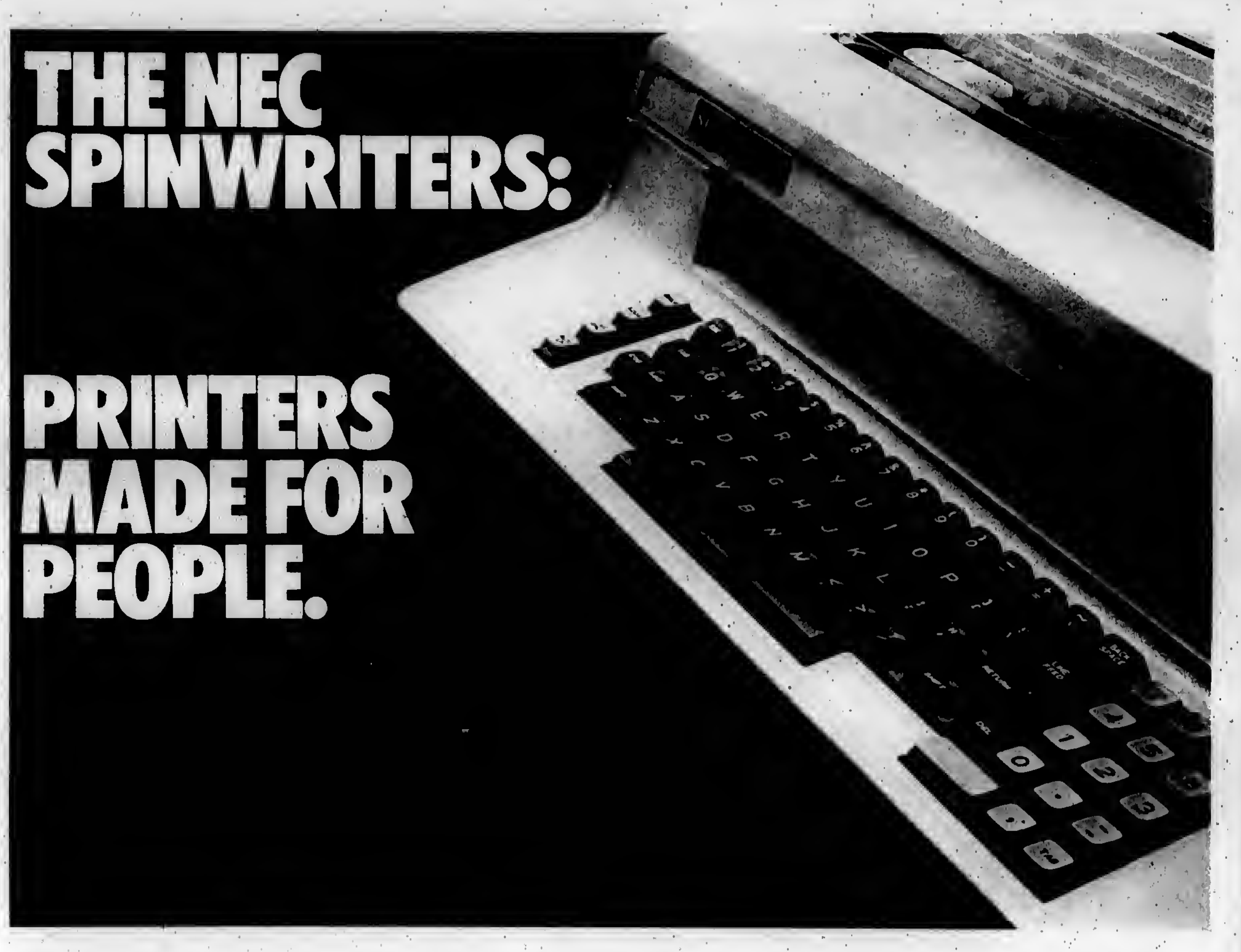

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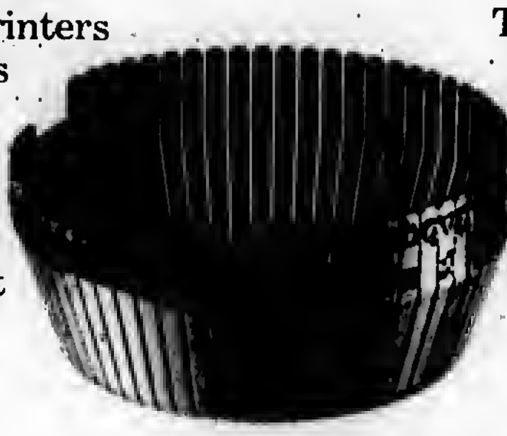

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System Tracking Tickets for Busy County Court

MINNEAPOLIS — The Hennepin County Court here has earned a national reputation for administrative and judicial efficiency. Contributing to that reputation is a terminal-based system that tracks court citations from violation to disposition, saving time for the court, trouble for the offender and dollars for the taxpayer.

This year, the system will handle nearly half a million court citations, mostly for traffic offenses but also for ordinance violations and criminal misdemeanors. It provides important advantages now and promises even greater benefits in the near future, according to S. Allen Friedman, court administrator.

"Hennepin County Court serves more than a million citizens in Minneapolis and some 50 suburban communities and ranks among the busiest limited jurisdiction courts in the nation," Friedman noted. "Without the citation-tracking and fine-processing system, we would be swamped with paperwork and would require many more clerks to handle the mounting caseloads."

Time and money savings already realized from the recently implemented system have been substantial, and traffic citation processing is now far more accurate and efficient, according to Friedman. These early benefits will multiply when the computer-compiled and maintained traffic violations file is put on-line for inquiry purposes and for swift transfer to and from the state-maintained motor vehicle records departments, he added.

The traffic citation processing system shares time on the county's IBM 370/168 mainframe. It utilizes two terminals initially developed for the banking business. These are the IBM 3604 data communications and the 3612 document processor units, which work in tandem to enter violations and fine payment data and to validate tickets and related documents.

Ten Stations

Currently, Hennepin County Court has 10 of the dual-terminal stations in operation. Six of these stations are located within the Government Center in downtown Minneapolis, and four of the stations are located remotely in outlying municipal court division offices.

Citation and disposition information is entered daily via the terminals and stored on a diskette transaction record, which is later processed in batch mode to update the computer-controlled traffic citation files.

The traffic citation system, serving Hennepin County's Traffic Court and Violations Bureau, provides essentially "cradle-to-grave" control over tens of thousands of multipurpose citations issued by more than 50 law enforcement agencies throughout the county. The majority of these involve traffic offenders, but citations are also issued for health, fire and building code violations and for such misdemeanors as shoplifting.

"Actually, computer control over citations begins with the printing of the tickets," according to LaGretta Dean, Hennepin County Court's system analyst. "Every ticket number is recorded on the file, and the record is updated as blank ticket blocks are assigned to the various municipalities and as the municipality assigns ticket batches to individual police officers at the precinct level. Every blank citation printed is thus accounted for, and we always know who has which tickets."

Citation tracking starts when the police officer writes a ticket, copies of which go to the Violations Bureau and to the DP department. In the DP department, CRTs are used to immediately enter the ticket number, the violation code and date of violation, the community and officer identity numbers, the location of the violation, the license number of the vehicle, the make and model of the vehicle and, if available, the name and address of the violator and his driver's license number.

All of this information is set up on the violations master file by ticket number. At any one time, there will be more than 125,000 violations records on the file, according to Dean.

"The system not only maintains the violations records, it also processes those records on a monthly basis to note overdue fine payments and trigger a summons report," she explained.

As fines are paid by the violators (about 85% by mail), the terminal stations once again come into play. A clerk uses the terminal to enter disposition information.

The programmed terminal assigns a transaction number, and the document processor is then used to validate the disposition data on the back of the returned ticket and on the violator's payment check.

This citation disposition entry eliminates the affected record on the violations file and creates a record on the dispositions file. The latter is maintained by transaction number and includes the date and amount of payment and the number of the ticket, plus the community and clerk codes for audit trail purposes.

Working with the dispositions file data, the system creates daily cash collection reports and also the monthly cash collection report used to disburse collections to the appropriate municipalities.

By taking full advantage of computer capabilities, the court has been able to cope with mounting caseloads without any increase in court staff, Friedman noted.

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Dissolves Punch-Card Bottleneck

Key-to-Disk Speeds Bank's Data Entry

Special to CW

HYATTSVILLE, Md. — Suburban Trust Co., noting that data entry is the most labor-intensive operation in its large-scale DP operation, claims a high level of efficiency using 15 key-to-disk systems to capture a large volume of daily transactions.

The transactions include installment, real estate and commercial loans, trust information and payroll data.

As recently as two years ago, Suburban Trust's data entry work was handled on punch-card equipment alone. But as a result of rapid growth, the bank started to develop a bottleneck in its data entry operations.

"The old arrangement simply couldn't handle our increased demands," Bob Wienecke, senior DP officer at Suburban Trust, observed. The bank then turned to a Pertec Computer Corp. CMC Division CMC 5 Keyprocessing system, with a resulting savings of both time and money, he said.

Suburban's system has a number of operator-controlled CRT keystations linked to a central minicomputer console that handles all system control functions, data format control and error and verification procedures. The operators key information from source documents while the system's resident disk memory captures all the data.

As a distributed data entry system, the CMC 5 performs error control, verification and other functions on the data as it is keyed. Verification and correction can be immediate, whereas with keypunching equipment, errors are caught further down the line in a subsequent verification process. From the disk, the corrected, formatted data is moved onto magnetic tape for later use in a computer run, he explained.

One of the major advantages of the CMC 5 is that it eliminated the need for Suburban Trust to transport bookkeeping data physi-

(Continued on Page 80)

Users Advised to Shape Plans Slowly

By a CW Staff Writer

NEW ORLEANS — Long-range planning is an important function of the DP manager, but two big roadblocks stand in the way. First, most people don't know how to put a long-range DP plan together; and second, it isn't clear what to do once such a plan is made up, according to Benjamin R.W. Knowles, vice-president of Brandon Systems Institute, Inc.

Addressing a session of the Federation of NCR Users (FNU) convention (Nucon:78) here, Knowles explained two reasons for progressing slowly with a long-range DP plan.

The process for creating a long-range plan must identify the most critical planning issues, determine feasible courses of action and support the plan with adequate documentation to get senior management support, he said.

Knowles proposed seven elements in the process (Fig. 1):

- Premises and issue selection — the assessment and problem identification element.
- Objective setting — the "what by when" element.
- Strategy development and selection — the "how" element.
- Consolidation into a strategic plan — the total-impact-on-budget element.
- Feasibility tests — the correction element.
- Implementation and control — the tie to annual planning.
- Measurement — the feedback element.

The identification of long-range planning issues is done in four steps, Knowles explained. First, trends covering workload growth are documented.

Second, changes in company policy and direction must be identified.

Future budget availability for DP activities should be discussed with senior management.

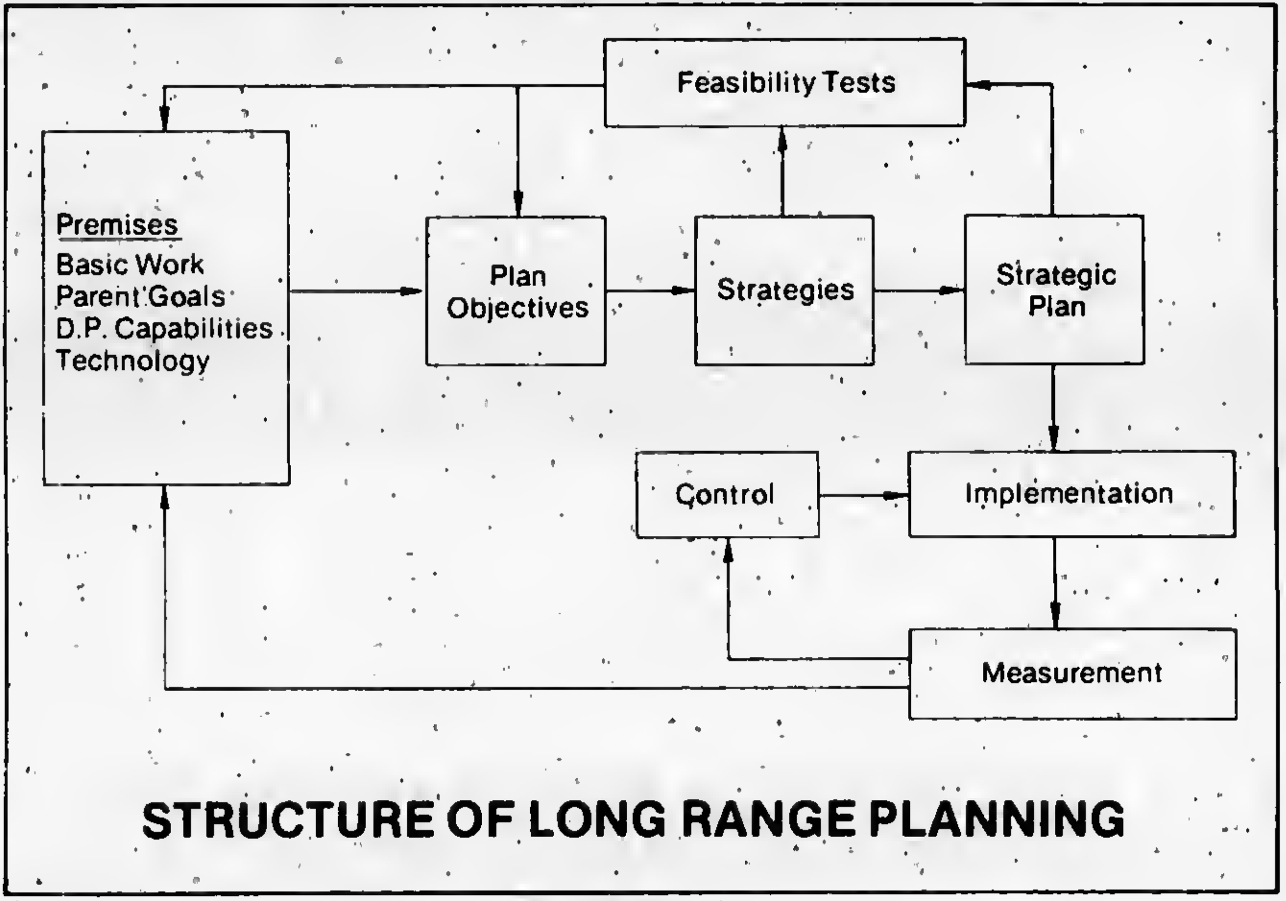

Figure 1

Third, DP management must determine whether there are desirable changes to methods of managing the DP department. Trends in budget use and personnel levels should be assessed.

Fourth, technological opportunities are evaluated.

"In the more 'how-to-do-it' sense, premises are studies," Knowles said. "The studies represent the data gathering and analysis stages in early planning. There is no unique standard for the form of the studies, nor is there a standard set of issues which a DP department must evaluate."

The four steps Knowles discussed will reveal a variety of potential problems and opportunities to be included in the plan, he said. Further, the DP management team will need to reduce the total number of potential issues to between three and 10. In early plans, the number of issues must be even smaller, perhaps only three, he suggested.

As a "motto," the planner must stress achievement of a few important goals rather than risk failure because of fragmented management attention, he stressed.

The objective development step is basically to convert the selected issues into meaningful statements which describe the intended result desired by the planner in terms of a change in a measurable variable. The step

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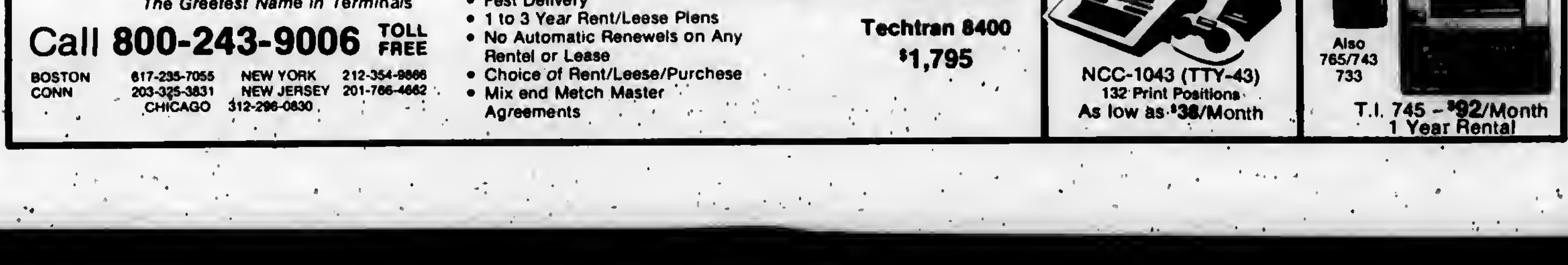
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Instead of Beefing Up System

User Boosts DP by Leasing CPU Components

By Robert J. Ehlers
Special to CW

SAN BERNARDINO, Calif.. — When the Southern California Mortgage and Loan Corp. first started processing data, it started with a 32K NCR Corp. Centrury 100. Now, several years later, the firm is still an NCR shop, using a 128K Century 201 linked to components of a 192K Criterion 8550.

Following the installation of the Century 100, business grew and applications proliferated; more CPU memory was installed. The Century 201 was installed after upward migration through two successively more powerful CPUs from NCR.

All too soon, however, the DP center was again back to working three shifts a day, seven days a week. Increasing the CPU memory to 512K would have been some help, but it also would have been relatively expensive. Another option would have been to install another, more powerful computer system.

Economics and a desire for system backup dictated the choice of a third course. Since there was a substantial lease equity in the 201 CPU, it was purchased. Then, for nearly the same monthly rental it would have cost to beef up the 201, the company leased components of a 192K NCR Criterion 8550 system.

Interconnected to the two CPUs are two tape drives, eight drawers of magnetic disk which put nearly 400 million bytes of information on-line at a time, punched card readers rated at 300- and 600 card/min and printers rated at 1,500- and 2,000 line/min. If any portion of the system goes down, the work can quickly be shifted to another segment.

Third Shift Eliminated

One immediate result of this greatly expanded capability was elimination of the third shift. Moreover, there is built-in capacity for expansion, which should handle the needs of the company for a minimum of five years and probably more.

The two CPUs use the same programs; no costly conversion was required. Through the use of floppy disk firmware, the 8550 performs as if it were another, more powerful 201.

The dual system provides multiprogramming capability for handling up to five processing operations at a time. This, too, is important because the company already has extensive on-line applications and plans more.

In the loan servicing department here, there are eight NCR CRT terminals. Four are equipped with thermal printers for producing hard copy whenever needed.

Immediate Answers

The on-line terminals permit questions from mortgage holders to be answered immediately. Formerly, up to 2,000 such replies a day had to be produced by line printer. Now that burden has been eliminated and customer service has been greatly improved.

The tax and insurance departments also make file inquiries, as does the loan transfer department.

There are on-line thermal keyboard send/receive typewriters located at the branch servicing offices in Washington, D.C., Denver, Phoenix and Honolulu.

At the company's headquarters in Newport Beach, Calif., an NCR thermal printer with dual tape cassettes serves two functions. It provides on-line inquiry capability for executives and the mortgage document shipping department, and it provides for off-line preparation of input data that can be transmitted to the remote computer center by telephone during slack hours.

The first DP applications at Western Pacific Financial involved loan servicing, and those still account for about 60% of the workload. But the library of 600 programs now embraces financial control, shipping and marketing, with even more to come in the latter two areas.

Once thing the company wants to do, for example, is develop better tools for measuring performance. One branch may produce $5 million in new mortgages while another is producing $20 million. Does that mean the second is $15 million more productive on a similar cost basis? Not necessarily, because the sizes of mortgages vary widely from on part of the country to another.

The first branch, therefore, might have worked even harder than the second branch. Thus, although a higher mortgage does bring in more loan servicing income, all other things being equal, the company wants to relate branch costs to production by units as well as by dollars.

Productivity Tracked

The primary guideline for DP at Western Pacific Financial is flexibility, for management feels the computer is ideally suited to serve several goals. One, of course, is to improve productivity — and hence reduce or at least inhibit the growth of operating costs — through the automation of paperwork.

To that end, the computer keeps track of each stage of business, from the generation of a mortgage in the field

(Continued on Page 81)

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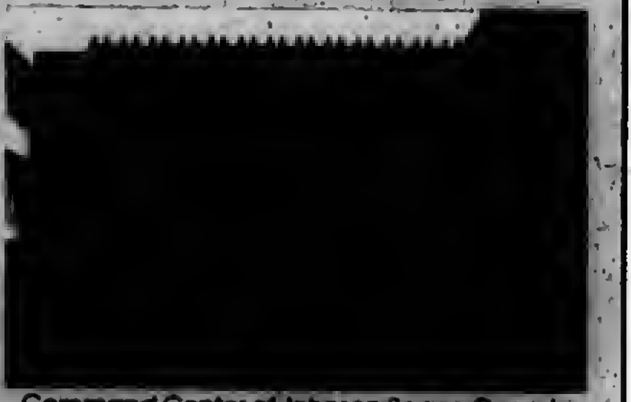
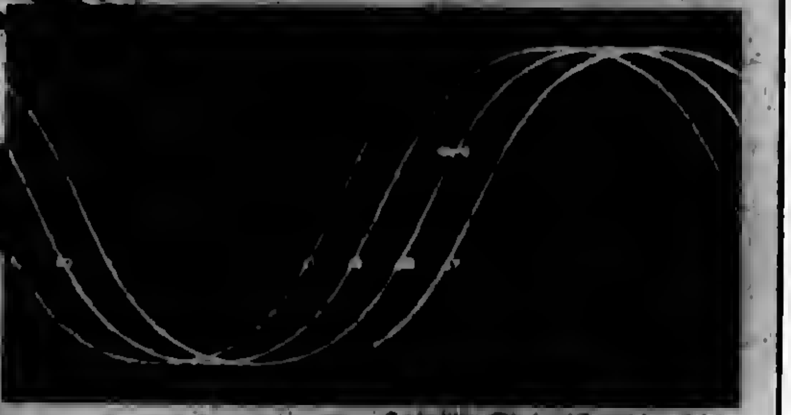

Command Center of Johnson Space Complex

Space Shuttle Control Center


Satellite Global Tracking Map

UETS Terminal Being Used in Data Entry and Test Mode

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Key-to-Disk Breaks Up Bank's Data Bottleneck

Data Entry Dimensions

(Continued from Page 77)

cally to a main computer for conversion to magnetic tape. The bookkeeping department data was being keyed into an IBM 3741 data entry station and recorded on its diskette.

"But the bookkeeping department was not only a good distance away from our main computer, an IBM 370/158, Wienecke said, "it was also separated from the other data entry sources."

The diskettes containing source data input had to be hand-carried to the bank's computer room for conversion to magnetic tape, a procedure that had the net effect of slowing down bank operations. "The effectiveness of our operators was impaired," Wienecke explained, "since they also had to be the messengers."

Error Correction

Use of the CMC 5 also helped Suburban Trust in error detection and correction. "Previously," Wienecke said, "we might lose hours of work because a series of errors could go undetected during entry." Wienecke also said that the system's capability to later correct formatting errors made during keying had the effect of speeding up the whole data entry process.

As a result, Suburban Trust sharply improved its overall data entry operations. "First and foremost," Wienecke said, "we were able to create an integrated distributed data entry system which permits us to solve source data problems using a systems approach, rather than having to deal with them using isolated pieces of hardware."

The problem of bookkeeping entries being hand-carried for conversion was eliminated automatically, since the system allowed the bank to install keystations as far as 2,000 feet from the system's control console.

With input direct to disk, format errors, once incorrectable, were also easily handled by the CMC 5 to the bank's satisfaction: "We can use the equipment to take three columns of data formatted 'ABC,' for example, and reformat the data 'BCA' or any other way we want," Wienecke continued. "We are very pleased with the flexibility the CMC 5 offers us."

According to Wienecke, overall throughput has risen sharply, since the system lets the bank's keystation operators add constant data such as header dates, codes and transit numbers to records without keying in each character of data. Various management information reports, such as operator performance statistics, are provided to the bank via an integral line printer tied to the system.

"Now we're adding refinements to the CMC 5," Wienecke said. "We've just ordered the data validation feature, disk storage to hold up to 200,000 records and Program Language/Edit (PL/E), which will give us real-time tests and displayed messages to help our operators. The system is growing with our needs."

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A state-of-the-art computer like the 303X needs a state-of-the-art impact line printer

User Boosts Capacity by Leasing Components

(Continued from Page 78)

until it is sold and then on through servicing. The last function can be spread over 30 years, although the life of the typical mortgage is less than 12 years.

In a similar fashion, the computer is used for the daily trust accounting and report generation for the company's escrow subsidiary. It also keeps the books for joint-venture construction projects, comparing expenses with budgetary limits and refusing to issue payment vouchers without approval.

But management wants to increasingly use the computer in more sophisticated ways. That, in essence, means using the existing data base to extract meaningful information and to do so in a timely fashion.

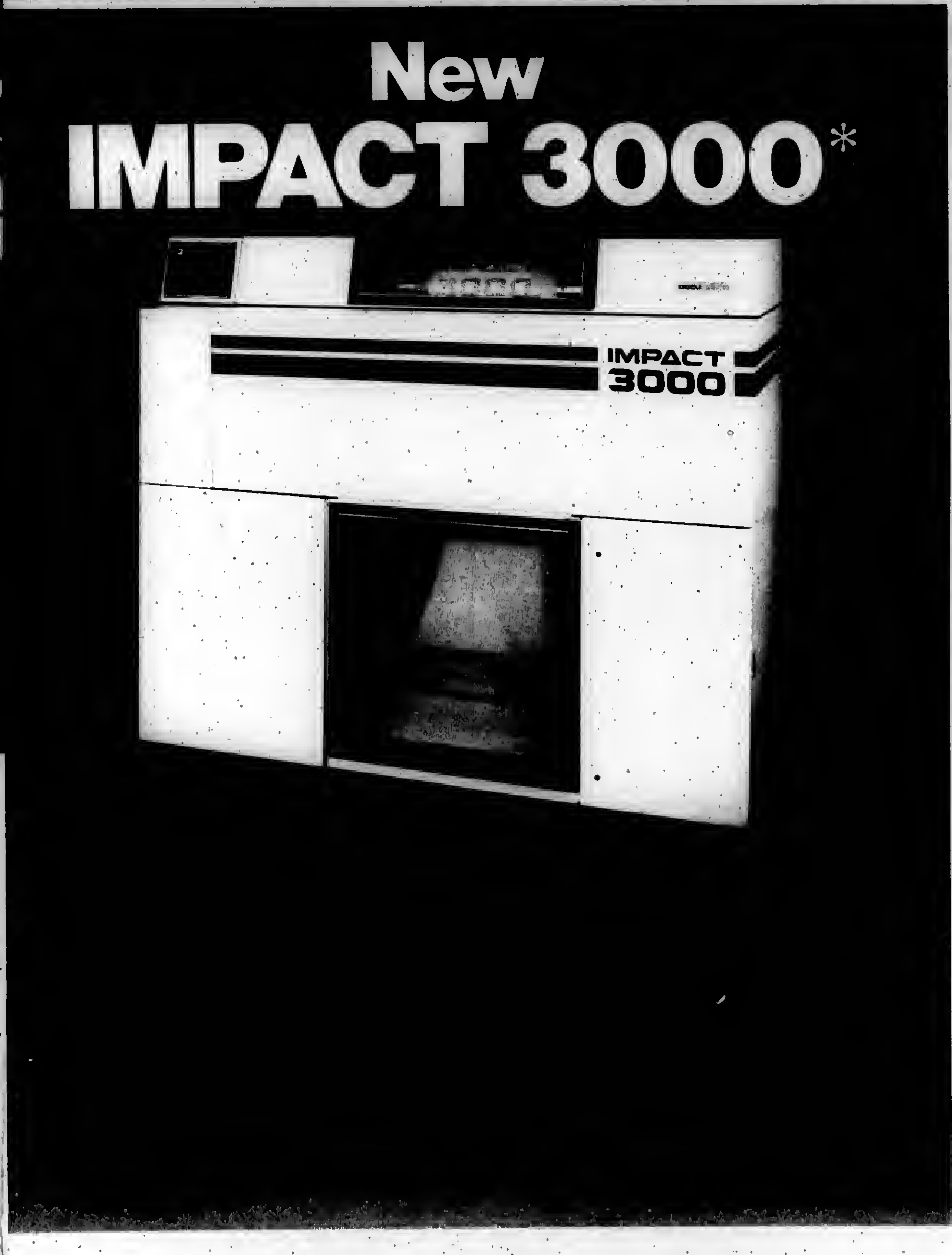
Back in the days of tight money, when the prime rate soared to 12% while mortgages were selling for only 9% to 10% because of California usuary laws, the computer enabled Western Pacific Finance to turn its loan warehouse around quickly. That helped minimize the impact of the adverse 2% to 3% interest spread and kept increasing the loan servicing base, which permitted the company to ride out the crunch.

More recently, the computer has been invaluable in putting together loan pools ranging from $1 million to $15 million in Government National Mortgage Association (GNMA) certificates for sale to institutional investors. Veterans Administration and Federal Housing Administration loans account for more than 80% of Western Pacific Financial's new business, and most of them have been sold in GNMA pools this past year or so. Currently, in fact, the company is servicing $700 million in 151 GNMA pools.

The computer can assemble such pools efficiently and can select the components to satisfy virtually any specifications.

Conversely, however, if there is a sudden shift in the market, as there was in June 1977, the computer enables Western Pacific to focus selling efforts on whole loans.

Ehlers is a senior vice-president and manager of DP at Western Pacific Financial Corp.



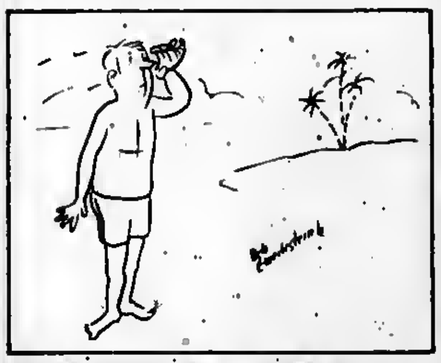
Digital Systems' Reader/Punch Fits Teletype 43

MONROEVILLE, Pa. — The Digital Systems Corp. has introduced a 30 char./sec tape reader/punch that has been integrated with the Teletype Corp. Model 43 teletypewriter.

The unit features a heavy-duty combination reader and "Mylar-rated" punch in a desktop enclosure that contains a power supply and interface electronics. The punch/reader is interfaced through an RS-232 communications port, which reportedly allows the terminal to be used on remote time-sharing applications. The unit can also be used alone for tape duplication and editing, the firm claimed.

Standard controls include reader/punch, start/stop and single step. Full remote software control of the unit at both 110 bit/sec and 300 bit/-sec is standard, according to the firm.

A reader/punch unit, including Teletype Model 43 costs $2,795 from the firm at 223 Monroeville Mall, Monroeville, Pa. 15146.



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Take Long-Range Plans Slowly, Users Advised

(Continued from Page 77)

also limits the time of accomplishing a specific change, he added, "Simply stated, the objective states *what* will change by when," Knowles explained.

At this point, many issues have been prioritized and some have been eliminated, he said, but no clear statement has been made about what result the DP management team intends to accomplish and how the team expects performance to be measured, not when the intended result will be measurable.

Long-range planning details according to Knowles, should include:

- What level of hardware capacity is targeted for each year.
- When major technology will be available.
- What critical user areas will be addressed with new systems by when.
- What changes are to be made in the performance of the DP.

The next element in the structure is the development of alternative strategies for each objective and the selection of the most desirable strategy. Knowles defined a strategy as a proposal describing how DP resources will be used to accomplish an objective. The objective deals with the people, machines, money and schedules of events which will cause the desired change (Fig. 2).

Master Schedule

For each planning year, the events described in each of the strategies must be combined into a "master event schedule" and the total department resource requirements must be combined to create a "master resource budget," Knowles explained. The merging of resources for change and resources for ongoing activities creates a proforma budget extending from the current budget year throughout the planning horizon.

The feasibility test element in the planning structure doesn't represent a separate step in the process. Instead, it highlights the kinds of reviews which must be made in strategy planning in order to assure that the plan is developing in a practical manner.

Once the plan has been finalized, the first real test of its workability is whether the first year is budgeted. The "best laid" plans are worthless if resources are not available to implement the events on schedule.

As soon as a budget is approved, the first events can be assigned. If no followup is done, it is likely that little of the plan will ever be achieved. A measurement step is needed, Knowles advised.

Measurement of task performance must determine whether the assigned tasks are being completed satisfactorily. If not, redirection of day-to-day activity is necessary to "get back on target," he said.

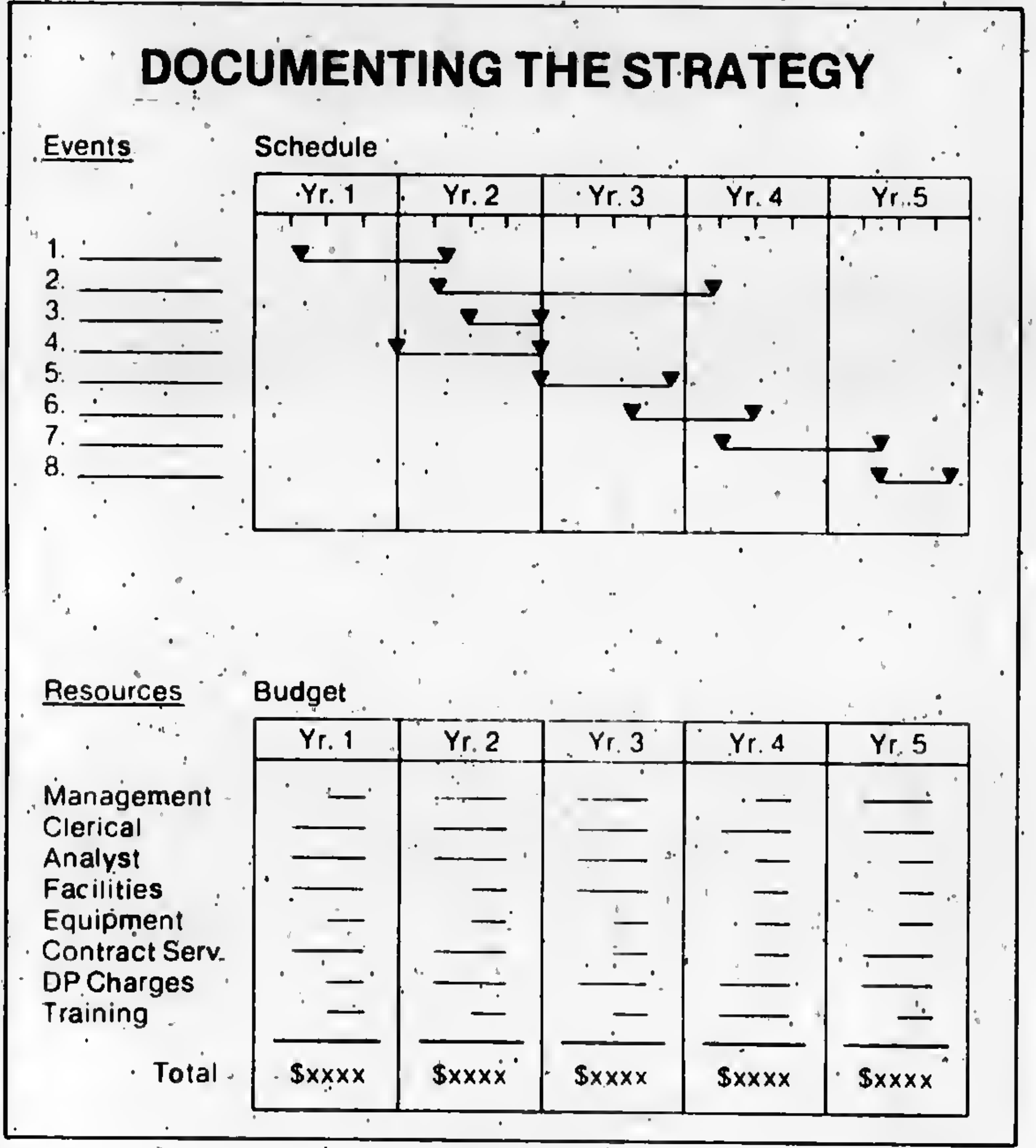

Figure 2

Proposal Book Rocks Industry!

A California publishing firm has literally taken the computer industry by storm with a recently-published "how-to" proposal book. The book, a 4 pound loose-leaf volume entitled *How to Create a Winning Proposal*, covers every aspect of proposal preparation from start to finish, including the nuts-and-bolts details on how a winner is put together.

Written by two top West Coast proposal consultants, *Winning Proposal* is rapidly becoming the standard text for use in commercial, government and OEM proposal efforts. It is currently in use by 74% of the major data communications equipment manufacturers in the nation and 58% of the EDP management and service organizations.

Using a step-by-step instructional technique, the authors provide a virtual roadmap to the entire proposal process . . . including section-by-section checklists to ensure the proposal team of covering all the important bases. Excellent guidelines are given on the contents, structure and methods of preparation for both solicited and unsolicited proposals. A tactical approach is used for developing an effective "win strategy," mobilizing the proposal team, and controlling the input of the various team members. Detailed instructions on how to analyze and respond to RFP's, RFQ's, and IFB's are included.

Copies are available from Mercury Communications Corp., 730-CW Mission Street, Santa Cruz, CA 95060. $65 (pre-paid) includes 3-5 day delivery inside USA. In Calif. add $3.90. For outside USA, U.S. $76 (Int'l money order) includes air delivery. To order C.O.D. call 408/425-8444.

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High- and Low-End Systems

HIS Level 6 Family Gains Two Members

By Jeffry Beeler
CW Staff

BILLERICA, Mass. — High- and low-end systems have joined the Honeywell Information Systems, Inc. line of Series 60 Level 6 minicomputers.

Both additions preserve compatibility with the other four members of the Level 6 family, according to HIS spokesmen. They also interface with IBM 370s, Memorex Corp. 1270s and other host mainframes, the officials added.

The HIS introductions include the low-end Model 23 — a "diskette-based, communications-oriented" system — and the high-end Model 57, a "Cobol-oriented" machine to which users can reportedly upgrade from the four earlier members of the Level 6 line.

At the same time, HIS introduced three other Level 6 products — a VIP 7801 CRT terminal, a MOD 200 executive for the Gcos 6 operating system and the DIU 9100 series of diskette drive units.

The MOD 200, an entry-level executive, permits users of the Model 23 to perform on-line transaction processing in multiterminal systems, the HIS spokesmen said. The DIU 9100 series consists of four diskette systems ranging from a 256K-byte, single-drive model to a 1M-byte, dual-drive version.

The Model 23, comparable to the low-end systems in Data General Corp.'s Nova series, reportedly executes 200,000 instruction/sec and provides roughly 60% of the processing power of a Model 33, the next largest member of the Level 6 family.

HIS Level 6 Model 23

The entry-level system also comes with the same 108 instructions and internal register organization as the larger Level 6 models, the officials said. As a result, the Model 23 can operate with both Gcos 6 MOD 200 and MOD 400, the same software used by the Model 33, the spokesmen explained.

This software compatibility is said to allow the system to accommodate Fortran and RPG as well as entry-level and intermediate Cobol.

HIS intends the Model 23 primarily for OEMs, systems houses and commercial end users that will buy at least four of the processors. In a typical application, the system can serve as an on-line processor or multifunction terminal in distributed processing networks, company officials said.

The Model 57, by contrast, compares roughly in performance to Digital Equipment Corp.'s PDP-11/70 and executes 700,000 instruction/sec, HIS said. Like its smaller predecessor — the "commercially oriented" Model 47 — the top-of-the-line system reportedly incorporates two processors.

(Continued on Page 89)

First-Timer's DP Net Boosts Output Tenfold

ROCHESTER, N.Y. — Productivity in the purchasing department of the city school district here has reportedly jumped tenfold since the department automated its clerical functions with its first minicomputer-based "distributed processing network."

During the system's first two months of operation, two operators produced 900 more documents than three unassisted clerks did during the same period last year, according to Thomas C. Iaia, supervisor of the purchasing department's purchases and stores.

Iaia, whose staff must generate documentation for 40,000 requisitions each year, acquired the on-line system to maintain inventory listings and produce reports for the 6,000 vendors that supply the city school district with everything from paper clips to buildings. The system also generates 25,000 purchase orders per year and helps the department, which must open all purchases of more than $1,500 to competitive bidding, prepare 400 quotation requests annually, Iaia said.

Before they acquired the automated network, Iaia and his staff performed most of their purchasing functions with the aid of a manual card filing system. Then in 1964, they switched to a punched card/punched tape system that remained in service until last year.

Under the most recent system, Iaia's staff members recorded purchasing information with the punched card/punched tape machine and then reinserted the resulting tape to produce a typed purchase order. They later punched a second tape from which they prepared purchase registers.

When a supplier subsequently filled one of the city school district's purchase orders, information describing the received item went onto a punched card whose two parts were stored in separate tub files, Iaia explained. One part of the card bore the handwritten date of the product's purchase order; the other

(Continued on Page 88)

Printer for Distributed DP Yields Up to 900 Line/Min

SAN ANTONIO, Texas — Datapoint Corp. has expanded its line printer family with the introduction of a variable-speed unit that the company said suits distributed processing applications.

The printer comes in two versions — the Model 9265, which outputs 64 upper case characters only at 900 line/min, and the Model 9266, which prints 96 upper and lower case characters at 660 line/min. Both versions use an anvil impact printing technique with a rotating drum.

The printer generates an original and up to five copies on fan-folded, edge-punched paper 4- to 19 in. wide, a spokesman said. Slewing paper at 130 in./sec, the unit prints 136 char./line with either 6- or 8 line/in., he noted.

The printer reportedly comes fully buffered and attaches to the I/O bus of any Datapoint processor except the company's Model 1500.

The Model 9265 costs $28,230 and leases for $785/mo on a three-year contract, while the Model 9266 sells for $30,670 and leases for $854/mo for the same period.

Datapoint is located at 9725 Datapoint Drive, San Antonio, Texas 78284.

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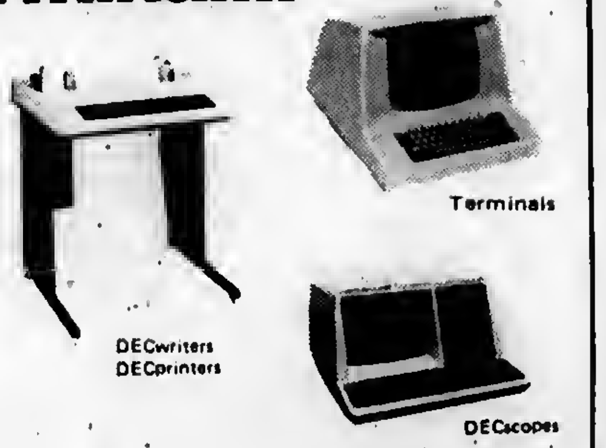

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IBM, DEC, DG Users Gain Double-Density Floppy

MOUNTAIN VIEW, Calif. — IBM compatibility is reportedly combined with single- and double-density recording capability in a floppy disk drive system and controller from Scientific Micro Systems, Inc. (SMS).

The FT series comes with a host interface processor (HIP) controller for Digital Equipment Corp. and Data General Corp. minicomputers, according to SMS officials, who described the HIP as an intelligent direct memory access controller that boosts system throughput by off-loading a CPU from disk I/O processing.

Capable of storing 2.5M bytes, the dual-head disk units function with computer-assisted tomography (CAT) scanners, image processing and display equipment, medical instruments, photocomposition systems, small business systems and other hardware requiring bulk storage, industry-standard media formats and high throughput, the spokesmen said.

The systems also come with two-drive expansion enclosures, they noted.

Prices for a two-drive system start at $3,700. Quantity discounts are available, SMS said from 777 E. Middlefield Road, Mountain View, Calif. 94043.

Three Interface Subsystems Offered for HP 2100, 21MX

ELGIN, Ill. — Both hardware and software are packaged together in three interface subsystems for the Hewlett-Packard Co. 2100 and 21MX series of minicomputers.

The Analytical Systems Corp. (ASC) 21000 line of interfaces consists of the Model 21101, a single-port asynchronous serial communications subsystem; the Model 21201, a parallel interface subsystem; and the Model 21301, an analog data acquisition subsystem.

The Model 21101 attaches to interactive hard-copy terminals, CRT terminals and line printers through Bell 103, 113 or 202 modems or their equivalents, according to ASC spokesmen.

The subsystem transmits at 50- to 19.2k bit/sec, accommodates 5- to 8-bit words and provides three stop-bit lengths, the officials added.

The Model 21201 reportedly interfaces with peripherals from Centronics Data Computer Corp., Control Data Corp., Data 100 Corp., Diablo Systems, Inc., Digital Equipment Corp., Lear Siegler, Inc., Okidata Corp., Versatec, Inc. and other vendors.

Capable of transferring data at up to 500k char./sec, the subsystem supports additional peripherals through controller switch selection and the assignment of an I/O subchannel, ASC spokesmen said.

The Model 21301 incorporates an intelligent controller, control memory and a 12-bit resolution analog-to-digital converter on one 8.67- by 7.75-in. interface board, the officials continued. The control memory holds 256 words by 16 bits of static Nmos storage and cycles in 2.4 microsec, while the firmware/state register-based controller cycles in 200 nsec, ASC said.

The models 21101, 21201 and 21301 cost $550, $975 and $3,675, respectively, from ASC at Box 533, Elgin, Ill. 60120.

Micos Rental Plan Includes Buy Option

ELMSFORD, N.Y. — Mini-Computer Systems, Inc. has announced a 12-month rental program with a purchase option for its Micos business computer systems.

With the program, users can rent a Micos system for $995/mo, including installation and maintenance, company officials said. Any time during the rental period, users have the option of buying the system and applying 50% of the rental payments against the system's $28,750 base purchase price.

Mini-Computer Systems is located at 525 Executive Blvd., Elmsford, N.Y. 10523.

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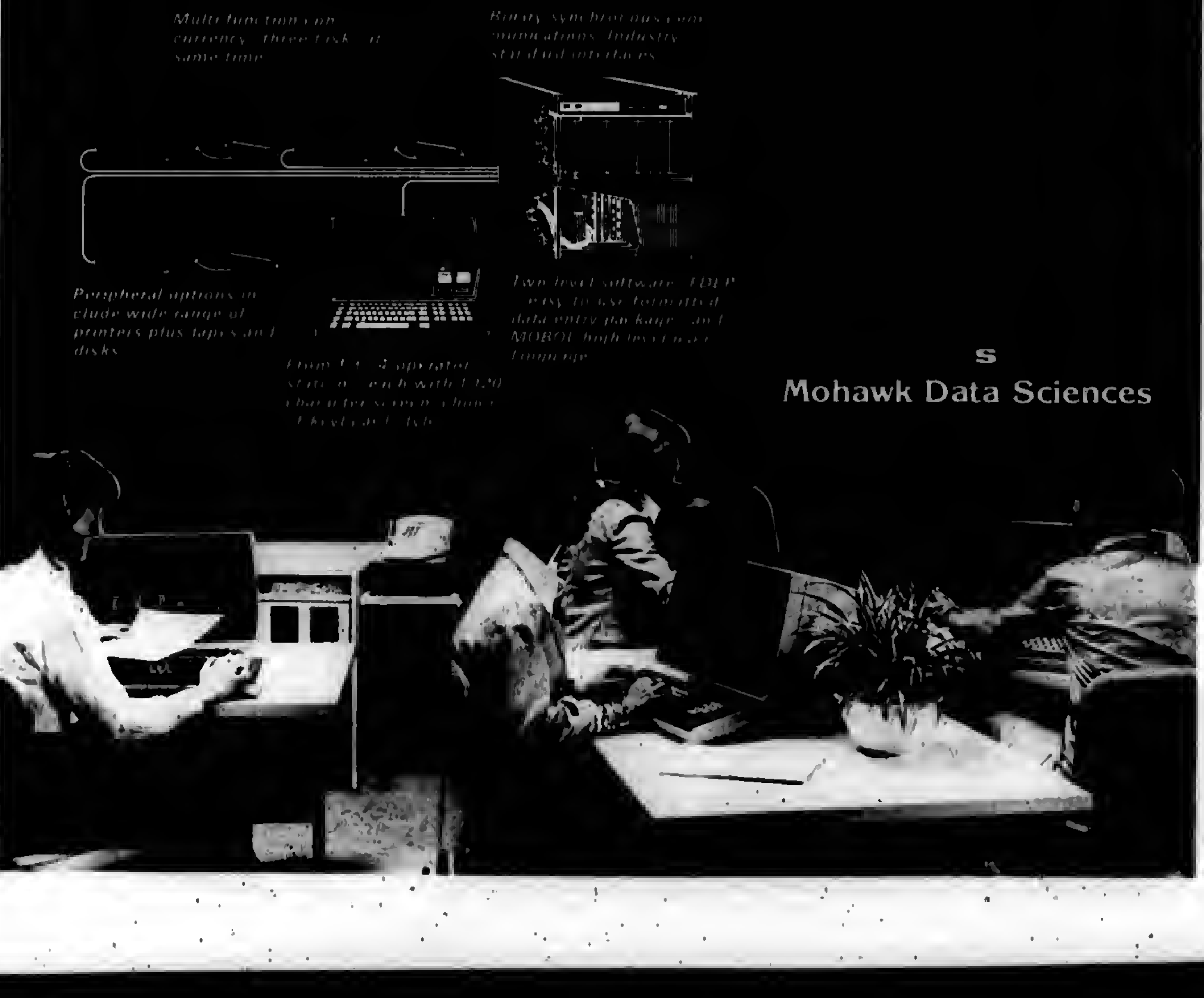
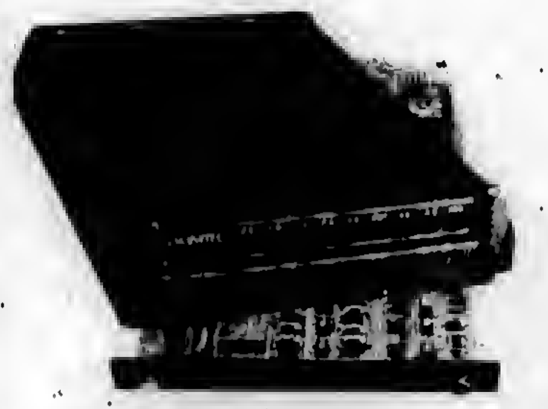
Send us the coupon right now, and learn more about the MDS Series 21 — the one-stop solution to your distributed processing needs. Or call James J. Byrne, V.P. Sales, (201) 540-9080.



Mohawk Data Sciences



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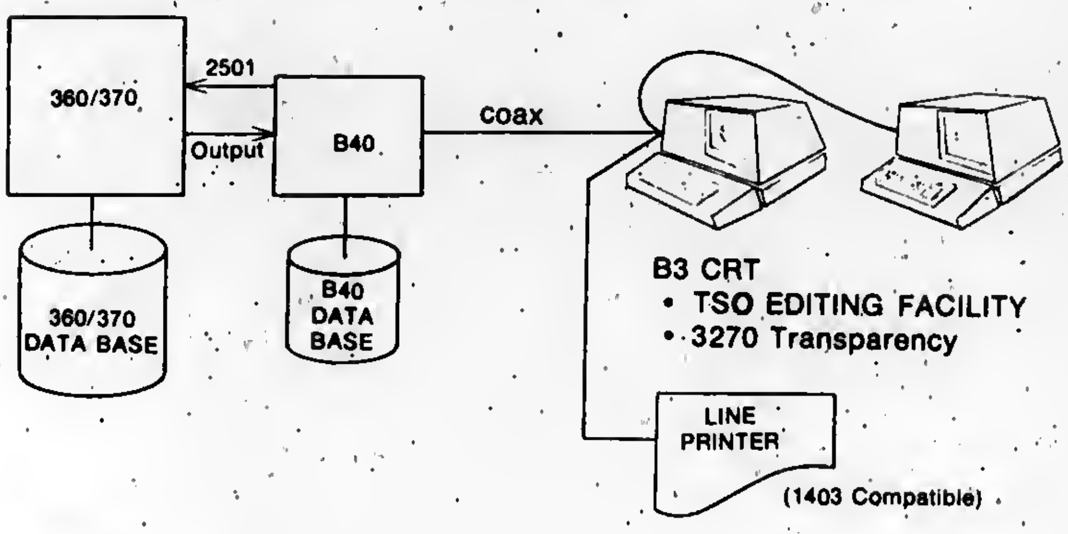
And the B40 does this independently, so your 360/370 is more available. Batch jobs are submitted from CRT's for compile or execution. Meanwhile, other jobs can also be submitted from your other card reader.



Really?

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Xebec Disk Emulates DEC Units

SANTA CLARA, Calif. — Both the Digital Equipment Corp. RK cartridge disk systems and the DEC RX floppy disk systems can reportedly be emulated by a disk storage system from Xebec Systems, Inc.

Designed to operate with both the LSI-11 and the PDP-11 series, the Soft Cartridge is also program-transparent with the RK and RX units, Xebec officials said.

With dual drives, the Soft Cartridge system stores 2.5M bytes, roughly the storage capacity of an RK-05, the spokesmen explained. With an optional two-drive expansion chassis, the system can grow to accommodate as much as 5M bytes, they added.

Thumbwheel switches are said to allow users to designate each of the system's drives as an RK or RX unit.

As an RX unit, each Soft Cartridge drive generates and reads DEC-format diskettes, interfaces to a host computer as a programmed I/O device and can pass the RX-11 interface diagnostic and RX-11 system reliability test, Xebec said.

Each drive operating as an RX unit generates and reads double-density format diskettes, interfaces to the host processor as a direct memory access device and operates under control of all RK-11 software drivers, the spokesmen added.

In both the RX-11 and RK-11 modes, the system is said to provide 77 recording tracks. In the RX-11 mode, however, the unit stores 256K byte/disk and provides 26 sector/track with 128 byte/sector.

By contrast, a system in the RK-11 mode holds 630 bytes on a single-sided diskette and provides 16 sector/track with 512 byte/sector, the officials noted.

When emulating both the RX-11 and the RK-11, the Soft Cartridge system reportedly rotates at 360 rev/min and comes with 48 recording track/in.; they said. An RX-11 unit, however, records 3,200 bit/in., while an RK-11 device holds 6,400 bit/in.

Both the single- and double-sided versions of the Soft Cartridge reportedly provide 83 msec average rotational latency and 35 msec head load. A single-sided model accesses in an average of 260 msec with 8 msec track-to-track access and 8 msec settling, the officials noted.

A double-sided version, by contrast, accesses in an average of 91 msec with 3 msec track-to-track access and 15 msec settling, they added.

A two-drive, single-sided system costs $4,950 from Xebec at 2985 Kifer Road, Santa Clara, Calif. 95051.

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Minicartridge Fits Same Purposes As 3M, HP Units

SUNNYVALE, Calif. — A mini-cartridge from Information Terminals Corp. (ITC) provides compatibility with the 3M Co. DC-100A and the Hewlett-Packard Co. 9162-0061 minicartridges, according to an ITC spokesman.

The Model TC-150 also operates with drive units from Candex Pacific, Instrumentation Technology Corp., Qantex and Texas Instruments, Inc., he added.

Equipped with a proprietary drive technology, the minicartridge is said to hold 140 ft of .150-in.-wide tape. Storage capacity depends on the user's data format, ITC explained.

Recording formats available with the minicartridge reportedly range from 800 bit/in. single-track to 1,600 bit/in. dual-track.

The Model TC-150 costs about $12 from ITC at 323 Soquel Way, Sunnyvale, Calif. 94086.

Unit Hastens Mini Plots

SANTA CLARA, Calif. — Overburdened minicomputers that control Versatec, Inc. electrostatic printers can reportedly cut their processing time eightfold with a unit that allows the minis to off-load vector-to-raster conversion.

Versatec's Vector-to-Raster Converter (VRC) also cuts minicomputer disk space requirements and I/O time 20-fold with a standard set of 256 active vectors expandable to 4,096, company officials claimed.

In addition, the VRC lets mini-based interactive graphics systems plot maps and drawings up to 6 ft wide and with up to 200 dot/in., they added.

Using a 56-bit microcode with a 100-bit-wide memory and a 275 nsec instruction cycle, the VRC's dedicated processor is said to convert as much as 1M byte/sec.

The 100-bit data path and the 56-bit microcode permit the unit's microprocessor to access a complete vector and to perform up to eight functions in one instruction cycle, the Versatec spokesmen said. Some of these functions incude arithmetic, logic, shift, rotate, branch and repeat.

The VRC's operation is supported by Versaplot-07 plotting software, a set of Fortran callable routines that are compatible with pen-plotter application programs, Versatec said.

The VRC unit costs $3,900 from the company at 2805 Bowers Ave., Santa Clara, Calif. 95051.

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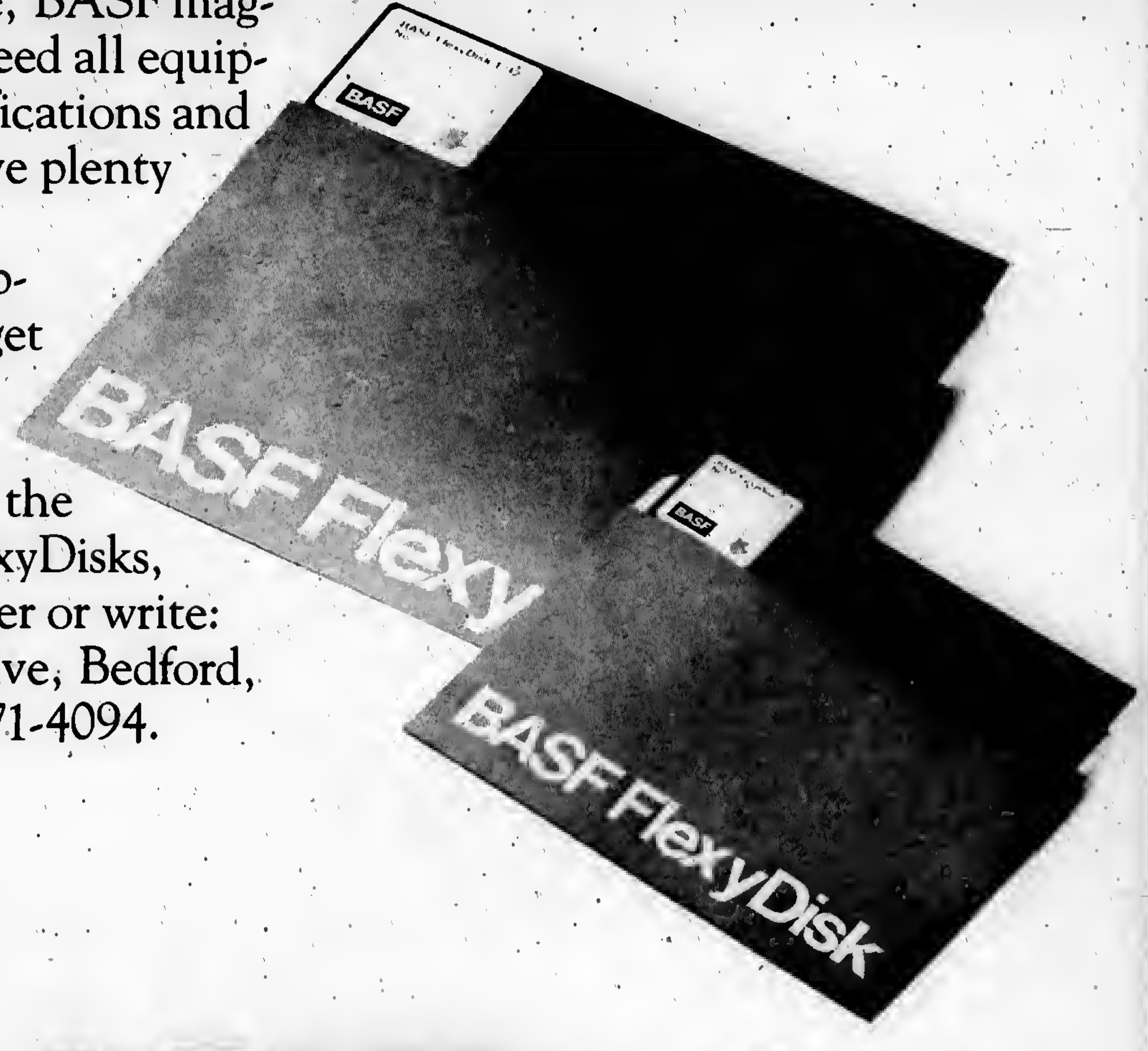

BASF The Original.

Computer Tape Disk Packs Diskettes Cassettes Mag Cards

First-Time User's Network Boosts Its Output Tenfold

(Continued from Page 83)

showed the product's punch-coded item number.

Later, when the purchasing department requisitioned the item from a warehouse, clerks pulled the two card parts from their respective tubs and reran them through the punch machine to produce a tape for inventory updates.

Unfortunately for the department, the process of manually retrieving cards and using the punch machine to generate purchasing documents proved time-consuming and often resulted in clerical errors, Iaia said.

Three Years, 10 Vendors

To overcome these drawbacks, Iaia and purchasing department assistant Richard C. Hopfer decided to replace the punch card/punch tape system with a computer, which they hoped would prove a more adequate alternative.

For three years, the two men evaluated systems from 10 manufacturers including IBM, Digital Equipment Corp., NCR Corp., Burroughs Corp., Singer Co.'s Business Systems Division and Olivetti Corp. Many of the systems they investigated, however, proved unsatisfactory for reasons ranging from excess noise to excess price, Iaia recalled.

Moreover, many of the prospective acquisitions experienced "a great deal" of downtime during sorting, Hopfer explained. "We wanted direct and immediate access to all data stored on fixed or removable hard disk," he said. "We didn't want to carry out a lot of sorting."

As a result, Iaia and Hopfer rejected the other configurations they considered and opted for a Wang Laboratories, Inc. WCS/20 system with a workstation, CRT terminal, 60 line/min printer, 10M-byte hard disk drive unit and a 9-track tape drive unit.

With this configuration, the purchasing department generates big quotation documents by entering the identification numbers for the school district's vendors plus information describing the items to be ordered.

When vendors respond to the department's requests for proposals, Iaia and his staff select the lowest bid meeting their specifications. An operator then enters the appropriate vendor number through the workstation, and the system automatically generates a purchase order.

At the end of the day, the system also produces a purchase registration which lists purchase order number, delivery location, vendor name and number, requisition number and date and the name of the requisitioner.

Inventory Listings

In addition to producing quotation request documents, purchase orders and other paperwork, the system uses the tape drive unit to provide listings of the school district's capital equipment. As the purchasing department receives vendor shipments, computer operators enter the appropriate inventory information, which goes onto disk and then is transferred to tape.

From there, the tape is sent to an IBM 370/138 at the Board of Cooperative Educational Services, which generates and distributes the completed listings to inventory checkers, Iaia explained.

Among the possible enhancements Iaia has considered adding to the system is a communications option that would allow the WCS/20 to transfer capital equipment listing information directly to the 370/138 and thus eliminate the need to first store it on tape. Such an option would reportedly allow the department to edit much of its purchase order information before sending it to the IBM mainframe.

Iaia also plans to create a file that groups vendors according to their areas of specialization and a second file that rates vendor performance, he said.

Pertec Floppy Drive Reads IBM Diskette 2 and 2D

CHATSWORTH, Calif. — A double-headed floppy disk drive unit from Pertec Computer Corp.'s Pertec Division is said to read and write up to 1.6M bytes of unformatted data on both sides of an IBM Diskette 2, 2D or equivalent.

Compatible with the proposed Ansi-standard interface, the FD650 reportedly transfers up to 62.5k byte/sec and accesses in 3 msec track-to-track with 15 msec settling and 35 msec head loading. Users can daisy-chain as many as eight of the units, according to a Pertec spokesman.

The product uses FM and MFM recording technology and provides double-density storage on standard 8-in. flexible media, the company official said.

Head positioning is controlled by a steel band that attaches to the head carriage and to a drive pulley on the shaft of a four-phase 1.8° permanent-magnetic stepper motor, the Pertec spokesman explained. Each step of the motor causes the head to move one track, according to the spokesman.

The FD650, with an electrical door lock and a die-cast aluminum base, costs $755. OEM discounts are available, Pertec said from 9600 Irondale Ave., Chatsworth, Calif. 91311.

Now, Memorex system's performance.

If your 100/200 MB removable disc storage subsystem isn't giving you all the performance you want; then Memorex's new 3770 Disc Cache could be just what you need.

It fits between your drives and controller, filling the gap in your system's performance by giving you faster data access and improved throughput.

Compare performance data for a 3770 Disc Cache Subsystem to a current 200MB Disc Storage Subsystem. For example, on the average, the time to access a full track of 13030 bytes from the 3770 is:

Track seek time:
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2.0ms vs. 8.3ms,
and data transfer time:
10.9ms vs. 16.7.

Thus, for data in the 3770 Disc Cache, significant increases in throughput at the channel level can be achieved. In fact, a 50% improvement in your data transfer rate is guaranteed when the Memorex® 3674 control unit is used.

Potential benefits from proper application of the 3770 can be less [illegible] automatic space management, and better time sharing response.

And putting a 3770 to work for you is easy, because full software compatibility is maintained.

The Memorex 3770 Disc Cache works with IBM 370/135 and above, Amdahl 470 V/5 to V/7, Itel AS-4 to 6, and other compatible CPUs. In short, any CPU with a Memorex 3670/75 Disc Storage Subsystem.

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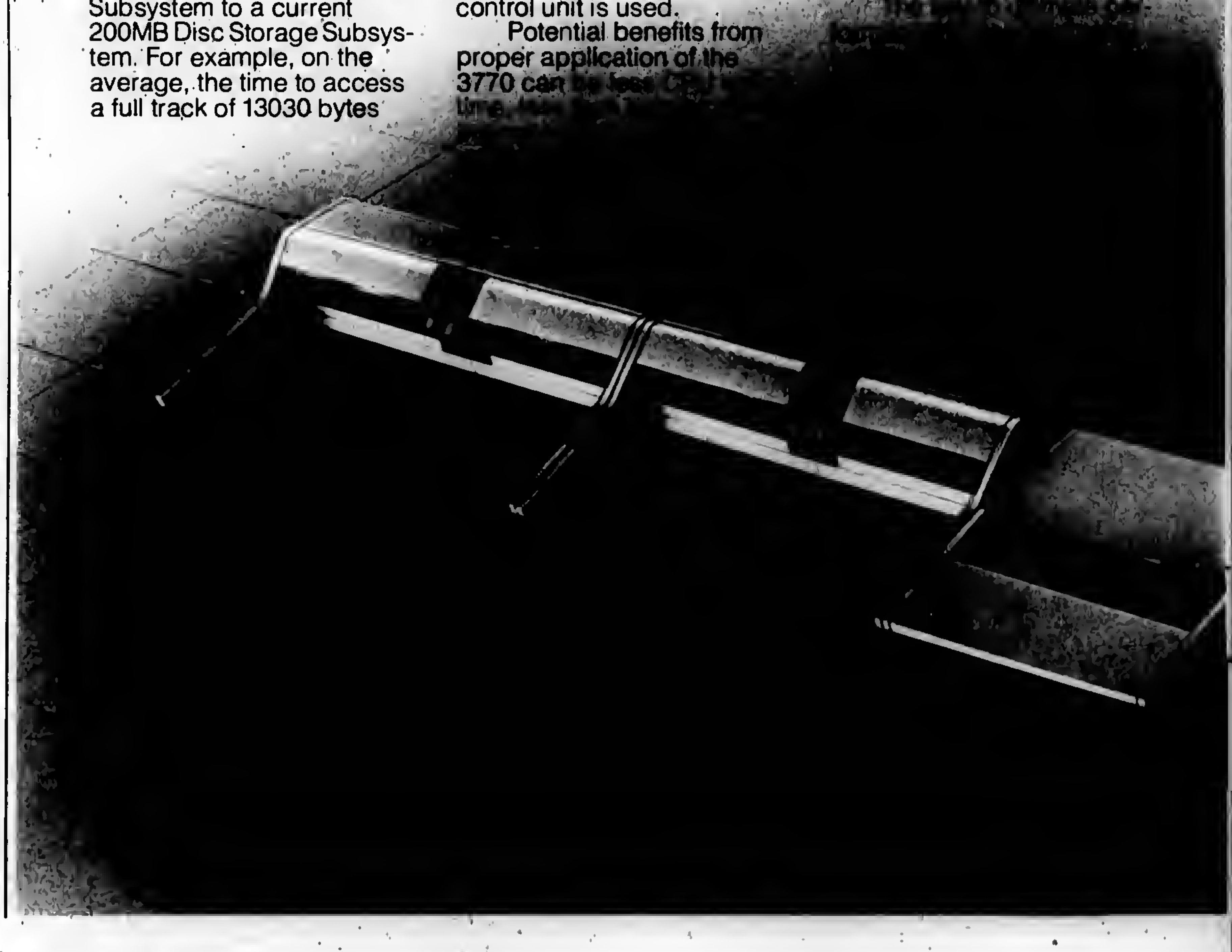


Drives Built for Military

PLAINVIEW, N.Y. — Qantex has introduced two military tape drive systems, one a 5.7M-byte unit that reportedly offers compatibility with all U.S. Navy computers and the other a 5M-byte unit that is said to fit into an aluminum suitcase.

The 5.7M-byte system, dubbed the Model 2420, operates with the AN/UYK-20, AN/AYK-14 and 642B computers as well as with Navy Tactical Data System (NTDS) interface types A, B and C, Qantex officials said. It also emulates the Navy's standard MIL-Spec cartridge memory system, the AN/-USH-26, the spokesmen added.

A typical 2420 is said to incorporate a tape drive, Ansi-compatible formatter, NTDS interface, power supply and enclosure.

Dubbed the Model 2720, the portable system also comes with an NTDS interface and allows users to load a 64K-byte program in 11 sec, company officials claimed.

Both tape system models reportedly come with either one or two transports for 3M Co. DC-300A cartridges, each of which holds 2.8M bytes of unformatted storage. They also read/write at 30 in./sec; rewind at 90 in./sec, record 1,600 bit/in. and transfer 48k bit/sec.

The Model 2420 costs $6,900; single- and dual-transport versions of the Model 2720 cost $6,135 and $7,105, respectively. Qantex is located at 200 Terminal Drive, Plainview, N.Y. 11803.

High-, Low-End Systems Join HIS Level 6 Family

(Continued from Page 83)

One of these computers executes the Level 6 set of 154 standard instructions, while the other processor runs 30 Cobol-generated "commercial" instructions, the officials explained. This second computer, dubbed the Commercial Instruction Processor (CIP), is said to operate twice as fast as its Model 47 counterpart.

The other CPU comes with an 8K-byte cache memory that reportedly cycles in 145 nsec and allows the Model 57 to provide 50% greater throughput than the Model 47.

In a typical application, the high-end Level 6 mini will serve as a host or remote computer in distributed processing networks, HIS spokesmen said.

The Model 23 uses a 16-bit synchronous bus with up to 12 card slots, two of which are occupied by the system's single-board processor, the officials noted. In a prepackaged, "minimount" version of the system, a memory board half as wide as the CPU card occupies a third bus slot. Users can therefore reserve the remaining nine I/O slots for peripheral and communications controllers, HIS noted.

Because each bus adapter accepts up to two controllers, the Model 23 is said to accommodate as many as 18 peripherals or an equal number of synchronous and asynchronous communications lines operating at 75- to 9,600 bit/sec. Peripherals that can be plugged into the bus structure include single- and dual-diskette drive units with up to 512K bytes of storage, 30- to 160 char./sec serial printers, 240-to 900 line/min line printers and CRT terminals like the VIP 7801, company officials said.

The Model 23's lone memory board, meanwhile, holds a minimum of 32K bytes expandable to 128K bytes, the spokesmen added.

Up to 23 Slots

Unlike the low-end system, the Model 57 incorporates a 16-bit, asynchronous Megabus with 10 circuit board slots expandable to 23. In a minimum configuration, one card slot is occupied by the main CPU board, another by the cache memory and a third by a memory management unit, which permits multiple users to share and access programs and data.

Still another chassis slot holds a memory board with up to 64K bytes of standard MOS storage, they noted. The remaining six slots in a basic Model 57 accommodate peripheral and communications controllers, each of which reportedly manage up to four units.

With these controllers, users can reportedly attach CRT terminals, 30 char./sec to 900 line/min printers, 10M-byte disk units and 33M- to 256M-byte mass storage systems plus 800-and 1,600 bit/in. tape drive units.

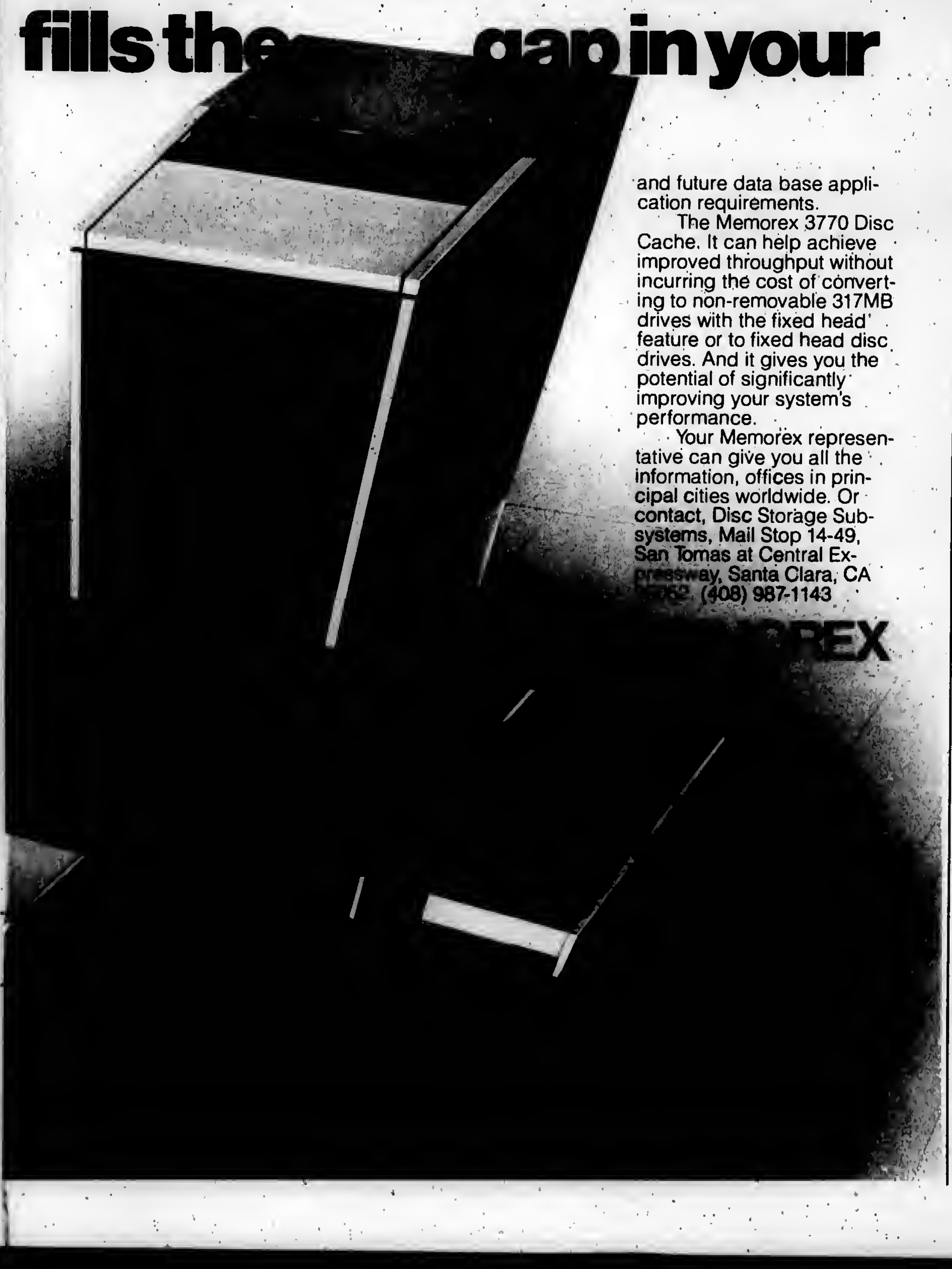
The controllers also allow users to add as many as 128 synchronous and asynchronous communications lines operating at 75- to 9,600 bit/sec, the spokesmen said.

Like the other members of the Level 6 line, the Model 57 requires a minimum of 32K bytes to operate. But with an optional high-density MOS memory that provides 256K byte/controller, users can expand the system to 2M bytes, the officials added.

A basic Model 23 configuration with a 64K-byte CPU, diskette unit, workstation and software costs $13,500.

A basic Model 57 configuration with a 256K-byte CPU, 67M bytes of disk storage, tape drive, console, CRT terminal and Gcos 6 MOD 600 executive costs $127,000. With a 192K-byte main memory, 512K bytes of disk storage, tape drive, printer, card reader, console, 16 asynchronous communications lines and one synchronous line, it sells for $217,000.

The Models 23 and 57 are available from HIS' Small/Medium Information Systems Division at 200 Concord Road, Billerica, Mass. 01821.



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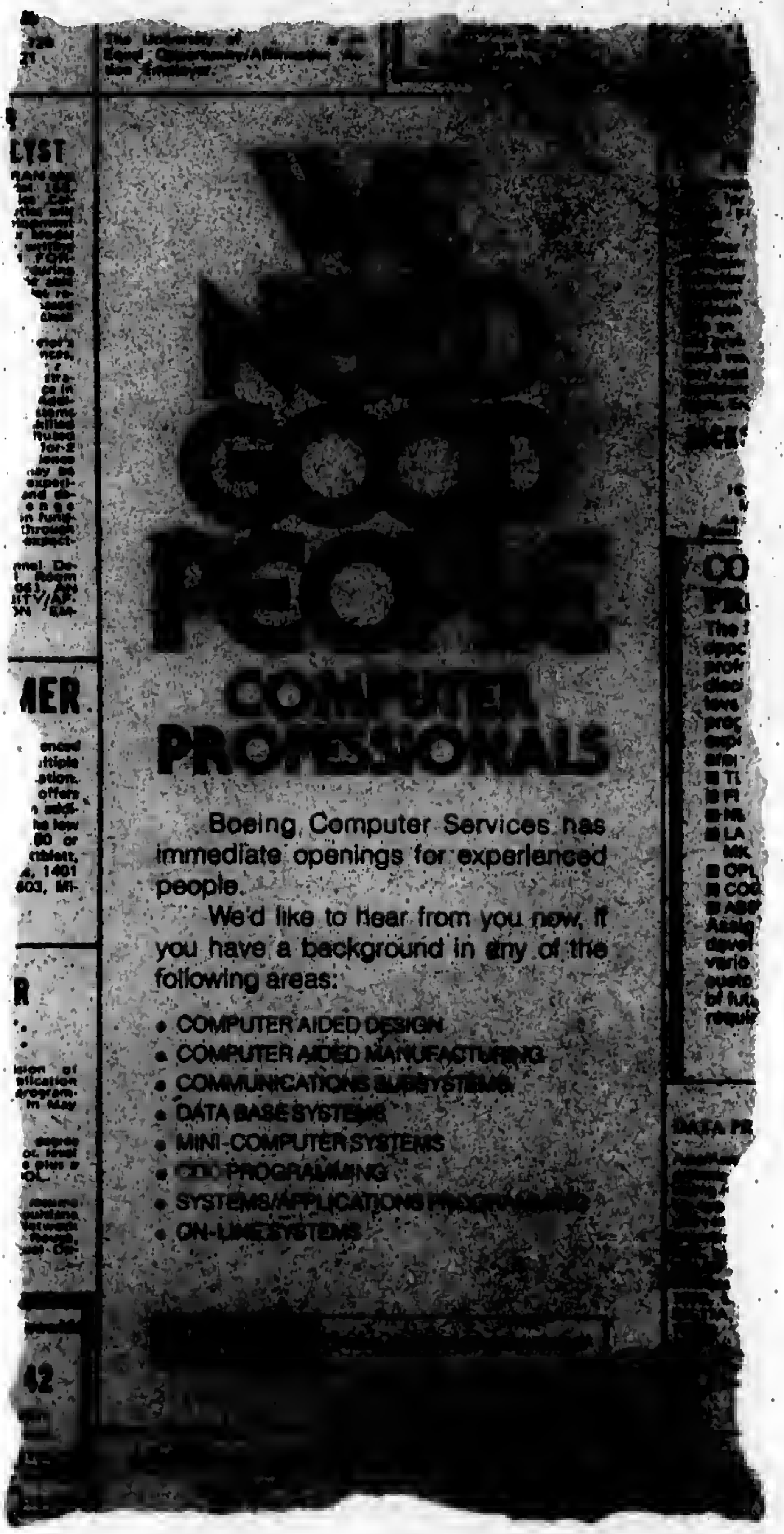

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Tracks 40,000 Customers

Micro Boosts Carnival Supplier's Odds

By Tim Scannell
CW Staff

COLLEGE PARK, Md. — Distributing roulette wheels, blackjack tables and bingo apparatus to various charitable organizations is less of a gamble since a company here decided to use a microcomputer system in its operations.

S. Lachman & Sons supplies carnival equipment, as well as paper hats and horns, to schools, churches, fire departments and service clubs that stage fund-raising events. The company, a fourth-generation family-owned business, originally operated under a manual system of stock and customer control. However, as the customer list grew to its present size of more than 40,000 names, this method of conducting business proved to be "terribly inefficient," according to Gary Cooper, vice-president of the firm.

"We were buying mailing lists from outside suppliers and doing everything manually," Cooper explained. "This was very unsatisfactory. The lists we bought were never updated properly and contained many obsolete names and addresses."

After looking at "probably every system in the minicomputer and microcomputer class," Cooper purchased a Pertec Computer Corp. Mits/Altair 8800b microcomputer system.

System Applications

The system is used at Lachman for three corporate functions: mailing list maintenance, accounts-payable bookkeeping and inventory control.

In its mailing list application, the system updates and corrects names and addresses, sorts the names into any desired sequence or category and prints out pressure-sensitive mailing labels. "All we have to do is input the names once at the computer terminal and from that point on, it's very simple to write a little program to sort them into any kind of classification we want — alphabetical by Zip Code, by type of business or whatever," Cooper said.

"If I want to sort through my 40,000 plus names and mail only to fire departments in Delaware, the computer can do that. And if I want to compound that with fire departments in Virginia and West Virginia, all I have to do is put in each of those three diskettes for a couple of minutes. The next thing I know, the machine has sorted together a brand new list of fire departments in those three states," Cooper explained.

(Continued on Page 92)

Text, Graphic Display Board Bows

ANDOVER, Mass. — Miniterm Associates, Inc. has introduced a combination text and graphic video display board for users of S-100 bus microcomputer systems.

The Merlin video interface combines the functions of text and graphics display and a keyboard input port, a spokesman claimed. The unit is said to be capable of displaying 20 lines of text, both upper and lower case characters, with a capacity of 40 char./line.

The 4K control read-only memory (ROM) of the system provides a keyboard driver with "Edit-key" decoding, display output with auto-and "wrap-around" scrolling, 14 monitor functions, 24 cursor/edit functions, graphic subroutines and a keyboard graphic drawing mode, according to the spokesman for the firm. The unit can be tailored to individual user systems with four definable monitor keys, seven edit keys and selectable I/O drivers, the company spokesman added.

The unit employs a direct memory access (DMA) controller, and the display address as well as the display mode are software programmable, the spokesman stated.

The control feature allows the user to define two separate display areas and modes, switching from one to the other via the keyboard. A default text mode reportedly makes it possible to display lines without the need for space-fill characters at the end of each line, the spokesman for the company claimed.

Merlin costs approximately $500 assembled and tested or $300 in kit form without ROM software from the company at Dundee Park, Andover, Mass. 01810.

Video Interface Includes 1K RAM

CANOGA PARK, Calif. — A 16-line by 64-char. video interface from Nucleonic Products Co. is said to accept data at TTL levels in Ansi standard Ascii and provide a composite video output which can be connected to any standard CRT unit.

The CRT-1000 includes 1K of random-access memory (RAM), a row-scanning character generator, and a video processor, the firm said. Video and synch timings are switch-selectable and the timing is crystal-controlled. However, the dot frequency can reportedly be adjusted to accommodate different CRT screen widths and scan rates.

Cursor Commands

The units responds to such cursor commands as "erase page," "cursor home," "erase to end of line," "cursor return," "cursor left," and "cursor down." In addition, an "erase line" function is provided which does not affect the cursor position, a spokesman claimed.

In addition, automatic scrolling and a "roll screen" command are available. The latter causes the bottom line to be replaced by what was previously at the top of the screen, the spokesman added.

The CRT-1000 is available in both a 50Hz and a 60Hz version for $119.95 from the firm at 6660 Variel Ave., Canoga Park, Calif. 91303.

Microage Packages Software For Business, Math, Games

TEMPE, Ariz. — Microage has inroduced several application software packages on mini-diskette in North Star Computers, Inc. format for users of S-100 bus, 8080/Z80-based microcomputer systems.

The packages include financial, mathematical analysis and statistical programs from *Some Common Basic Programs* by Osborne & Associates; a backorder program using disk data files and a mailing list program, a spokesman for the company said.

Two disks of games, volumes one and two, are also offered by the company. They include such programs as trap, Taxman, Mathdrill II, Calendar, Civilwar, Golf, Lunar Lander Mathdrill, Hukle, Taxman, Weekday, Button, Frog, String, Change, and Shooting Star, for example.

In addition, Microage is offering Northstar DOS for Centronics printers which permits retail sales reporting using disk files.

The programs cost $35 each from Microage Mail Order at 803 N. Scottsdale Road, Tempe, Ariz. 85281, or write the company at 1425 W. 12th Place, #101, Tempe, Ariz. 85281.

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Micro Boosts Business Odds For Carnival Supply Firm

(Continued from Page 91)

Aside from the initial cost of the microcomputer and its peripherals, storing the mailing list data on diskettes is as economical as the old system of keeping the names on labels, Cooper continued. "I get about 2,000 names on each diskette, which means it's costing about 5 cents per name for storage. And here we can use each name an unlimited number of times and re-sort the names in unlimited different ways."

Accounts Payable

Lachman's Mits/Altair system also handles the company's accounts payable, replacing a large mechanical bookkeeping machine previously used for this purpose, Cooper said. "Our computer makes posting (transferring entries) a lot faster and it doesn't have the maintenance problems of the mechanical system. We just key in an account number and the system automatically searches the files, gets the account, finds its past balance, asks you the pertinent questions and does all the posting," Cooper said. "When it's finished, it gives you a hard copy."

The computer has also done away with the need for manually handling ledger cards, Cooper continued. "Any comparisons that our accountant needs to make are done by the computer rather than by hand or by adding machine. By reducing the number of hand entries, it reduces the number of mistakes and gives a much neater, cleaner finished product," he noted.

Inventory Control

A third major task performed by Lachman's microcomputer is inventory control. "While we don't keep a computerized perpetual inventory on all of our 10,000 different items — many of which cost less than a penny each — we do use the computer to keep track of certain staple, frequently used items," Cooper explained. "The computer keeps the records of what we purchase and sell so that we can make monthly comparisons and order more efficiently in the future."

Along with these major applications, the microcomputer also prints shipping lables and charts when needed, automatically types letters via a word processing program and calculates odds for customers using bingo and other games of chance for fund-raising purposes.

The 8800b at Lachman's includes two floppy disk drives, a CRT terminal and a printer. One of the main reasons the firm chose to purchase the Mits/-Altair system was because it was "complete," Cooper recalled. "The other vendors had portions of systems but Mits had everything, put together and working."

Future Plans

Future plans for the system include adding payroll and acounts receivable for the 15-employee firm. "In the accounts receivable system, we plan to keep all the current accounts on-line so that the system will be used for realtime inquiry to the data base as well as posting invoices," Cooper said.

"I also plan to put several on-line terminals in our front office so that our billing clerks and other personnel will be able to call up any account by number, see the balance, check whether it is past due, see how much the customer has purchased in the past and so on," Cooper added.

Cooper said he is also considering integrating a time-sharing version of the Basic programming language that will allow several terminals to access the system concurrently without interfering with each other.

"The small businessman no longer has to decide, 'Do I do it by hand or spend $50,000 for a computer?,' " Cooper noted. "For the cost of a bookkeeper for one year, he can pay for the whole system. It pays for itself in one to two years in labor savings alone."

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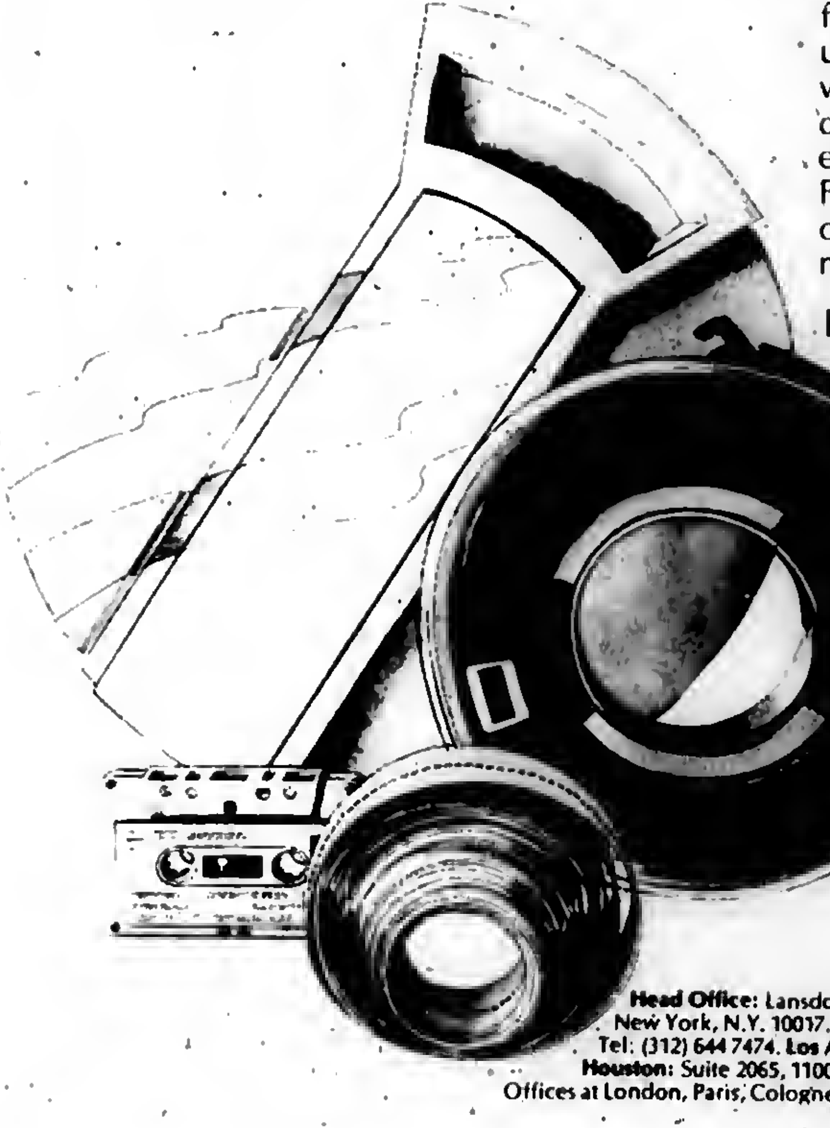

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Upkeep Firm to Service Rocky Mountain Region

BOULDER, Colo. — Microprocessor Computer Systems Corp., a minority enterprise, has announced a microcomputer systems maintenance service for the Rocky Mountain region of the country.

The service is available for terminals and systems from Texas Instruments, Inc., Lear Siegler, Inc., Soroc Technology, Inc., Diablo Corp., Digital Equipment Corp., North Star Computers, Inc., Tec, Inc., Applied Digital Data Systems, Inc. and Malibu.

The firm will offer both field and walk-in service as well as annual maintenance contracts, a spokesman said. It will reportedly be maintaining a "full line of parts" manufactured by the companies whose equipment the firm services.

The firm, at 1280 28th St., Boulder, Colo. 80303, is a distributor for computer systems and terminal equipment, including microcomputers, CRTs and printers for business, research and industrial applications. The firm's services include both hardware and software maintenance, the spokesman said.

Varta Battery Backs Up RAMs

ELMSFORD, N.Y. — A 9V rechargeable nickelcadmium battery has been unveiled by Varta Batteries, Inc., for use as a backup power supply for semiconductor random-access memories (RAM).

The battery has a capacity of 110 mAh and a discharge voltage of 8.4V, the firm said. The approximate lifetime per charge of the battery is 10 hours and the unit can be recharged up to 1,000 times, the firm claimed.

The battery can reportedly be fully recharged in 14 hours or permanently trickle-charged for buffer and standby operations.

The approximate price of the battery is $9 with an optional charger unit priced at an additional $6 from the firm at 85 Executive Blvd., Elmsford, N.Y. 10523.

Firms Offering Free Brochures

- Tektronix, Inc. is offering a four-page application note detailing how to use a logic analyzer to debug a microprocessor-based process control system. The pamphlet also highlights two common problems associated with debugging such systems. Tektronix can be reached through P.O. Box 500, Beaverton, Ore. 97077.
- A series of synchro-to-binary coded decimal converters that are available with either three- or four-digit unipolar or bipolar outputs is described in a two-page data sheet available from Natel Engineering Co., Inc., 8954 Mason Ave., Canoga Park, Calif. 91306.
- A catalog covering the major microcomputer development systems and logic analyzers is being offered by Microcomputer Rentals. The catalog, containing information on all the systems rented by the firm, can be obtained by sending a letterhead request to the company at 705A Lakefield, Westlake Village, Calif. 93161.
- A 48-page catalog published by Datel Systems, Inc. describes the company's line of monolithic and hybrid data converters. The firm is located at 1020 Turnpike St., Canton, Mass. 02021.
- A 32-page "short form" guide to Analog Devices' line of measurement and control products is available from the firm. The catalog includes details on digital-to-analog and analog-to-digital converters, multiplexers, switches, amplifiers, transducers and I/O subsystems. The company is located at Route 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

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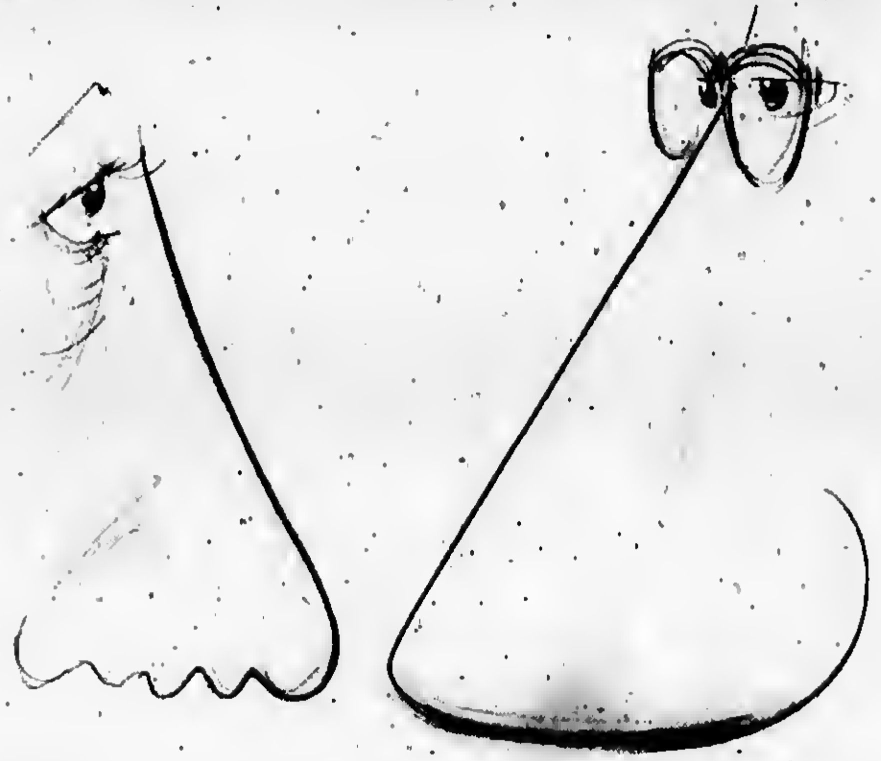

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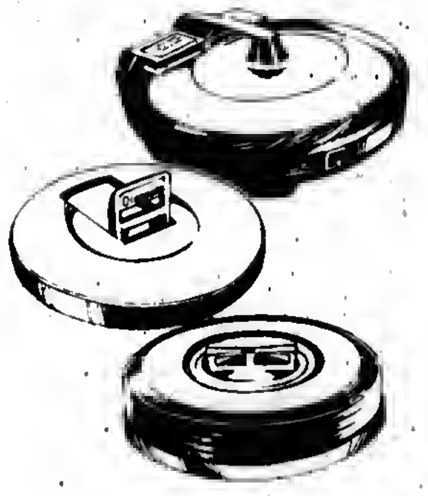

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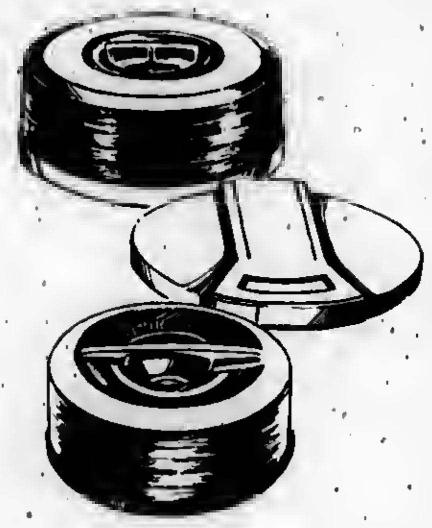

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From IBM as Early as 1980

Industry Seers Expect H Series After E

By E. Drake Lundell Jr.
CW Staff

While industry prognosticators are confident about their forecasts of the E series from IBM [CW, June 6], they are less willing to make predictions about the next series of machines expected from the firm.

All agreed, however, that the next major announcements after the E series will be about what is known internally at IBM as the H series of machines and that these will eventually cover the 370 line from the Model 148 class of machines upward.

But they are less sure about the exact timing of the announcements or the specific characteristics of the machines themselves. The best guesses at present are that the first members of the H series could appear as early as the beginning of 1980.

While IBM is expected to follow a "bottom-up" announcement strategy with the E series (announcing the smallest members of the family first and the larger systems later), an opposite — or "top-down" — strategy is expected with the H machines.

Under this scenario, IBM will announce the largest H machine first. This machine is expected to be larger than the present 3033 and therefore not impact the 30 series machines IBM is now producing. Only later would IBM announce smaller models of the H series.

Several observers expect IBM will leapfrog present technology and use 64K chips in the H series of machines, bypassing 32K chips.

One observer believes the H machines will essentially serve as mid-life kickers for the present 3031, 3032 and 3033 processors and therefore not be radically different in architecture from those machines, which themselves are just improved 370 systems.

At the same time, however, he predicted a system called Sierra is being developed by IBM for announcement in the mid-1980s to replace the entire 30, E and H series. The Sierra system would incorporate ease-of-use features that would make it simple to operate by the ultimate users of the system, he indicated, and would incorporate an entirely new operating system as well as some major hardware advances.

ADL's Gimbel Sees Vendors Geared to Accommodate DDP

By Marcia Blumenthal
CW Staff

CAMBRIDGE, Mass. — Distributed data processing (DDP) is an evolutionary rather than a revolutionary concept, and the hardware for DDP is hardly unique, according to Norman S. Gimbel of Arthur D. Little, Inc. (ADL) here.

Since 1976, many large integrated DP manufacturers have been building enhancements into their systems that incorporate features to facilitate distributed systems, the head of the Distributed Systems Unit of ADL's Information Systems Section said.

Gimbel, who directed a recently completed ADL Impact Services study on DDP, pointed out the manufacturers committed to DDP architecture are emphasizing DDP features such as resource-sharing capability and the ability to support smaller networks in developing their latest data communications products.

Gimbel forecast that the market for DDP products will reach $5 billion by 1983, with integrated DP, minicomputer and terminal manufacturers shipping $4.2 billion. In 1977, he noted, these three categories of manufacturers together shipped only $300 million worth of DDP products.

However, Gimbel cautioned that system enhancements have only been developing since 1976 and, because there has been little field experience in using these products, his predictions have a high degree of uncertainty. He anticipates it will be three years before anyone can predict the future of DDP with a high degree of confidence.

Three Leaders

Gimbel identified IBM, Digital Equipment Corp. and Hewlett-Packard Co. as the integrated manufacturers leading the pack in developing network architecture.

"The network architecture that each of these companies commits itself to is of fundamental importance," Gimbel stressed, "because they will use this architecture as a framework to fill out their product lines for distributed systems usage."

IBM in particular, with its Systems Architecture Network product line, has emphasized DDP and has the resources and the customer base needed to compete in this market, the ADL expert said. "This is a very complex product," he added, "and the development costs for the product are one of the chief market considerations. IBM has a tre-

(Continued on Page 97)

IBM-AT&T Satellite Clash Seen Benefiting Smaller Users

By Brad Schultz
CW Staff

WOBURN, Mass. — A major clash between IBM and AT&T over various data communications markets in the 1980s will benefit small to medium-size consumers of those markets, the president of The Yankee Group predicted here recently.

Rising labor costs combined with plummeting hardware costs will prompt managements to "get that intelligence in the field," Howard Anderson said. It will then make sense for many organizations to establish distributed data processing (DDP) networks, bringing sophisticated communications technology to rather "obscure" outpost facilities where labor is comparatively cheaper, he explained.

The introduction of services from Satellite Business Systems (SBS), in which IBM is a partner, will accelerate this trend among large firms and agencies, Anderson said, noting that only large organizations will be able to afford the $320,000 to $340,000 antenna installations necessary to receive SBS broadcasts.

Yet sales of SBS services will actually expedite sales of the competing Bell Data Network (BDN), he said, because even large organizations will not be able to afford SBS antenna installations at outlying sites; instead, they will be inclined to implement BDN or equivalent communications be-

(Continued on Page 96)

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IBM-AT&T Satellite Battle to Benefit Users

(Continued from Page 95)

tween outposts and central or primary SBS facilities.

The resultant high demand for BDN, IBM's counterpart System Network Architecture (SNA) and equivalent products will drive down the cost of those products, benefiting the small to medium-sized independent or outpost user, Anderson continued.

Important IBM Market

IBM cannot rely too heavily on its office equipment business if the firm is to maintain a dynamic growth rate, Anderson said, pointing out that there are limits to which offices can be automated.

Citing a recent International Data Corp. study on "the office of the future," Anderson said 51% of a typical corporate secretary's work time is devoted to activities "away from the desk" that cannot be simulated by a machine.

IBM must therefore enter the telecommunications industry despite certain opposition on that score from the U.S. Justice Department's Antitrust Division, Anderson believes. In the 1980s, the computer industry will actually become a "subset" of the telecommunications industry, he added.

The cost of computer hardware is sinking fast while the cost of communications is rising fast, Anderson noted, indicating that DDP is basically a reaction against the latter trend.

IBM has "slipped badly" twice in the last 15 years by allowing the emergence of minicomputer and plug-compatible CPU vendors as alternatives to mainframe-bound IBM, Anderson said. Having lost those markets, IBM is not about to pass up the new DDP market, he indicated.

Anderson stated two "precepts" of IBM marketing strategy: "Never let anything get in the way of access to IBM customers" and "Never let anything get in the way of access to IBM markets."

Unless it moves solidly into DDP, IBM could lose a critical portion of its potential business in the 1980s, he said. He added, however, that, on the other hand, AT&T knows it could lose the substance of its business to IBM.

AT&T Move

Independent telephone companies generally operate at a loss within their respective regions, Anderson said. These companies make up this loss with their share of AT&T's long distance call earnings, deriving 50% of their revenues from "AT&T Long Lines," he noted.

SBS electronic mail services threaten to cut sharply into those long distance revenues, Anderson said. Accordingly, AT&T must move into the area of computing or perhaps offer electronic mail itself, he indicated.

However, AT&T is also faced with Antitrust Division opposition, bound by a 1956 consent decree which prohibits its moving into computing.

Anderson thus presented a vision of the world's largest mainframer and the world's largest communications vendor engaged in a marketing "war" while the Justice Department feebly attempts to diffuse both parties in what would be a long process of litigation. The battle will be joined as both firms vie for consumers of controllers, multiplexers, front ends and smart terminal networks, Anderson said, adding that worldwide sales revenues on these product types are currently growing at an annual rate of 300% to 400%.

New Companies

Samson Software Service has been formed to provide programming, consulting and analytical support. Service is available on a national network basis, according to the firm located at Suite 114, 14737 Sherman Way, Van Nuys, Calif. 91405.

Arinco Corp. has been formed as a DP consulting firm primarily engaged in international market and product development projects for computer equipment manufacturers. The firm is located at Suite 112, 105 E. Marcy, Santa Fe, N.M. 87501.

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Wisconsin Kills 4% Sales Tax on DP Services

By Marguerite Zientara
CW Staff

MADISON, Wis. — Wisconsin no longer levies its 4% sales tax on "the sale of computer and data processing services including time-sharing, designing or converting systems, programming, consulting, training, reformatting of data and computer printing."

Gov. Martin J. Schreiber signed Assembly Bill 1220 on May 12, repealing a bill passed in the spring of 1977 taxing those items. The bill taxing processing and programming work was implemented last August, according to Glenn Jacobson, executive vice-president of the Southern Wisconsin Chapter of the Data Processing Managers Association (DPMA), which worked on the issue.

In response to the bill taxing software in Wisconsin, the Committee United for Tax Equity (Cute) was formed late last fall.

Cute is comprised of businesspeople who independently had been trying to fight implementation of the sales tax.

By organizing as Cute, these businesspeople were finally able to introduce a single bill to repeal the sales tax, Jacobson said.

Wisconsin has a two-year budger cycle but, during the in-between year, "mini-budget" bills can be introduced that make amendments, so that some budget work is done every year, Jacobson explained. Cute got enough support in the Joint Finance Committee, which in turn applied pressure on the governor's office, that Assembly Bill 1220 was introduced as an amendment in the mini-budget cycle, he said.

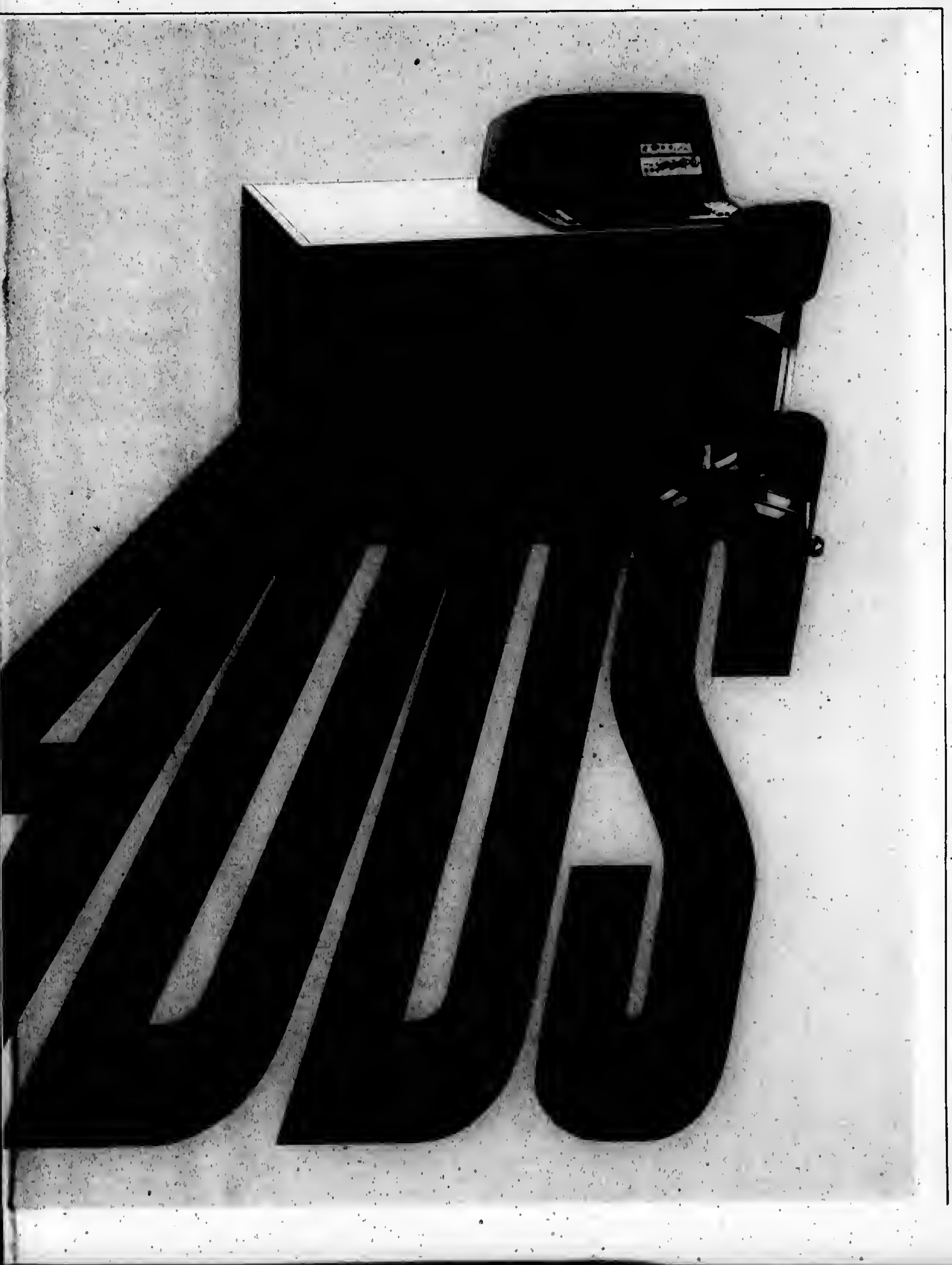
Two major factors helped get the bill introduced, Jacobson said. The tax originally went through because the state needed additional revenue; in 1978 the state had a surplus of almost $450 million.

"It was very obvious that after the first year there was no additional revenue needed," he said.

The second factor was that the brunt of the tax had essentially been borne by small businesses using service bureaus. For that reason, legislators received a lot of pressure from the Wisconsin Merchants Association, which was opposed to the tax. The state was "even taxing any company which operated as a data processing service organization. That meant that in some cases where large corporations had a separate corporation to do their own internal data processing work and were billing out to another corporation, they had to charge their own company the 4% sales tax," Jacobson noted.

According to Jacobson, after the bill was introduced, "it went through without any problems whatsoever.

"I think that we were very fortunate in Wisconsin. We are the first state that I know of to successfully kill the DP tax through the legislative route, rather than going through the judicial system," he added.



Gimbel: Vendors Geared for DDP

(Continued from Page 95)

mendous edge here."

Of the other major DDP market leaders, DEC has its Decnet product line and HP has its Distributed System Network. Both of these companies are currently updating their initial product lines based upon real field experience, Gimbel said, adding both companies are also stressing the marketing of these lines.

A group of other suppliers such as Data General Corp. is holding back, waiting until the smoke clears, Gimbel observed. He made no criticism of this group, indicating this is perfectly rational strategy.

Terminal manufacturers are another group making a significant impact in the DDP market. Today, Gimbel said, the three terminal manufacturers most involved with DDP are Datapoint Corp. with its ARC system, Sycor, Inc. with its 445 Sycorlink and Four-Phase Systems, Inc. with its unique software approach.

Aside from manufacturers, value-added network vendors and remote computing services (RCS) were examined in the study to determine what kinds of products and services they might offer to give customers more distributed capability. The study concluded that RCS firms will probably not offer a product for implementing private networks.

Users are a primary force in propelling the development of DDP systems, Gimbel noted. "The user community is looking for cost-effective DDP networks, and it looks like the products which have been coming along in the past two years are starting to deliver what the user wants," he said.

On the other hand, Gimbel said, there are many users who have systems they have built over the years. These users have put a great deal of money and effort into building their systems, and they are not about to obsolete them overnight.

Rather, the process of moving to DDP systems will be evolutionary as these users gradually update their networks, Gimbel said.

In Products, Markets, Size

Dramatic Changes Cited in Personal DP Area

SAN JOSE, Calif. — The development of the personal computer industry between 1974 and 1977 can be summed up in a word — new; new companies selling new products at new prices to new customers through new channels of distribution.

In the last 12 months, there have been dramatic changes in the personal computer industry, according to a report recently released here by Creative Strategies, Inc. (CSI). Large firms such as Pertec Computer Corp. and Tandy Corp. (Radio Shack) entered the market.

Production capacity rose from 50,000 units to 8,000, including for the first time, stereo and department stores. Radio Shack, with 7,000 stores now carrying computers, accounted for the major retailer growth, the report noted.

Unit shipments for 1978, the report predicted, will rise to 278,000 from 43,000 systems shipped in 1977. By 1982, the personal computer segment of the industry will have grown to $3.5 billion, having started from virtually zero in 1974. Software packages and peripherals will constitute a large percentage of the overall revenues.

Nine Market Segments

The study identified nine major market segments: six for nonhome use and three for home use. Nonhome users include very small businesses, low-end business applications, self-employed professionals, scientists, educational institutions and industrial applications.

Because of the acute need for DP power in small organizations, the market for personal computers in the small business sector is expected to top $1 billion by 1982, the report concluded.

On the other hand, the home usage sector is made up of hobbyists, home programmers and consumers. CSI defined the hobbyist as a person who likes to assemble the hardware but who has little interest in learning to program. The report suggested that this market has already peaked.

Of more interest were the home programmers — people willing to invest time in original programming and debugging — and consumers, those users who are interested in specific purchasable application packages. Researchers noted, however, that the distinction between these two segments is diminishing.

The ultimate number of prospects for home applications was a major question addressed by researchers. After interviews with more than 100 industry participants and five consumer surveys with members of various social groups, CSI concluded that the true home market for personal computers is 20 million households out of a total of 77 million.

Overall, the personal computer will not change society, the report suggested, but will be integrated into the life style of a specialized group of consumers. Demographic characteristics of this group included households that consist of professionals, technicians and managers who have some college education and an adjusted gross income of more than $15,000.

Competition for both sectors of the market will come from a variety of directions. Researchers stated that entrants will primarily be consumer electronic firms and manufacturers of intelligent terminals, minicomputers and office equipment.

Texas Instruments, Inc. will become the dominant force in the industry by 1979, the report contended. Semiconductor dominance, consumer retailing experience and a strong brand image were identified as some of the factors contributing to TI's future market strength.

IBM will not be left out in the cold, the study maintained. The giant will by-pass the home market sector, capitalizing on its direct sales force and worldwide reputation for service to capture a large share of the nonhome market.

The study, "Personal Computing," is priced at $695 and is available from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

DSI to Market Series/1 Basic

DENVER — DSI, Inc. has acquired exclusive marketing and licensing rights to the Basic/1 language system for IBM Series/1 minicomputers, according to Larry Johnston, DSI president.

"The Basic/1 interpreter fills a real need for IBM's Series/1 software accessories," Johnston said, "and our marketing efforts were designed to dovetail with IBM's Series/1 marketing."

The firm, which originally became involved with the Basic/1 system as a supplier of Series/1 turnkey systems, acquired North American licensing rights from the original developer of the Basic/1 system, Graham Computer Enterprises. DSI will honor all Graham Computer Enterprises licensing commitments.

Foreign licensing rights have been awarded to Gulf Computing, Kuwait, DSI reported.

INTRODUCING
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Average Upkeep Costs Pegged at 7.6% of Budget

PENNSAUKEN, N.J. — DP users in the business sector spend an average of 7.6% of their annual DP budgets on maintenance, according to a survey recently released by Alltech Publishing Co.

However, the study noted that there is a great difference in the cost of maintaining computer installations, with maintenance budgets ranging from .2% to 31.5% of the annual DP budget.

The four-volume study, "Maintenance Considerations in the Information Handling Marketplace," also detailed maintenance requirements for the personal computing and federal government sectors.

The business segment of the study was drawn from interviews with 54 user organizations, 23 equipment suppliers and 16 third-party maintenance firms.

Of the 54 user installations surveyed, 92.9% used maintenance services supplied by CPU manufacturers, the report stated.

Interestingly, the report concluded that maintenance personnel have a significant influence in the sale of computer equipment. The data indicated that 20% of the users surveyed purchased equipment based on advice given by maintenance personnel.

Manager's Burden Increased

However, as DP managers are increasingly finding their systems configured with components from multiple suppliers, they are required to take a greater role in managing their installations rather than relying on equipment suppliers to perform that function by default. The mixed-vendor environment is a key problem area currently facing many users, the report said.

The majority of user respondents rated their overall maintenance services satisfactory. However, six users (10% of the sample) rated maintenance unsatisfactory, which, according to Alltech, presents an important opportunity for third-party vendors.

Respondents cited two significant advantages in using third-party maintenance firms. First, the user can install peripheral equipment other than that manufactured by the CPU supplier. Second, a competitive situation develops, causing the user organization to receive better vendor performance.

The study examined maintenance considerations from the perspective of the user, equipment suppliers and maintenance vendors. The four volumes include an executive summary of the entire study (Volume 1), a marketplace overview and an analysis of the personal computing sector (Volume 2); a discussion of maintenance considerations for the business DP sector (Volume 3); and a description of the maintenance of DP equipment installed in the federal government (Volume 4).

The study costs $6,000 and is available from Alltech Publishing Co., 212 Cooper Center, North Park Dr. and Browning Road, Pennsauken, N.J. 08109.

Acquisitions

Sun Information Services Co. has acquired all of the stock of **The Weiland Computer Group, Inc.**, a privately held company based in Oak Brook, Ill. The Weiland group will operate as an independent subsidiary.

On-Line Systems, Inc. has purchased **Bili Associates, Inc.**, a software and consulting firm based in Boston. On-Line Systems has created a project management division to be staffed by the members of Bili and some additional On—Line Systems personnel.

U.S. Datacorp has announced that a tentative agreement has been reached to acquire **Micromation Corp.**, a computer output microfilm service company headquartered in Miami, Fla. Terms of the sale were not disclosed.

Control Data Corp. has acquired the assets of **Computing Associates, Inc.** of Tucson, Ariz. The firm will become part of CDC's Professional services Division. Terms were not disclosed.

McGrawHill, Inc. has acquired the assets of **Edutronics Systems International, Inc.**, a subsidiary of Coleman American Companies, Inc. The purchase was for an undisclosed amount. It will operate as a division of the McGraw Hill Book Co. Under a licensing agreement, Coleman American will continue to market Edutronics products and services in a number of foreign markets for several years.

Tymshare, Inc. has acquired the business and assets of **Autotax**, a privately owned publisher of business and tax publications.

Network Analysis Corp. has acquired **SRA Communications.** SRA was formally owned by a subsidiary of Automatic Data Processing, Inc.

Itel Corp. has agreed to acquire **Health Control Corp.** of Dallas, Texas, for an undisclosed number of shares of Itel Stock.

Tymshare Inc. and **Medical Information, Inc. (MII)** have reached an understanding for the acquisition of MII by Tymshare. Completion of the acquisition is subject to final contract approval.

Xitan, Inc. has purchased the assets of **Technical Design Labs, Inc.**, a firm that caters to the personal and hobbyist computer markets.

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Executive Corner

- Donald W. Fedderson has been appointed president and chief executive officer at Application, Inc.
- Albert P. Francis has been named vice-president, Plato business office, for Control Data Education Co.
- Rigdon Currie has been appointed to the new position of vice-president of business planning at Diablo Systems, Inc.
- Dr. Warren C. Tyler has been named executive vice-president for Data Terminal Systems.
- John W. Burger has been appointed director of communications systems for General Dynamics communications Co.
- David Nielson has been appointed vice-president and regional manager at Greyhound Leasing and Financial Corp., Phoenix. Joseph J. McCusker has been appointed assistant vice-president of the Dallas office; William H. Valler, New York office; Kenneth B. Giddes, Atlanta office and James P. Dugan, New York office.
- Allen R. Heimer has been promoted to president of Cobaloy Co., a division of Graham Magnetics, Inc., and to vice-president and quality assurance manager of Graham.
- James A. Oles has been named sales manager of CMI Corp.
- Stanley J. Knight has been appointed assistant to the president at Inforex, Inc.
- Cognitronics Corp. has announced that David Shepard has been elected to the new post of chairman and William J. Lawless Jr, has been elected president. Ralph Palmero, together with Shepard and Lawless, will constitute the "corporate office."
- J.H. Smith has been elected chairman of the board of Warrex Computer Corp.
- Robert G. Fritsky has been appointed vice-president of marketing at Continental Computer Leasing Corp.
- Martin J. Weisberg has been named director of marketing at Millennium Systems, Inc. ,
- Wesley V. Winsor has been appointed a vice-president of Information Sciences, Inc.
- Salvatore Brucculeri has been named controller of Mathematical Applications Group Inc.
- Peter F.W. Raiswell has been named vice-president of administration at Threshold Technology, Inc.
- William W. Chorske has been elected a senior vice-president of the Perkin-Elmer Corp. Chorske recently was appointed general manager of the company's Data Systems Group.
- Dr. James Cunningham has been named head of National Semiconductor Corp.'s magnetic bubble memory operation.
- Bob L. Buatt has been promoted to vice-president of customer services for Informatics Inc.'s Equimatics Division.
- Krishna V. Srinivasa has been elected president and chief executive officer of Programmed Closing Systems, Inc.

Foreign Orders & Installations

Shell International Petroleum Co. has installed two Univac 90/30 systems in its DP facility in the Shell Centre, London.

The Aerospace Division of Saab-Scania AB has ordered a SEL 32/75 system from Systems Associates AB, the Swedish agent for Systems Engineering Laboratories, Inc. The system is valued at $250,000.

A Univac 90/30 system has been installed by Erik Myhre's Travel Agency, the joint owners with Braathens, a Norwegian airline.

Barclay's Bank has ordered 100 self-service financial teller terminals valued at $3 million from NCR Corp.

Spain's largest bank, Banco Espanol de Creditor, headquartered in Madrid, has ordered a large-scale system from Univac valued at $4.6 million.

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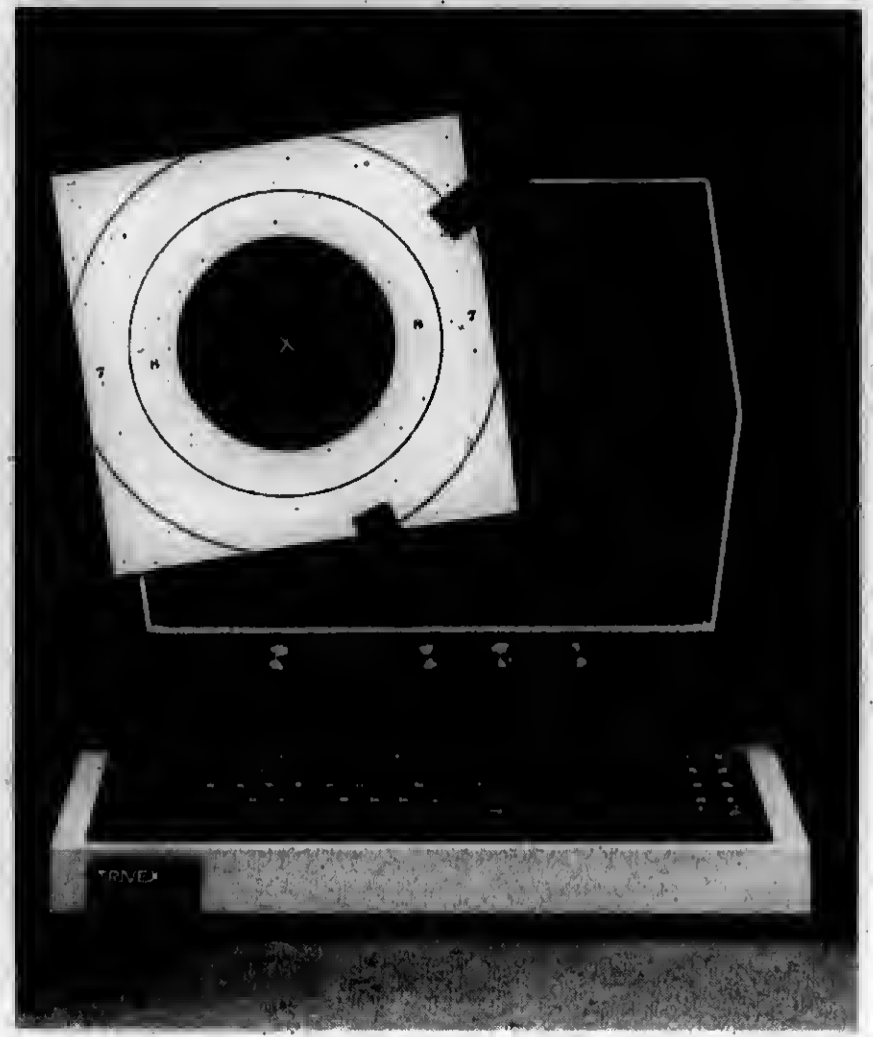

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5. Are there one or more special functions you need to make your job a lot easier?	☐	☐

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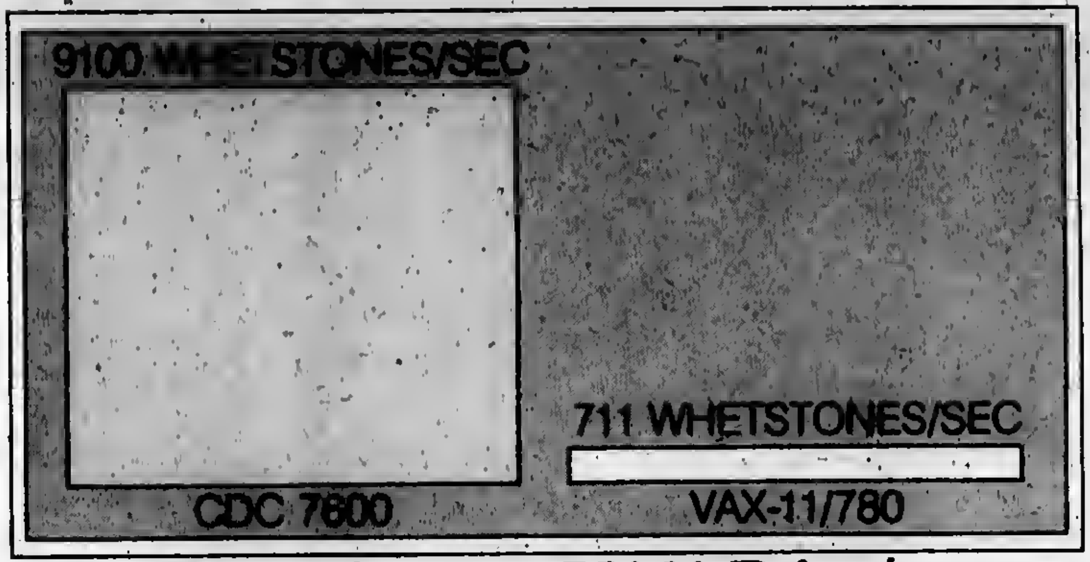
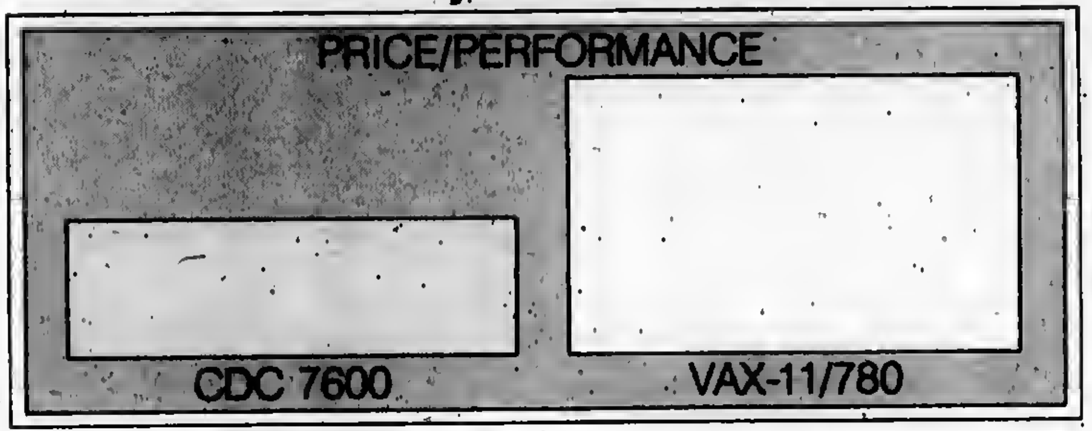
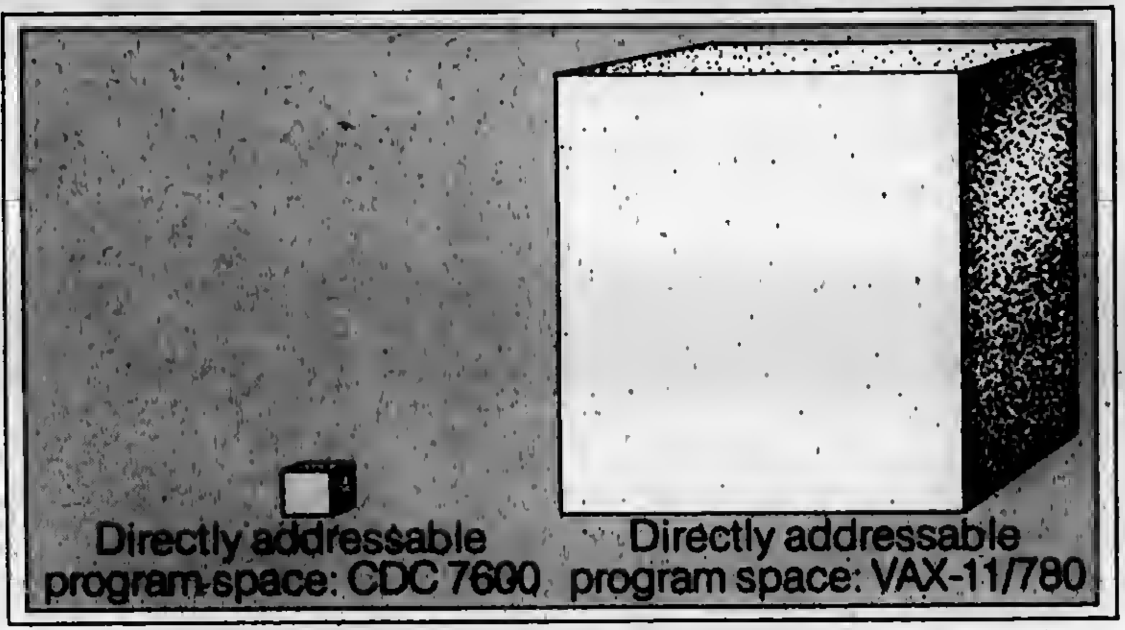


Round two to VAX: Price/Performance. The 32 bit VAX is the world's fastest mini. A $141,000 VAX system runs 711 double precision Whetstones. That's one twelfth the speed—at one twenty-fifth the cost. A dozen VAX systems could equal the throughput of one 7600—and you'd still save literally millions of dollars.





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These positions require innovative, creative persons to analyze various segments of the electronic measurement or computer graphics market, define business opportunities and provide marketing programs to best utilize our resources.

Career background elements include test equipment sales or sales management, specific market development activities, electronic engineering competence plue marketing education.

Send detailed resume and salary history to Art Andersen, TEKTRONIX, INC., P.O. Box 500, W65, Beaverton, Oregon 97077.

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SYSTEMS ANALYST: Duties include helping to install and maintain operating systems in a customer site environment. Good communication skills are essential.

Both positions require 3 to 5 years experience and a college degree. We provide an orientation program in Minneapolis. These positions offer excellent growth opportunities, salary and company benefits. Send resume and salary history in complete confidence to:

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GM

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General Motors Corporation has several openings for career minded people in its Information Systems Activity located in Detroit, Michigan. These positions require a college degree, preferably in Computer Science, Math or Engineering, or equivalent working experience.

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If you are interested in working in a new and rapidly expanding science, an exciting challenge exists in the area of computer performance and capacity measurement. Candidates should be familiar with the OS/MVS operating system, hardware and software interface requirements, and possess skills and abilities for researching, investigating, and analyzing.

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Candidates should be experienced in the development of systems functioning in a timesharing environment with an emphasis on MULTICS, GTSS, or DTSS as well as a working knowledge of Fortran, BASIC, PL-1, or CDBDL.

Programmer/Analysts

Candidates should be experienced in COBOL, or PL-1. Proficiency in the use of IMS or CICS and Structured Programming is desirable as well as experience in areas such as Personnel, Payroll, Financial, Marketing, Logistics, Material Control, or Specifications systems.

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Experience required in an IBM Hardware and Software environment including PL-1 or FORTRAN, TSO or similar remote programming facility, and a working knowledge of statistical software programs such as SPSS.

General Motors offers career growth and development as well as an opportunity to work with the most recent state-of-the-art hardware and software. Please send your resume and salary requirements in confidence to:

General Motors Corporation

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San Francisco Peninsula

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To qualify, you must have a degree in accounting, industrial engineering or computer science (with MBA desirable) and 5 years' experience in EDP auditing or systems analysis. Knowledge of COBOL and Mark IV would be an asset. Must have the ability to work with all levels of management.

At Varian, we provide stable jobs, competitive salaries and benefits, plus excellent opportunities for personal recognition and advancement.

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If you meet these requirements, we'd like to talk with you.

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A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:

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- Who has excellent communications skills.

If you have the experience and are interested in this growth position, we want to speak with you.

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The Education Center has a rewarding and challenging opportunity for a person who has been successful in sales and has the ability to train salespeople in product and skills. This is a highly visible position which requires a person to have:

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Applicant must be aggressive, self-motivated and have ability to communicate effectively with users.

These are growth opportunities with an industry leader, offering excellent starting salaries and a very comprehensive benefits package. In addition, the living and recreational opportunities offered by this intermountain west location are outstanding.

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3 - 5 years experience as P/A with commercial/construction industry oriented applications. Distributed processing environment desires T/C background.

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Please send your resume in complete confidence, including current salary and position desired, to: Director, Software Products Division. Or call 609-921-8550.

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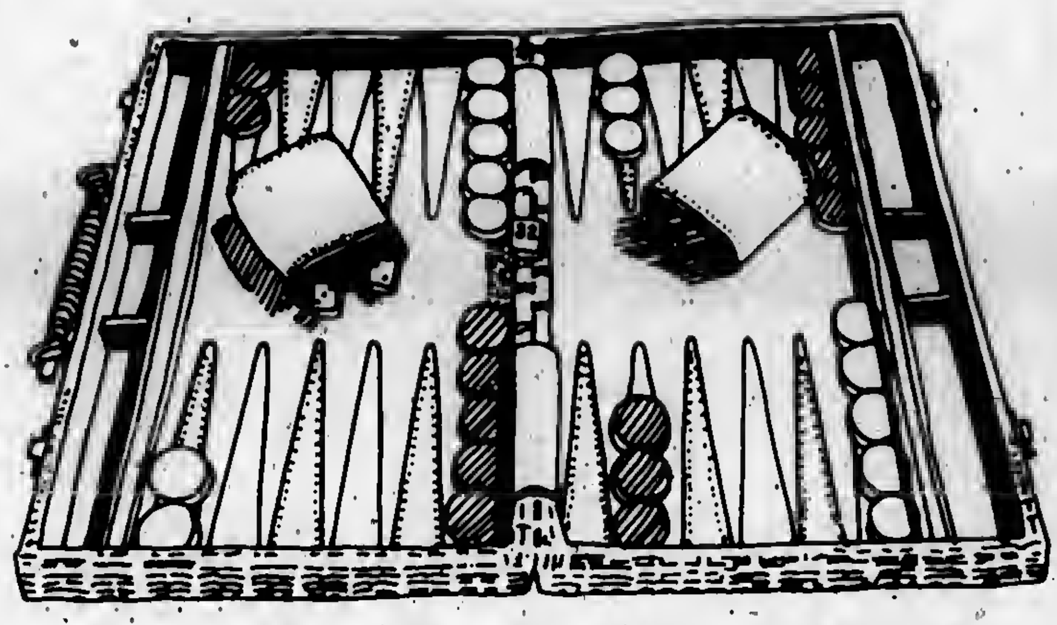

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At Gillette, there's a lot more going on than you may have known. In addition to our personal care line (which we know you know about), we make our living by manufacturing and selling some of the best photographic equipment, writing instruments and appliances on the market.

But there's even more to Gillette than successful products. There's an extremely challenging and innovative environment for data processing professionals.

Right now, our thrust is toward the development of network distributive processing, with on-line office automation, electronic mail, and a sophisticated system of satellite business offices. To effectively develop and implement our effort in this direction, we need people. People who are good at what they do. People who are good at the following:

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Our hardwere consists of IBM 370/158 operating under OS/SVS and a DEC System 10. The IBM 370/148 and several PDP 11's are scheduled for installation as we enter network distributive processing.

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If you're up to our standards end would enjoy an opportunity to share your expertise with others in your field, we will essign you immediately to responsibilities es e course developer, lecturer, workshop leader, or tutor (working with students on a one-to-one basis).

To qualify you will need excellent interpersonal and communication skills and e solid background in COBOL end JCL/Utilities. Experience in the following areas would be beneficial: TSO, VSAM, IMS, ALC, Mark IV, or Top-down design/structured progremming.

Prior teaching experience is prefarred but not mandatory.

In return for your technicel know-how we offer an excellent package of compensation that includes top benefits and exciting potential for growth. For confidential consideration, please send resume end salary history to: Elaine Ridley, 400 N. Capitol St., Washington, D.C. 20001. An Equal Opportunity Employar M/F.

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Large Nat'l Corp. based in S. Fla. is expanding. Positions require experience as software support to a IBM 370/OS VSI computer. MVS is most desirable. Macro coding is e plus. Need people who can't stand idleness. Salary to 20 to 24K.

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Qualified candidates should have relevant project management responsibilities for highly integrated systems requiring extensive user interface and consultation with industry and functional management consulting specialists. Measurement of performance will include ability to recruit and train consultants and develop long range plans for the continued growth of a technical data processing consulting group. These opportunities are:

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Assume overall technical management responsibility for the design, development and implementation of a large scale utility billing and accounting system. Hospital business systems development is also desirable.

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PROGRAMMER/ ANALYSTS

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Duties
To manage the design and implementation of internal marketing systems to support all aspects of the marketing/sales function including:
- advertising effectiveness system
- sales activity management system
- product planning/forecasting system
- order entry system
- sales reporting system.

Experience/background
The successful candidate must have 5 - 7 years in information systems function including
- 3 - 5 years project management experience
- successfully implemented at least two major marketing/sales systems
- 2 - 3 years experience with multinational operations
- 1 - 3 years experience with distributed systems based on mini-computer technology.

Duties
To manage the installation and develop the policies and procedures for data processing operations in all subsidiary offices as well as European headquarters.

Experience/background
The successful candidate must have experience with
- minicomputer operations
- data communications
- effective operations workflow
- data processing standards, policies, procedures
- installation planning.

Duties
To
- establish and organize data processing operations for German, Swiss, and Austrian subsidiaries
- develop specifications for systems in marketing, field service, and general administration
- install and maintain all systems
- support the growth of the central Europe operations through management of all information systems and data processing resources.

Experience/background
The successful candidate must have 5 - 7 years in information systems function in Sales/Service organization including
- 3 - 5 years project management experience
- direct responsibility for data processing operations
- successfully installed 2 - 3 major systems.

If you need further details call Jan Cederlund - Tel. No: 766.51.78 & 924.21.33.

Interested? Send your CV and also indicate what position you are interested in, salary level and contact telephone number to:
Jan CEDERLUND, EUROPEAN EMPLOYMENT MANAGER, DATA GENERAL EUROPE, 61, rue de Courcelles 75008 PARIS (France).

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Data General

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Salary commensurate with experience & ability. Comprehensive benefit package. Mail resume to: Carl Jocobs, Employee Relations,

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The successful candidate will have a combination of seven or more years operational management and data processing experience in systems, operations (including scheduling, planning and design) and programming in a job shop environment. Direct experience in managing a multiple 360/370 computer installation required, with language capability in JCL, BAL, etc. necessary. This generalist should possess academic background in business and computer science.

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Minimum qualifications: extensive programming experience (PL/1 preferred), knowledge of basic statistics, experience using computer-based statistical packages, supervisory skills, bachelor's degree.

Salary negotiable, based upon training and experience, send salary requirements. Date of appointment: 1 August 1978. Date of application: 28 June 1978. Submit application materials to:

William E. Ceshin, Chairperson, Search and Selection Comm., Center for Faculty Evaluation and Development in Higher Education, Kansas State University, 1627 Anderson Avenue, Manhattan, KS 66502.

Interested applicants are urged to telephone (800) 255-2757 or (913) 532-5970 for further information.

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- SENIOR SYSTEMS PROGRAMMERS you should have four or more years' EDP experience in installing and maintaining IBM's operating systems (OS or VS) or equivalent experience supporting an IMS DB/DC environment. VTAM experience a plus. System performance monitoring and tuning is part of this job.

If you seek a challenge and are ready to advance, send a detailed resume with salary history in strictest confidence to:

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Unlike other CPU manufacturers, we produce "turnkey" systems. We develop and sell the whole package, from hardware and OS, right down to the applications software. If you want to be the complete "Renaissance Computer Pro", we're the company that can turn you into one.

In NCR's mini-computer Engineering and Manufacturing, Wichita, programmers and analysts are in continual collaboration with design engineers. They work together in task teams on projects like state-of-the-art systems management, automated software development, shifting higher capabilities down to smaller computers, distributed data processing . . . and a dozen other areas. Everyone gets to work on every phase of development and application. Our more flexible methodology will give you wider involvement than you've ever known before.

And you'll find more than a fast-paced, "ample-room-at-the-top" environment and showcase facilities. Wichita is non-stressful . . . relaxed . . . neighborly.

With a metropolitan population of almost half a million, it is still a place where in 10-15 minutes of light traffic driving you can be home in a fine community. A place where you can walk safely at 10 o'clock at night, and soon know hundreds of people by their first names.

Want "to come do it all"? The following career opportunities are as wide as Kansas itself:

Senior Programmers/Systems Analysts

Those are high level positions, several involving group leadership and technical direction. You may work on development of software architecture and OS implementation for new-generation mini-computer systems, or on maintenance of support tools for existing systems. You have experience in real-time systems design ranging from 2-7 years, using languages like Pascal, SWL, Fortran, PL-I, Snobol, Assembly. BS or MS in Computer Science is desired.

Programming Consultant/Analysts

These positions call for extensive experience (5-10 years) in OS design and engineering, sufficient to provide technical leadership in division software design projects. One assignment involves development and promotion of compatibility-migration strategies for NCR's family of interactive small computers. MS in EE or Computer Science desired.

Programmers — DBMS

Design, code, test, support data base management systems for NCR's interactive small computer systems. Openings for recent graduates, with MS in Computer Science preferred.

Programmer Analysts

The work involves test planning, performance measurement, and integration of COBOL software for small computers. You may also lead design effort in system simulation. Requires BS in Computer Science or EE, preferably MS, with 1-4 years experience in software development.

QA Analysts

Investigate software problems to satisfy quality assurance requirements. Coordinate with module developers, QA, and marketing. Requires Computer Science degree (MS preferred) with 1-4 years experience in software development and use of assembly language.

Diagnostic Programmer

Develop diagnostic programs for NCR systems, involving logical and physical I/O for overlay drivers. Need 2+ years in assembly language diagnostic system development, working with mag media formatting and drivers. BS in EE or Computer Science with emphasis on digital systems and machine level programming.

Programmer Analysts

Provide support for utility modules for NCR's small computer systems, including design, code, document, test for source/functional compatibility. Ability to plan and document test procedure, and monitor through release, interfacing with hardware, software, and marketing people. Requires Computer Science degree (preferably MS) with openings for recent graduates. Special requirement for one position: knowledge of CDC operating systems for support of CYBER leased service.

Programmers

There are assignments for OS and compiler programmers. Some will implement OS modules, involving design, code, test, and document for development and maintenance tasks. Compiler programmers will engage in support and improvement of compilers on related software. Generally, these jobs require knowledge of high level languages and some experience in assembly language programming. Requires BS in Computer Science; openings also for new graduates with BS or MS in Computer Science.

Please send resume, indicating both position of interest and salary history, to: **Mr. Jerry Long, Manager, Professional Recruitment, or Rick Veldhouse, Professional Recruiter, NCR Corporation, Engineering and Manufacturing, Wichita, Kansas; (316) 667-6192.**

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INSTRUCTOR

Computer Hardware

At CRAY RESEARCH INC, we design, build, market and support Super Scale Computers used in scientific applications. We currently have an outstanding opportunity for a talented computer hardware instructor.

This person will be instrumental in all phases of developing courses for customers and employees. The applicant should have a minimum of 2 years teaching experience and 2 years maintenance on large scale computer systems. Writing exposure is a plus. Location is Chippewa Falls, one of Wisconsin's most attractive and scenic recreational areas.

This position offers excellent growth potential, salary and company benefits. Send resume and salary requirements in confidence to:

T.V. Lotzer
CRAY RESEARCH INC.
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The qualified candidate possesses a minimum of 2 years COBOL programming experience and at least 1 year in systems design including team leadership responsibility for major system development.

PROGRAMMERS

A minimum of 2 years COBOL experience on large scale hardware will qualify you for this challenging, growth-oriented position.

We offer an excellent salary and full benefits including profit sharing and cash bonus. So if you're ready to take the bull by the horns, come to Iowa Beef - where your skills are challenged and your achievements recognized. Send your detailed resume with salary history and requirements, in strictest confidence, to: Manager Professional Employment, IOWA BEEF PROCESSORS, INC., P.O. Box 3350, Sioux City, Iowa 51101.

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NBC

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NBC is expanding its telecommunications systems group and has an immediate need for 2 Senior Telecommunications Systems Analysts. These positions offer you the opportunity to participate in the continuing development of a sophisticated nationwide distributive communications network.

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Energy Management Systems Programmer Operator

Challenging new position open in sunny Albuquerque to project manage a dual EMS Computer System to be operational in 1979. Responsibilities include approval of manufacturer developed software and hardware documents consistent with contractual guidelines and project objectives.

Upon completion of system acceptance testing and field integration, the Programmer will develop new power applications programs and other programming techniques, while being responsible for on-going software maintenance.

Applicant should possess a background in, or knowledge of, Electric Utility Power Operation and be experienced in Assembly, Fortran and other computer languages.

If interested, please send resume, salary history and reference to:
Plains Electric Generation and Transmission Cooperative, Inc.
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University of Southern Mississippi

Dept. of Computer Science and Statistics

Faculty positions are available beginning September, 1978.

Rank: Instructor or Assistant Professor Areas of Interest: Programming Languages, Operating Systems, Data Base Design, computer hardware and advanced software topics. Candidates are expected to have either a M.S. or Ph.D. in Computer Science or other closely related fields. Persons wishing to be considered should send their resume to Danny R. Carter, Box 106, Southern Station, Hattiesburg, MS 39401.

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Develop Application Software for worldwide Manufacturing/Wholesale Distribution needs at NCR's Corporate Headquarters.

Here's an exceptional opportunity for you to enjoy unusually high visibility with a strongly software-oriented major computer manufacturer.

NCR's worldwide headquarters in Dayton, Ohio has wide-open career paths for upward-bound Systems Analysts with 3 or 4 years of experience utilizing COBOL in either a manufacturing environment—developing bill of material or inventory control systems—or, in a wholesale distribution environment—developing order processing or inventory control systems.

And you'll not only find a highly competitive, fully commensurate salary and comprehensive benefits at NCR, you'll have an opportunity to be involved in every phase of software development and application. Very few systems professionals anywhere will have equivalent diversity, visibility, and upward mobility.

To investigate this opportunity in Dayton—a city that offers many of the cultural, recreational and educational attractions of a large city with the friendliness of a town—send resume promptly to: Mr. Ronald G. Garman, Executive & Professional Recruitment, NCR Corporation, Dayton, Ohio 45479.

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LOS ANGELES, CA
8616 La Tijera Boulevard
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213-642-2462

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408-866-3186

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2000 West Loop South
77027
713-965-5666

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SYSTEM DESIGNERS PROGRAMMER/ANALYSTS

The Denver, Colorado office of a well known leader in public policy analysis and research has multiple openings at all levels of system design and programming. We are seeking creative, intelligent people who will respond to, and grow with, challenging opportunities. Candidates backgrounds must include:

- **Broad background in computer technology, including on-line environments, dete base design, dete structures, acess techniques, etc. (Telecommunications experience is desireble).**
- **Solid experience with commonly used high level progremming languages. (Programmer candidetes should be experienced in 370 OS COBOL).**
- **Experienca in systems design, especially large, complex, integrated applications, is required for systems analyst applicants.**
- **Experience with minicomputer hardware, operating systems, end programming languages is desirable.**
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Projects include innovations in administrative automation of public welfere programs in severel states. These systems will be distributed, interactive, with an extremely flexible software design.

Candidates can expect salaries ranging from $17,000 to $30,000, and growth commensurete with quelifictions and contributions. Please send resume, with salary history, to:

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If you are planning to attend the NCC, please contact Ms. Pamela Tarwater at (303) 837-1500 to arrange a meeting in Anaheim.

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We are now entering our second phase of growth in the rapidly expanding computer peripheral business area. If you missed the opportunity of joining a winning team during our earlier growth and expansion, we are now offering a new opportunity to join a company who pioneered the computer peripheral field. Rapidly expanding technologies and growth of our product lines have created immediate career opportunities for highly motivated professionals to work in a creative and challenging environment within our Advanced Development Laboratory.

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All positions offer fully commensurate salaries and opportunity for rapid and sustained growth. Benefits—including medical/dental plans, tuition reimbursement, profit sharing and retirement—are outstanding.

Washington, D.C., Interviews
Are Now Being Scheduled for
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For further information, call collect Jerry Speno (415) 786-5089.

Or rush your resume including salary requirements to:
Jerry Speno, Supervisor,
Professional Employment, Dept. IM, Diablo Systems, Inc., 26460
Corporate Avenue, Mail Station
D-101, Hayward, California 94545.

If you do not have a resume handy, please fill out the coupon and mail it to Mr. Speno's attention.

Please Print:

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To $25,000 Ranga

Unusual opportunity in Smokey Mountain area of East Tennessee. Need DP pro for expanding $50mm corporation. Will give guidance and direction for future growth, systems and vendor selection. Prefer 5 years experience plus in systems development, manufacturing/business applications with good user interface ability and a burning desire to succeed in a ground floor opportunity.

Project Leader
$22,000 to $25,000 Range

Tennessee based division of Fortune 200 corporation needs project leader for leadership and direction of new and existing systems. Prefer large IBM mainframe experience from manufacturing, retail or distribution environment. Report to MIS. Should possess good oral communications skills and management interface ability. This is a staff position.

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Send Resume or Call
Contact Jim Morgan
EXECUTIVE PERSONNEL
CONSULTANTS
5050 Poplar Ave.-Suite 1601
Memphis, TN 38157
(901) 761-4560

Programmer Analyst

We seek a qualified individual to fill this key position in our Richmond headquarters. Will assist in the analysis, development and programming, of computer systems. Prepare necessary systems and program documentation. Must be able to communicate effectively with users; and program proficiently in COBOL. BASIC and Teleprocessing a plus. Degree preferred with experience in programming and systems analysis.

Liberal starting salary. Excellent benefits.

Reply in writing stating qualifications to A.J. Falco, Personnel Manager

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Computer Systems

Opportunities exist for softwere engineers to work with minicomputer systems in a real-time environment. These engineers should have 2-5 years experience end a BS or MS in engineering, physics, math, computer science, or equivalent. Assembly language and FORTRAN experience is required. Experience with IBM 370 JCL, FORTRAN and PL1 is desireble.

SOFTWARE ENGINEERS
Computer Systems

We offer qualified engineers involvement with minicomputer systems in a real-time environment. Candidatas should hava a BS or MS in computer science, physics, engineering, math, or an equivalent degree, plus 1-2 years of assembly language and FORTRAN experience.

SENIOR DIGITAL ENGINEERS

These positions offer involvement from system to final hardwara dasign in a combined hardware/software atmosphere. Working with mini and micro computers, you will develop special purpose digital computer hardware to process data from alectro-optical camera systems. You must hava a BSEE or MSEE, or equivalent, plus 2-5 years experience in TTL and ECL design.

DIGITAL ENGINEERS

In a mini/microcomputar atmosphere, these engineers will be designing special purpose digital computer hardwara. Qualifiad candidates will have 1-2 years experience in the dasign of TTL and ECL circuits.

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You'll be working on large software packages in an IBM 370/158 VS1 terminal-oriantad system anvironment. If you hava a BS or MS in anginaering, physics, or mathematics, plus axperiance with optical, alectro-optical, structural, or thermal software applications, this is the sort of challange you'll appreciate. 2-5 yaars experience with FORTRAN and JCL utilizing an IBM 370 is required. PL1 axperience would be helpful.

For an appointment, call Larry Curtin, at (617) 276-2950 or send your rasuma, including present salary, to Larry Curtin, Employmant Manager, ITEK Optical Systems, A Division of Itek Corporation, 10 Maguire Road, Laxington, MA 02173.

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(Will Train)
To $20,000 Range

Large southern energy products corporation needs qualified programmer/systems analyst to train for EDP audit position. Prefer large IBM mainframe experience in programming/design of computerized accounting systems. Outstanding benefits and career opportunity with dynamic expanding corporation. No EDP audit experience or travel required. Contact Jim Morgan.

Sr. Systems Programmer
To $22,000 Range

Leading Mid-South corporation needs DP pro for software development in new systems implementation. Prefer IBM 370, OS, systems programming experience with good communications and interface ability. Report directly to MIS. Advance into staff management position. Contact Jim Morgan.

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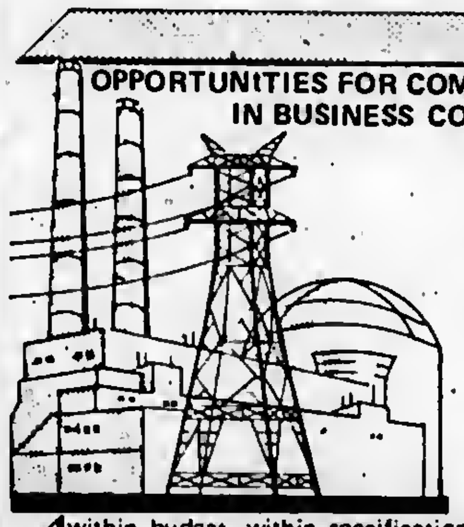
DIRECTOR OF COMPUTER SERVICES
COLBY COLLEGE

Applications are invited for the position of Director of Computer Services at Colby College. The position is available immediately. The Director will have overall responsibility for planning and directing the data-processing activities of the College, including management and development of PDP 11-based administrative systems as well as academic program. Preference will be given to candidates holding an appropriate advanced degree and having several years experience in a computer center at an academic institution. Salary and benefits competitive. Send resumes including names of three references not later than June 16, 1978 to: Paul G. Jenson, Dean of Faculty, Colby College, Waterville, Maine 04901. An Equal Opportunity/Affirmative Action Employer.

OPPORTUNITIES FOR COMPUTER PROFESSIONALS IN BUSINESS COMPUTER APPLICATIONS:



ANALYST PROGRAMMERS

Wa have openings for experienced individuals who have a proven track record in large applications systems using advanced IBM 370 hardware and software technology. If you desire to help us ready for the 1980's, if you produce quality systems on time, within budgat, within specifications, you may lika the challanges.

TP EXPERIENCE

Our TP project has openings for experienced persons who seak to further their learning in the 370 MVS TP anvironmant. Tha persons who have mora than one year of solid track racord in one or more of tha following should apply: CICS-VS, 370X NCP or emulator, VTAM/SNA, TCAM, BTAM. A technical leadership position is also availabla for an individual with two years of heavy axperience in TP software and the ability to combine tha components of a multi application on-line anvironment into a cohesive action plan.

Please apply in writing with educational, employmant end salary history to:

Mrs. Linda Heidenis

NORTHEAST UTILITIES
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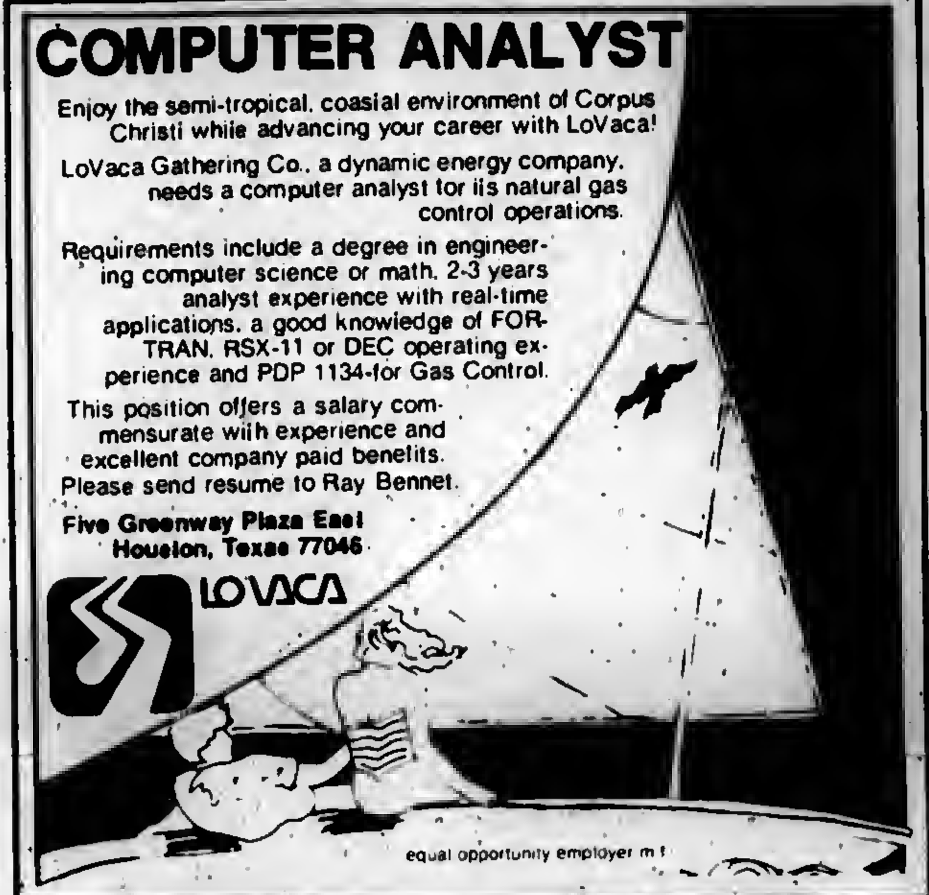

COMPUTER ANALYST

Enjoy the semi-tropical, coastal environment of Corpus Christi while advancing your career with LoVaca!

LoVaca Gathering Co., a dynamic energy company, needs a computer analyst for its natural gas control operations.

Requirements include a degree in engineering computer science or math, 2-3 years analyst experience with real-time applications, a good knowledge of FORTRAN, RSX-11 or DEC operating experience and PDP 1134-for Gas Control.

This position offers a salary commensurate with experience and excellent company paid benefits. Please send resume to Ray Bennet.

Five Greenway Plaza East
Houston, Texas 77046

LOVACA

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COLORADO
Computer Science Professionals

The Solar Energy Research Institute, located in Golden, Colorado is a private research institute charged with expediting commercial applications of solar energy.

To meet this responsibility, SERI is seeking programmers and analysts to assist in the development of a comprehensive solar energy information bank. Successful candidates will have designed and/or implemented on-line information data base applications utilizing relational or inverted file DBMS's such as: ADABAS, BASIS, SPIRES, or SYSTEM 2000.

Opportunities also exist for analytical applications programmer/analysts, communication analysts and systems administrators. These positions require an appropriate Bachelors degree and relevant experience in a technical or scientific atmosphere.

SERI offers competitive salaries and excellent benefits, including dental coverage and relocation assistance.

For immediate consideration, send a detailed resume (no phone calls) including salary history and professional references to:

Mr. J.J. Yacovella, Personnel Services
THE SOLAR ENERGY RESEARCH INSTITUTE
A Division of Midwest Research Institute
1536 Cole Boulevard
Golden, Colorado 80401
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MANAGER
Systems & Programming

We are looking for a Data Processing Manager who is seeking a new challenge. This is a full-charge, high-visibility position that reports to the Vice President/Director of Information Systems, and has responsibility for the management of the corporate systems development and programming efforts.

Our requirements are a college degree and at least eight years of Data Processing experience. Your most recent experience should include managerial responsibilities for a staff of professionals who design and implement sophisticated financial, marketing and manufacturing systems.

Action Industries, Inc. is a publicly-held, consumer-oriented company which has had an exceptionally good growth pattern over the last five years. This position is in our corporate headquarters in the Pittsburgh area. We offer a full range of Company-paid benefits and a salary which is commensurate with the stature of the position.

Interested candidates should mail a resume to T.J. Merriman, indicating current salary. All inquiries will receive a prompt response and be held in the strictest confidence.

ACTION INDUSTRIES, INC.
CHESWICK, PA. 15024

AN EQUAL OPPORTUNITY EMPLOYER M/F

DATA BASE ARCHITECT
mid $20's

Our client, a Washington area company, seeks an individual with minimum 3 yrs data base design experience, preferably on IBM equipment. Should have B.S. Degree, good analytical and verbal skills. Opportunity to design the structure of a new data base system geared to management requirements. Position offers high visibility and opportunity for continued personal growth. Send resume, establishing qualifications, in confidence to:

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COMPUTER SCIENCE FACULTY

Join a dynamic department with an established program in which 115 majors are currently enrolled. Two positions open for persons qualified in appropriate software areas. Applications welcomed from computer science doctoral candidates who wish to conduct a doctoral research project on the job. Salary from $13,000 to $21,000 for 9 months depending on qualifications and rank. Send resume or phone (218-236-2603) to Martin Holoien, Chairman of Search Committee, Moorhead State University, Moorhead, Minnesota 56560. Moorhead State University is an equal opportunity/affirmative action employer and is in compliance with Title IX of the education amendments of 1972.

SYSTEMS ANALYST

We are seeking several key individuals capable of assuming project management responsibilities for the development and implementation of large scale sophisticated banking systems. Initial assignments will be in such areas as EFTS, Central File, and On-Line Teller systems.

These are non-programming positions, however, candidates should have a programming background preferably in an IBM DOS environment. Experience with on-line systems and CICS is desirable but not required.

If you are interested in a challenging opportunity, personal growth and earnings potential limited only by your ability, and the contentment of working in a pleasant midwestern city, please contact:

Gene Katchmark, AVP
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During the next three years, we're planning to double our business with the Federal Government. To accomplish this objective we need to hire marketing professionals with talent, demonstrating:

- **Federal Government marketing experience;**
- **Successful computer systems sales records; and**
- **Customer satisfaction orientation.**

New business demands have created a variety of available positions in mainframe sales both to DOD and Civilian Agencies.

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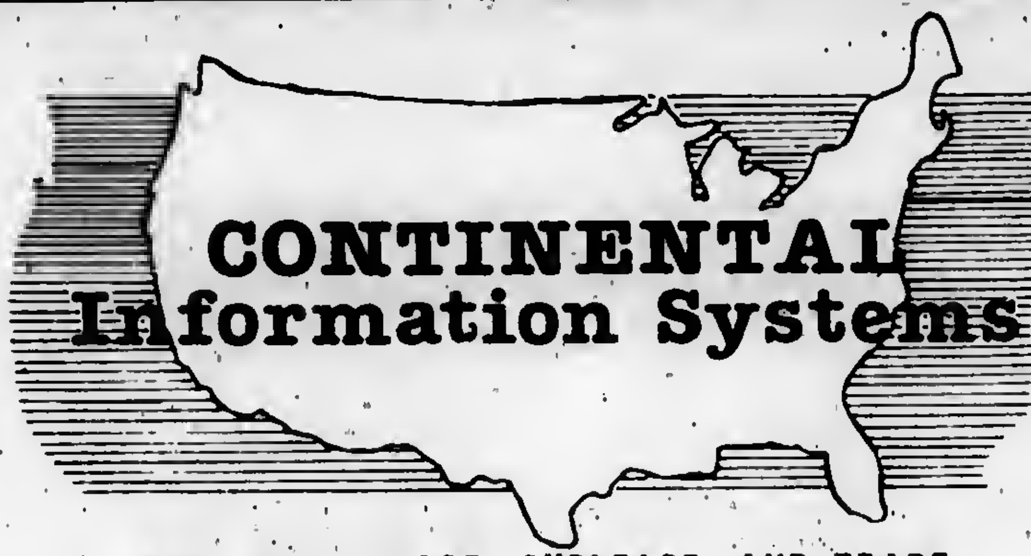

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A bidders' conference is planned for the latter part of June, 1978, to be held in Sacramento, California. Interested bidders may receive a copy of the IFB document, at a price of $100.00*, and may secure information as to the exact location, time, and date of the bidders' conference by contacting:

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Accounting System Development, 714 P St., Room 1092
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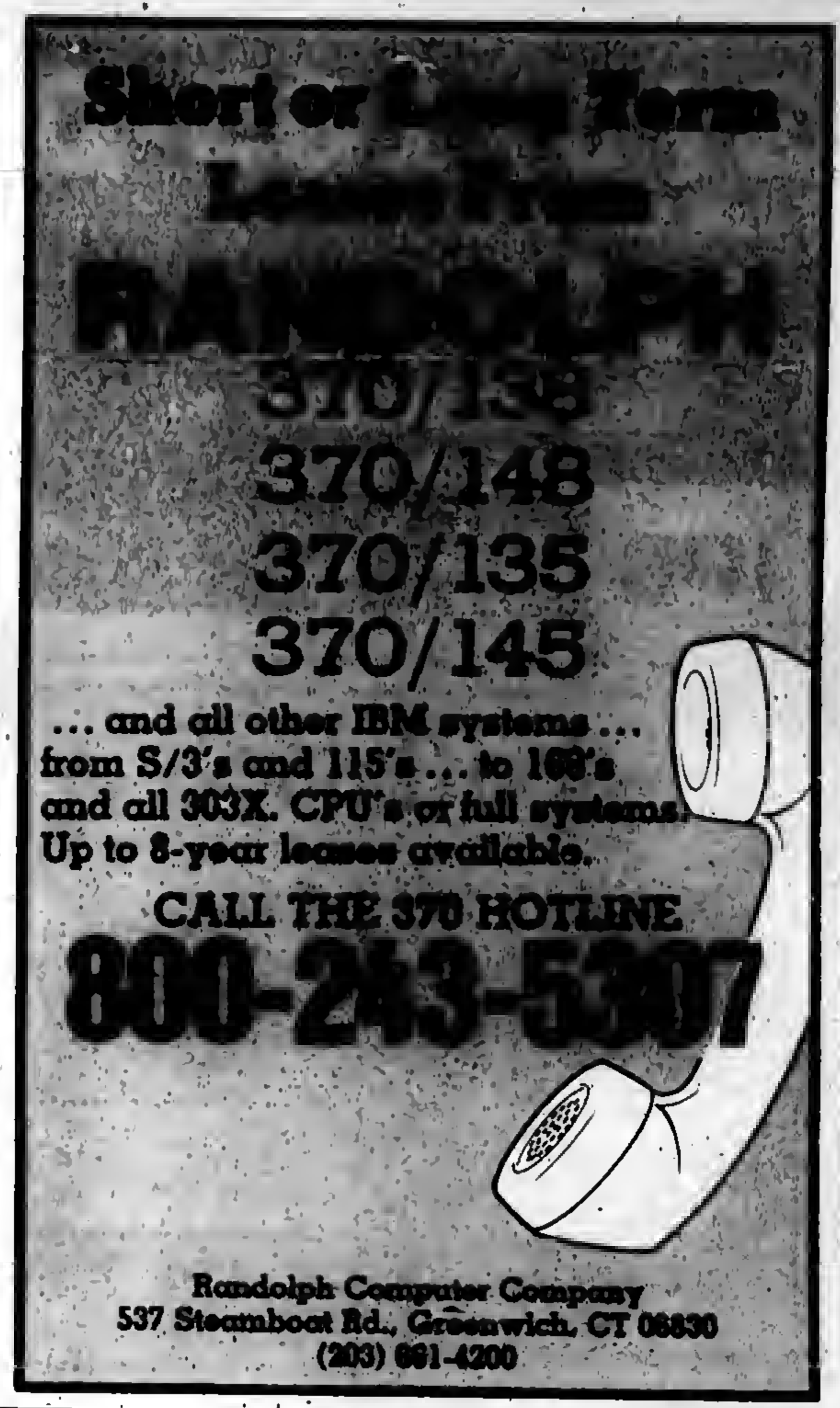

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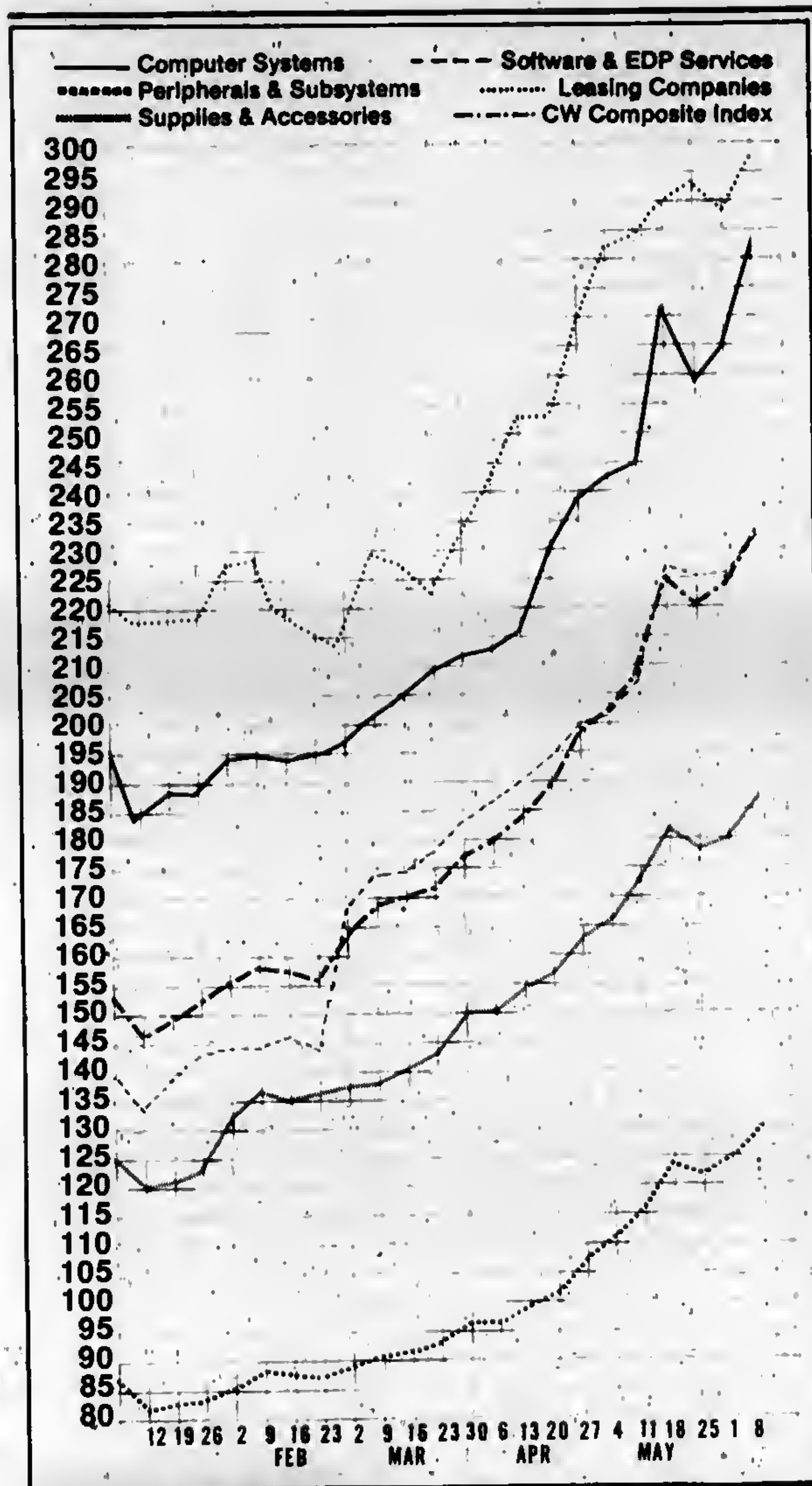

Earnings Reports

ALPEX COMPUTER
Three Months Ended March 31

	1978	1977
Loss	$121,409	$24,801

COMTEN
Three Months Ended March 31

	1978	1977
Shr Ernd	$.86	$.18
Revenue	11,807,000	7,175,000
Tax Cred	880,000	118,000
Earnings	2,287,000	407,000

DATASCOPE
Three Months Ended March 31

	1978	1977
Shr Ernd	$.26	$.34
Revenue	3,607,000	3,152,000
Earnings	294,000	385,000
9 Mo Shr	.74	.95
Revenue	9,801,000	8,620,000
Earnings	834,000	1,082,000

DATA SYSTEMS ANALYSTS
Year Ended Dec. 21

	1977	1976
Shr Ernd	$.65	$.34
Revenue	4,657,303	3,533,958
Earnings	433,280	258,884

DIGI-LOG SYSTEMS
Three Months Ended March 31

	1978	1977
Shr Ernd	$.14	$.33
Revenue	1,259,465	1,104,994
Tax Cred	12,308	91,230
Earnings	101,760	218,189
6 Mo Shr	.47	.37
Revenue	2,589,048	1,752,587
Tax Cred	118,944	105,896
Earnings	352,048	248,328

NATIONAL COMPUTER SYSTEMS
Three Months Ended April 30

	1978	1977
Shr Ernd	$.30	a$.23
Revenue	6,434,500	4,018,400
Earnings	495,700	381,800

a-Adjusted to reflect 50% stock dividend in December 1977.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 7, 1978.

All statistics compiled, computed and formatted by
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COMPUTER SYSTEMS

EXCH		PRICE 1977-78 RANGE (1)	CLOSE JUNE 7 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 36	36 1/4	+3 3/8	+10.2
N	BURROUGHS CORP	55- 91	76 1/8	+4 1/8	+5.7
O	COMPUTER AUTOMATION	18- 36	36 1/4	+2 1/2	+7.4
N	CONTROL DATA CORP	20- 35	35 3/8	+2 3/4	+8.4
O	CRAY RESEARCH INC	15- 46	38 1/2	-2	-4.9
N	DATA GENERAL CORP	35- 61	59 3/4	+4 3/8	+7.9
N	DATAPOINT CORP	18- 61	60 7/8	+5	+8.9
N	DIGITAL EQUIPMENT	37- 53	51 5/8	+4	+8.3
N	ELECTRONIC ASSOC.	2- 8	8 3/8	+ 1/2	+6.3
A	ELECTRONIC ENGINEER.	8- 18	17	+1 1/2	+9.6
O	FOUR-PHASE SYSTEMS	13- 32	31 5/8	+ 3/8	+1.1
N	FOXBORO	28- 54	38 3/4	+2 1/2	+6.8
O	GENERAL AUTOMATION	6- 17	17 1/8	+3 7/8	+29.2
O	GRI COMPUTER CORP	1- 1	1 3/8	+ 1/8	+10.0
N	HEWLETT-PACKARD CO	52- 87	83 7/8	+6 1/8	+7.8
N	HONEYWELL INC	43- 59	58 5/8	+1 5/8	+2.8
N	IBM	236-286	265 1/4	+7	+2.7
O	MANAGEMENT ASSIST	5- 18	17 3/8	+1 1/8	+6.9
O	MICRODATA CORP	7- 18	16 1/8	+ 1/4	+1.5
O	MINI-COMPUTER SYST	5- 12	7	- 1/4	-3.4
O	MODULAR COMPUTER SYS	5- 15	14 3/8	+ 3/8	+2.6
N	NCR	32- 57	57 1/8	+2 7/8	+5.2
O	PRIME COMPUTER INC	12- 25	23 1/2	+1 3/8	+6.2
N	PERKIN-ELMER	17- 25	25 1/4	+2 3/8	+10.3
N	RAYTHEON CO	16- 50	49 7/8	+4 1/8	+9.0
N	SPERRY RAND	30- 45	43 5/8	+1 7/8	+4.4
O	SYCOR INC	8- 24	24	0	0.0
A	SYSTEMS ENG. LABS	5- 19	18 7/8	+1 1/8	+6.3
A	WANG LABS.	10- 24	23 1/4	+2 1/4	+10.7

LEASING COMPANIES

EXCH		1977-78 RANGE (1)	CLOSE JUNE 7 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 6	5 5/8	- 1/4	-4.2
O	BOOTHE COURIER CORP	8- 18	16 7/8	+ 1/2	+3.0
O	COMDISCO INC	9- 20	19 1/2	+3 3/4	+23.8
A	COMMERCE GROUP CORP	1- 3	5/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1	+ 1/8	+14.2
M	DATRONIC RENTAL	0- 2	1 5/8	0	0.0
A	DCL INC	1- 4	3 5/8	- 3/8	-9.3
N	DPF INC	6- 13	12 5/8	+ 5/8	+5.2
N	ITEL	13- 27	25 5/8	+ 7/8	+3.5
N	LEASCO CORP	19- 35	33 5/8	+1 1/8	+3.4
O	LEASPAC CORP	1- 2	1 3/4	- 1/8	-6.6
A	PIONEER TEX CORP	5- 11	6 7/8	0	0.0
N	U.S. LEASING	10- 16	15 1/4	+ 3/8	+2.5

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EXCH		1977-78 RANGE (1)	CLOSE JUNE 7 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 1/4	0	0.0
O	ANACOMP INC	7- 15	14	- 3/8	-2.6
A	APPLIED DATA RES.	5- 14	13 1/2	+ 7/8	+6.9
N	AUTOMATIC DATA PROC	23- 33	33 1/8	+1 5/8	+5.1
O	COLEMAN AMERICAN COS	1- 2	1 1/2	0	0.0
O	COMPU-SERV NETWORK	7- 15	9 1/2	- 1/2	-5.0
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
O	COMPUTER HORIZONS	1- 2	3 3/4	0	0.0
O	COMPUTER NETWORK	6- 11	10 3/4	+ 1/2	+4.8
N	COMPUTER SCIENCES	7- 12	12	+ 3/8	+3.2
O	COMPUTER TASK GROUP	1- 4	3	-1 1/2	-33.3
O	COMPUTER USAGE	1- 4	3 1/4	+ 1/8	+4.0
O	COMSHARE	5- 15	15 1/4	+2	+15.0
O	DATA DIMENSIONS INC	3- 6	5 5/8	+ 3/4	+15.3
O	DATATAB	1- 2	1	0	0.0
N	ELECTRONIC DATA SYS.	14- 23	20 3/4	0	0.0
O	INSYTE CORP	2- 3	1	- 1/8	-11.1
O	IPS COMPUTER MARKET.	1- 2	2 1/4	0	0.0
O	KEANE ASSOCIATES	3- 4	5 7/8	+2 1/8	+56.6
O	KEYDATA CORP	1- 3	1 7/8	+ 1/8	+7.1
A	LOGICON	7- 17	11 3/4	- 1/2	-4.0
A	MANAGEMENT DATA	1- 2	1 1/8	- 1/8	-10.0
A	NATIONAL CSS INC	10- 27	27 1/4	+2 7/8	+11.7
O	NATIONAL DATA CORP	4- 12	11 1/2	+ 1/2	+4.5
A	ON LINE SYSTEMS INC	16- 26	25	+1 1/8	+4.7
N	PLANNING RESEARCH	3- 7	6 3/4	0	0.0
O	PROGRAMMING & SYS	1- 1	3/4	- 1/8	-14.2
O	RAPIDATA INC	2- 6	5 1/2	+ 1/2	+10.0
O	REYNOLDS & REYNOLD	17- 27	26 1/2	+2 1/4	+9.2
O	SCIENTIFIC COMPUTERS	1- 6	5 1/8	- 1/8	-2.3
O	TYMSHARE INC	14- 27	27 3/8	+2 5/8	+10.6
A	UPS SYSTEMS	4- 7	6 1/8	- 1/8	-2.0
N	WYLY CORP	1- 5	4 3/4	- 1/8	-2.5

PERIPHERALS & SUBSYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE JUNE 7 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	13- 25	24 1/4	+1 1/4	+5.4
O	ADVANCED MEMORY SYS	7- 14	13 1/8	- 1/2	-3.6
N	AMPEX CORP	8- 17	16 3/4	- 3/8	-2.1
O	ANDERSON JACOBSON	3- 9	8 1/2	+1	+13.3
N	APPLIED DIG DATA SYS	10- 20	16 3/8	- 1/8	-0.7
O	BEEHIVE INT'L	5- 12	6 1/8	+ 1/4	+4.2
A	BOLT, BERANEK & NEW	6- 10	9	+ 1/2	+5.8
N	BUNKER-RAMO	8- 18	17 7/8	+ 7/8	+5.1
A	CALCOMP	3- 9	8 1/2	- 1/8	-1.4
O	CAMBRIDGE MEMORIES	1- 8	7 5/8	+1 3/8	+22.0
N	CENTRONICS DATA COMP	16- 30	26 5/8	+ 3/8	+1.4
O	COGNITRONICS	1- 3	2 1/8	+ 1/8	+6.2
O	COMPUTER COMMUN.	5- 10	9	+ 1/2	+5.8
O	COMPUTER CONSOLES	4- 8	7 3/4	- 1/4	-3.1
A	COMPUTER EQUIPMENT	2- 6	5 1/8	- 1/8	-2.3
O	COMPUTER TRANSCEIVER	1- 1	1 3/8	0	0.0
O	COMTEN	9- 28	27 1/2	+4 3/4	+20.8
N	CONRAC CORP	19- 28	23 3/8	+ 1/8	+0.5
O	DATA-ACCESS SYSTEMS	4- 5	4 1/2	+ 1/4	+5.8
O	DATA 100	6- 17	15 5/8	- 1/2	-3.1
A	DATA PRODUCTS CORP	9- 21	20 3/4	+2 1/4	+12.1
O	DATA TECHNOLOGY	3- 4	4	0	0.0
O	DATUM INC	1- 4	4	- 1/4	-5.8
O	DECISION DATA COMPUT	2- 3	2 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	1/2	0	0.0
A	DOCUMATION INC	6- 21	19 1/4	-1 1/8	-5.5
O	DATARAM CORP	2- 24	21 1/4	0	0.0
N	ELECTRONIC M & M	4- 7	7	+ 1/8	+1.8
O	FABRI-TEK	1- 2	1 3/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1 3/8	0	0.0
N	HAZELTINE CORP	8- 15	14 1/4	- 1/4	-1.7
N	HARRIS CORP	28- 61	59 3/4	+6	+11.1
O	INFOREX INC	4- 10	9 5/8	+ 1/2	+5.4
O	INFORMATION INTL INC	8- 14	8 3/4	- 1/4	-2.7
O	INTEL CORP	38- 61	61	+6	+10.9
A	LUNDY ELECTRONICS	3- 6	3	0	0.0
O	MSI DATA CORP	6- 19	17 7/8	+ 5/8	+3.6
N	MEMOREX	23- 49	47 1/4	- 1/4	-0.5
N	MOHAWK DATA SCI	5- 12	11 1/4	+ 1/8	+1.1
O	PENRIL CORP	2- 9	9 7/8	+ 5/8	+6.7
N	PERTEC CORP	7- 14	11 5/8	-1 3/8	-10.5
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	QUANTOR CORP	3- 5	3	0	0.0
O	RECOGNITION EQUIP	6- 10	9 1/8	+ 5/8	+7.3
O	SCAN DATA	1- 4	3 1/4	- 1/8	-5.4
N	STORAGE TECHNOLOGY	10- 39	38 1/2	+ 3/4	+1.9
O	T BAR INC	7- 19	16	+1	+6.6
O	TALLY CORP.	4- 9	7 1/2	- 1/4	-3.2
A	TEC INC	6- 10	7 3/8	+ 1/8	+1.7
N	TEKTRONIX INC	29- 45	44 5/8	+3 7/8	+9.5
N	TELEX	2- 7	5 7/8	- 3/4	-11.3
O	TESDATA SYSTEMS CP	13- 20	19 1/2	+2 1/4	+13.0
O	WILTEK INC	1- 1	1 1/8	+ 1/2	+80.0

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EXCH		1977-78 RANGE (1)	CLOSE JUNE 7 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	8 3/8	+ 1/8	+1.5
O	BALTIMORE BUS FORMS	1- 5	4 1/2	+ 3/4	+20.0
A	BARRY WRIGHT	10- 28	26 1/8	-1 3/8	-5.0
O	CYBERMATICS INC	1- 1	1 1/8	0	0.0
O	DUPLEX PRODUCTS INC	14- 25	23 3/4	- 1/2	-2.0
N	ENNIS BUS. FORMS	6- 16	16 3/8	+1 3/8	+9.1
N	3M COMPANY	43- 57	56 3/4	+3 3/8	+6.3
O	MOORE CORP LTD	24- 37	33 1/2	+1 1/2	+4.6
N	NASHUA CORP	16- 31	30 3/4	+2	+6.9
O	STANDARD REGISTER	18- 26	24 1/2	- 1/4	-1.0
A	TAB PRODUCTS CO	5- 13	11	+ 1/4	+2.3
N	UARCO	18- 27	24 3/8	+ 3/4	+3.1
A	WABASH MAGNETICS	10- 15	14 1/4	+1 1/4	+9.6
N	WALLACE BUS FORMS	17- 25	24 5/8	+1	+4.2

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View on Proposition 13:

Local DP Can't Take Budget Cuts

By Brad Schultz
CW Staff

IRVINE, Calif. — While the full impact of California's tax limit initiative — the controversial Proposition 13, or Jarvis Bill — will not be known for some time, the measure could spark local government budget slashing in many states.

And what better area to cut than DP?

Not so, according to a University of California computer science professor here. Administrators looking for items to trim may find DP budgets difficult targets since even a slight reduction in funding for a typical municipal or county DP operation would have a devastating impact on its ability to support current systems, he said.

A slight budget cut on an average local government DP facility might render the facility's computer systems nearly useless since they could not then be adequately maintained or developed, Prof. Rob Kling of the University of California at Irvine (UCI) said here last week.

Moreover, computer systems are generally inelastic, Kling said, explaining that "systems do not shrink" and cannot easily be diminished in terms of physical size, power consumption or overhead.

In contrast, there is far more elasticity in most other local government operations, such as schools or public works, he continued. Schools can survive radical cuts in expenditures by simply eliminating certain programs and courses, he said, adding that many local agencies will not be crippled by worker layoffs which reduce payrolls.

With his colleagues at UCI's Public Policy Research Organization (PPRO), Kling has studied the nature of DP facilities and personnel in the public and private sectors. He has found that gov-

(Continued on Page 4)

Debug Views On DP Careers, Women Urged

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — Women aspiring to the managerial stratosphere of the computer industry have some special career debugging to do before they can make the leap from technical staff to the executive suite.

Along the way, women will have to find mentors and emulate the dress of the top executives within their companies. In addition, females pursuing managerial careers must avoid overspecialization in one technical area and learn to take risks.

This was some of the "nuts and bolts" advice given during a session on careers for women in the computer industry at the recent National Computer Conference here.

Panel leader Thelma Estrin of the University of California at Los Angeles said that women must consciously develop strategic plans for their career paths, rather than rely on circumstances to propel them. Career planning forces self-awareness, she said.

A special problem faced by women in all industry, according to Estrin, is the lack of role models — females who have attained positions of authority within the corporate structure.

Because there are so few female executives, women must consciously choose a mentor — usually a male. This should be done at the beginning of a woman's career, Estrin said, and the mentor should not necessarily be her immediate supervisor.

Carolyn Morris, now a sales manager for general systems at Hewlett-Packard Co., chose her mentor after

(Continued on Page 4)

Routine DP Audit Uncovers $289,000 Welfare Fraud

By Ann Dooley
CW Staff

LOS ANGELES — A recent, routine computer audit alerted officials here to the largest welfare fraud uncovered in this county to date — a woman who allegedly claimed benefits under 10 different names for herself and a total of 47 children.

The woman, Barbara Williams, alias Barbara Jean Thompson, turned herself in last week after news of the scheme was broadcast nationwide. Williams stole $289,000 in welfare payments over a seven-year period using forged-documents including birth certificates, Social Security numbers and driver licenses, Los Angeles County Department of Public Social Service officials charged.

The 33-year-old Williams, who has four children, listed as many as nine children as dependents in several of her welfare claims, according to authorities. She used the forged documents to qualify for Aid to Families with Dependent Children (AFDC) and food stamps at 10 welfare offices in the county, officials said.

While engaged in the scheme, Williams was living in a well-furnished home in an affluent area, according to Michael Connors, director of the Welfare Fraud Prevention and Investigations Department. She had Cadillac, Porsche and Ford automobiles, he said.

Williams' property will be seized and any savings accounts will be traced

(Continued on Page 8)

ACM on Ansi Flowcharts: Examine the Alternatives

By Don Leavitt
CW Staff

NEW YORK — The "ubiquitous ignoring and rejecting" of the current American National Standards Institute (Ansi) specifications for flowcharts means that advocating a minor or cosmetic revision of that standard "would be worse than pointless," according to a review committee sponsored by the Association for Computing Machinery (ACM).

Instead of dressing up a standard geared to old flowcharting techniques, the committee urged a "careful, independent, comparative examination" of the documentation alternatives, especially some that have come into widespread use in the past years.

In its report to ACM's Standards Committee, the flowchart committee recommended a study "in greater depth than can reasonably be expected of a volunteer committee [which] might be appropriately funded by the American Federation of Information Processing Societies (Afips).

"This, however, might be regarded as setting an undesirable precedent," the report continued without further explanation. "In that case, the study might be done using the U.S. government's Federal Information Processing Standard Publication 24 as its nominal take-off point and the National Bureau of Standards [as a] possible funding agency."

If such a study is not undertaken, the committee recommended a serious "updating and clarification" of the existing standard, formally known as X3.5-1970. The ACM unit spelled out 26 areas that need attention if such a revision is to have any merit.

But the recommendation to upgrade the standard was made "reluctantly,"

(Continued on Page 8)

Draft Communications Bill Doesn't Cover Every Base

Ronald A. Frank
CW Staff

WASHINGTON, D.C. — The rewrite of the Communications Act of 1934 proposed by the House Subcommittee on Communications may be more important in what it does not state than in what it specifically defines.

Most industry experts contacted a week after the legislation, known as the Communications Act of 1978, was introduced, said the 200-page document was being carefully studied to determine its impact. Although described by committee chairman Lionel Van Deerlin (D-Calif.) as a complete revision, regulatory experts point out that it is by no means a one-for-one replacement for the Communications Act of 1934.

While the rewrite has been called deregulatory in nature, many areas now under the jurisdiction of the Federal Communications Commission (FCC) are not addressed in the proposed act. This raises the questions, according to one knowledgeable source, of whether the rewrite is actually a superficial document "thrown out" for fine tuning during the upcoming hearings on the bill.

Analysis

The legislation would supposedly free AT&T from the constraints of the

(Continued on Page 6)

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Debating 81 Instructions

Jury Out in Memorex vs. IBM Case

By Catherine Arnst
CW Staff

SAN FRANCISCO — The decision in the Memorex Corp. vs. IBM antitrust case is being debated behind closed doors here by 11 jurors, while lawyers for both sides wait nervously in nearby offices.

For a week now, the 11 jurors have been poring over the 20,000-page transcript of the case in an attempt to determine whether Memorex has proven that IBM monopolized the computer systems market and its submarkets.

The most crucial determination for the jury will be the answer to that question, for if it finds IBM is a monopoly, it will have to apply different standards to IBM's behavior than it would to other computer manufacturers' behavior, Judge Samuel Conti told the jury in his instructions.

IBM, of course, argues that it is not a monopoly, in which case the practices and actions Memorex has attributed to it were just necessary business practices in a highly competitive industry.

Five days of closing arguments capped the six-month-long case before the jury retired to make its decision, which could come at any time now.

Memorex attorney John Endicott read his closing argument from a notebook the size of the San Francisco telephone book. The lengthy argument was needed, in part, to explain the complex decision process through which the jury of 11 men and women have to go. The jurors must cover 81 instructions from the judge.

In order to prevail, Memorex must prove three claims to the jury's satisfaction: that IBM possessed monopoly power in a relevant market or submarket; that IBM willfully acquired or maintained that monopoly power rather than earn it as a consequence of a superior product, business acumen or historical accident; and that Memorex was injured or damaged in its business or property as a result of IBM's conduct.

Damage Claims

If the jury decides all these claims in Memorex's favor, then it must assess damages. Memorex is asking for $306,580,000 in damages based on the losses it claims it suffered in the products it attempted to market to compete with IBM's product line.

Memorex claimed a loss of $50,675,000 in its attempt to compete with the IBM 650 disk drive; $48,837,000 in the case of the 3670 disk drive; $27,156,000 for the 660 disk control units; $36,291,000 for the 3671 and 3672 disk control units; and $50,737,000 for the 1270 communications control unit. Memorex also claims a $97,884,000 loss in the computer systems market which the firm also tried to enter.

These figures were based on calculations of both the amount spent on development and production of the products and the loss of profits from the products Memorex expected to sell but never did because of IBM's alleged monopoly, Endicott said.

According to law, the court is not allowed to tell the jury that any damages awarded to Memorex would be tripled.

Endicott emphasized that "everybody is doing it" is not a defense in antitrust actions and, although IBM may have been doing what everyone else was doing, according to Conti's instructions, "a firm which possesses monopoly power may be precluded from employing otherwise lawful practices which have the effect of unnecessarily excluding competition from the market or submarket."

IBM attorney Patrick Lynch spoke for almost as long as Endicott, but didn't use notes. He used analogies liberally, however, and at various points during his closing argument compared issues in the case to sporting events and to buying a new car, a stereo system, peaches and soft drinks.

Lynch argued that all the actions Memorex accused IBM of taking for anticompetitive reasons were in actuality only taken to remain in the running in a highly competitive market. Product innovations and price cuts which are at issue in this lawsuit always ultimately benefited the consumer, either by advancing the state of the art, increasing capabilities or lowering prices, he said.

Memorex was trying to ensnare IBM in a "Catch-22," Lynch said. For example, it accused IBM of creating a barrier to entry when it offered short-term leases, locking in users and lowering prices unfairly when it offered long-term leases and avoiding competitive pressures when it offered equipment for direct sale, he said.

Both parties spent a great deal of time on market definition and market measurement, for if Memorex fails to prove that IBM controlled the lion's share of the relevant market, then it will have failed to clear the first hurdle.

Memorex claims IBM monopolized approximately 70% of the general-purpose computer systems market, which includes peripheral devices as a submarket. IBM claims the electronic data processing market is actually the relevant market and estimates that it has only one-third of that market.

However, Conti has allowed the jury to consider power in a submarket as a valid measure of monopoly power, and even an IBM expert witness testified that the general-purpose computer systems market is a part of the general-purpose DP market. That could qualify it for submarket status in the jury's mind even if it accepts the larger market definition IBM claims.

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17	Continental Oil
18	Western Electric
19	Tenneco
20	Procter & Gamble
21	Union Carbide
22	Goodyear Tire & Rubber
23	Sun
24	Phillips Petroleum
25	Dow Chemical
26	Westinghouse Electric
27	Occidental Petroleum
28	International Harvester
29	Eastman Kodak
30	RCA
31	Rockwell International
32	Caterpillar Tractor
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34	United Technologies
35	Bethlehem Steel
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38	Kraft
39	Xerox
40	General Foods
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43	LTV
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45	Amerada Hess
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48	Marathon Oil
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50	Minnesota Mining & Manufacturing

How many of the Fortunate 50 sort with SyncSort? Thirty-four companies—or 68% of the total. (A comparable percentage of the other 450 firms on the Fortune 500 list are likewise lucky in their choice of a sort program.)

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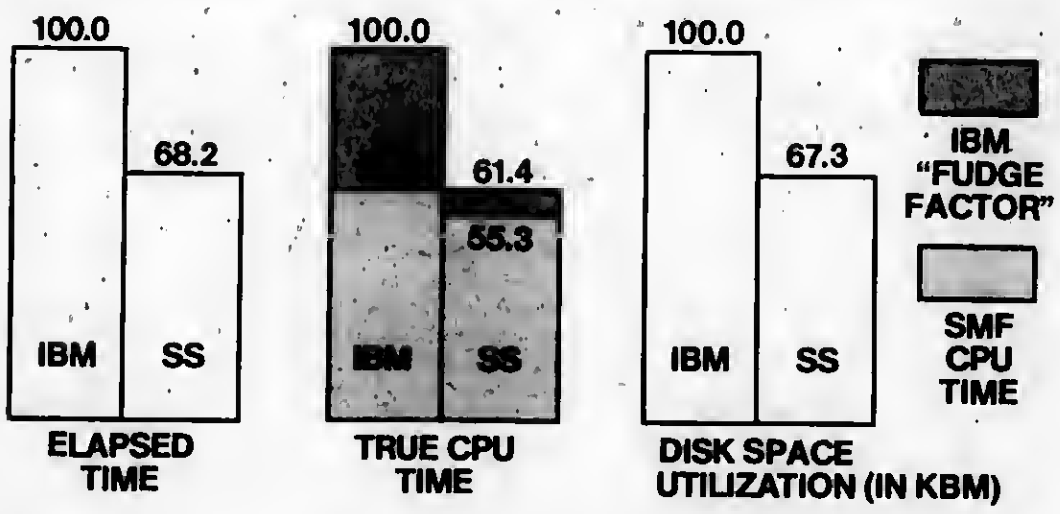

If that's the case, why doesn't everyone sort with SyncSort? Frankly, we don't know. That's the biggest puzzle of all.

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CRTs 'Like Truth Serum' in Housing Courts

By Marguerite Zientara
CW Staff

NEW YORK — A computerized information system in New York City's housing courts "has been like a truth serum," according to one of its developers.

Housing judges in Queens, Manhattan and the Bronx now have CRTs on their benches and can retrieve information in seconds on violations and related matters concerning about 1,999,000 housing units, according to Bruce J. Gould, staff associate at the Community Service Society, a nonprofit organization that studied delays in the housing courts and developed the system.

The primary goal of the system, Gould said, is to see that buildings are maintained in good condition. Since most of the cases in the housing courts stem from landlords suing tenants for rent, the computerized system indicates immediately whether a tenant has legitimate reasons for withholding rent.

Data for Judges

Information furnished to the judges includes an overall description of the building in question; its street address, number of units and number of floors; the name and address of the owner and managing agent; the status of real property tax payments; the number of complaints against the building; and any violations uncovered in inspections by the Code Enforcement Agency.

The name and address of the complainant, the date the complaint was registered and any action taken can also be called up on the CRT.

In addition, New York's Emergency Repair Program enables repairs to be made to a building by the city, reimbursable by the owner. The CRT indicates the monetary balance of this program and details the type of repairs on which the money was spent.

The system also indicates when a violation was first noted, when an item was scheduled for reinspection and whether it was reinspected. The violation is classified as "ordinary," "hazardous" or "imminently dangerous," Gould said.

The system is linked to the records of the city's Department of Housing Preservation and Development.

"With such instant information, judges can get a better picture of a landlord and thus can make quick judgments. The system has changed the nature of testimony in court," Gould said.

The system runs on an IBM 370/148 and costs $8,000/mo for maintenance, he added. Now being financed by Federal Community Development funds, it was initiated under a grant from the New York Community Trust.

In Manhattan, the equipment includes seven IBM 3277 CRTs and one 3288 printer. In the Bronx, seven AT&T Dataspeed 40 CRTs and a Dataspeed 40 printer are used. Queens uses three Dataspeed 40 CRTs and one printer.

Gould said the system is not saving "enough money to mention." What money is saved is derived from eliminating the need to subpoena documents and records for the court since all data is now accessible via CRT.

Moneymaking Plans

The purpose of the system, in Gould's view, is "to *make* money because we'll be able to collect money owed the city for housing matters by having the evidence at the judges' fingertips. We'll be able to collect penalties levied for noncompliance with the law, and we'll recoup funds from the Emergency Repair Program."

Pending is a plan to sell computer printouts in the courthouse to "promote information on the buildings in the city and encourage litigants to act."

The system started in Manhattan in October 1976; Queens joined in December 1977 and Brooklyn will join this month.

Before the system was implemented, Gould drafted a bill which became law stipulating that all information on the judge's CRT screens would be considered prima facie evidence "so there would be no fights about the evidenciary value of the information."

Women Advised on Entering Management

(Continued from Page 1)

she had been with HP only a few weeks. Describing the incident, she recalled walking up to a vice-president she admired, introducing herself and telling him she was interested in learning more about the company.

Technical Competence

Besides selecting a mentor, women seeking entry into management in the computer industry must develop technical competence. This is one of the few industries, the panelists agreed, that requires thorough technical knowledge in some particular area. Therefore, any prolonged absence from the profession hinders career development, Estrin noted.

However, Estrin warned that women should not fall into the trap of becoming overspecialized. "Women feel they have to be super technicians" and tend to avoid taking the risk to move up "without complete knowledge of a technical area. Women must learn to let go of technological concerns if they are to succeed in management," Estrin commented.

Nomi Guillen-Williams, manager of systems design for Control Data Corp., also emphasized the risk of getting locked into a specialty. She suggested developing generalist skills by taking on the management of a project within the company.

Drawing from her speciality, software, Guillen-Williams urged women to take the opportunity to work on various software projects. Software is a much easier base from which to penetrate the managerial ranks than hardware, she claimed.

As part of career planning, Guillen-Williams advised women to make sure their companies have top-management-supported affirmative action programs. If the company doesn't have the commitment of the top executives to promote women to managerial levels, then get out your resume, she suggested.

HP's Morris stressed that to advance her career, a woman must change her image from that of a technician to that of a manager — a person who can coordinate business functions, not just technical projects. To do this, a woman may have to change companies, Morris said.

Morris moved to HP and sales because, "After you've seen one operating system, you've seen them all," she said.

Authority Image

Developing an image of authority is particularly important in the hardware sector of the industry, according to Dr. Donnamarie E. White, manager of the education department of Advanced Micro Devices, Inc. "In hardware," she stated succinctly, "men do not take women seriously."

Clothing plays a large part in building an authority image, White stressed. Wear neutral-colored skirted suits with the length just below the knee, she advised. Most importantly, observe how the top executives in the company dress and emulate them.

Avoid wearing heavy makeup and jewelry and don't carry a purse. "In other words," White continued, "avoid appearing feminine, with one exception — always wear a wedding ring, even if you are single."

The highly tailored White later admitted she designs clothes as a hobby and enjoys flamboyant styles. She said she used to wear her designs to work until she realized her clothes were an obstacle to moving into the executive suite.

White urged women to read "how-to" books. She suggested, among others, *The New Executive Woman* by Marcia Williams and *The Woman's Dress For Success Book* by John T. Malloy.

Crowding around the speakers after the session, the women attendees seemed eager to learn more of the experiences of these managers who have succeeded in reaching the industry's executive levels.

Local DP 'Taxed' Already

(Continued from Page 1)

ernment DP centers usually handle more kinds of applications and more complex kinds of data than do industry centers.

Since the demand for technical expertise at a facility rises with the diversity and complexity of that facility's activity, the effects of DP budget cuts are more severe in government than in private industry, Kling said.

Explaining why DP tends to be more "intensive" in government than in private industry, Kling pointed out that accounting tasks can be especially convoluted in the public sector since program funding there can often have many sources, requiring more elaborate audit trailing.

Whether or not DP budget cuts are made in local government, the financial support for public DP is already poor in most cases, Kling said. Even local government DP salaries are not competitive with private industry.

One reason for this situation is that non-DP department heads who supervise DP personnel might find themselves earning less than their subordinates if DP salaries were competitive with industry, he continued.

Because salaries are not competitive, city and county DP jobs are typically taken by recent college graduates who leave for the private sector after about three years, Kling said. As a result, local governments are already deficient in the experienced personnel usually needed to develop sophisticated software, he explained. However, elaborate systems are occasionally created by "whiz kids" and left in the lurch when the creators depart, he added.

Many local governments now anticipate severe budget cuts although they have committed themselves to significant computer system development well into the future, Kling said, indicating these cities and counties have "crossed the Rubicon" and cannot revoke development plans before the cuts take effect.

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For Data Security Device

Commerce Lifts Secrecy Order on Patent Bid

By Howard A. Karten
CW Staff

WASHINGTON — In an on-again, off-again move, officials of the U.S. Patent Office have reversed their recently imposed secrecy order on a patent application relating to computer security. The decision, which came in the wake of national news coverage of the story, reversed the Patent Office's earlier finding that disclosure or dissemination of the application by a University of Wisconsin-Milwaukee professor could harm the national security.

The patent application, which resulted from research funded by the National Science Foundation (NSF), is believed to be related to data encryption and a device that would perform that security function. George I. Davida, the associate professor of electrical engineering and computer sciences who applied for the patent, was unwilling to discuss any aspects of the case pending official notification that the order had been rescinded.

Last December, Davida, then a graduate student at the school, was awarded an $89,728 grant by the National Science Foundation to fund his research. Davida subsequently applied for a patent on the project and on April 21, the patent office imposed the secrecy order on the patent application.

Neil Kalishman, a patent lawyer contacted by *Computerworld,* explained that the Patent Office, an agency of the U.S. Department of Commerce, screens all patent applications for possible defense or national security implications.

Commerce Department officials also refused comment on the reversal, saying that discussion of pending applications is prohibited by federal law.

A Patent Office division called Group 220 refers any patents that it thinks might fall into this category to the Pentagon, which then examines them in further detail.

Kalishman, who practices patent law in Clayton, Mo., explained that under U.S. law, the Commissioner of Patents is required to withhold the issuance of a patent if, in his opinion, disclosing patent information would be detrimental to the national security. The Patent Commissioner is also required to notify defense agencies in such cases, and those agencies then make the actual determination about security.

In 1970, during the Vietnam war, the mathematics building on the Madison campus of the university was bombed. In the aftermath, several University of Wisconsin campuses adopted policies barring classified research. Davida was involved in university-funded, unclassified research.

Commenting on the lifting of the order, Frank A. Cassell, assistant chancellor for university relations, said, "our first concern has always been Prof. Davida and that he be allowed to continue with his research. We're very pleased that the government has withdrawn the secrecy order. We would also want to say, however, that we still believe there were very fundamental issues involved in this case, and those issues have not been resolved by the withdrawal of the secrecy order."

Although U.S. regulations provide for a judicial mechanism for challenging such secrecy orders, this method was not used in this case. An appeal was under way at Wisconsin, but was never filed. The only action taken to try to reverse the secrecy order, Cassell continued, was an attempt by Werner A. Baum, chancellor of the Milwaukee campus, to enlist the aid of Richard C. Atkinson, NSF director.

Role of Kreps

Cassell speculated that Commerce Secretary Juanita Kreps played an important role in the action. He said Kreps, a former vice-president of Duke University, was in touch with Baum recently and reportedly said she would "look into" the issue and hoped it could be favorably resolved. Cassell added that the conversation between Kreps and Baum "gave us some reason to think she was involving herself personally in this."

However, Homer Moyer, Commerce deputy general counsel, denied any involvement by Kreps. Claiming that the timing of Kreps' conversation with Baum and the lifting of the ban were coincidental, Moyer said the defense agency involved reversed its original request for secrecy. Moyer refused to identify that agency, however, claiming it was not a matter of public record in any case and was not Commerce policy to identify the agencies.

The fact that Davida's work was done under an NSF grant is of no significance to the case, Cassell stated.

Commenting on the lessons to be learned from the incident, Cassell said, "Universities and scientists have to be constantly alert to efforts by the government to interfere with or intrude in the process of open research. These efforts circumscribe the principle of academic freedom . . . I would guess the massive national publicity in this case had something to do with the government withdrawing the order, even though an appeal had never been filed."

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Firearm-Tracking Proposal Meeting Opposition

By Ann Dooley
CW Staff

WASHINGTON, D.C. — A computerized system proposed for tracking the distribution of firearms by licensed dealers, manufacturers and importers — but not individual owners — is meeting with stiff resistence from citizens, legislators here and the three groups of licensees.

The system, proposed by the U.S. Treasury Department's Bureau of Alcohol, Tobacco and Firearms (ATF), is not a gun registration or control system, according to Jim Hunt, ATF research and regulations coordinator for the project, who emphasized individual gun owners would not be affected.

The computerized information would be used to trace the distribution of guns in this country and to aid in tracking firearms thefts, he explained.

None of this information is currently at the disposal of the ATF bureau from any centralized system, Hunt said. The ATF performs nearly 60,000 traces each year, but only on a manual basis.

For this reason, there is no way of getting an overall picture of trends or general activities, he added.

Right now, if a dealer orders 5,000 guns, that information is unavailable. With the computerized system, it would be possible to chart overall distribution trends as well as devote more investigation time to dealers with high volumes or an unusual trade flow, Hunt said.

But the public appears to be opposed to this kind of a system, he noted. The ATF is required to ask for citizen opinions before such a proposal can be implemented, and the response so far has been 30-1 against the idea.

Further, the U.S. House of Representatives recently voted to cut the bureau's budget; if the proposal were to be accepted, ATF would not have immediately available funds to set it up.

Under the proposed system, AFT would require quarterly reports from licensed gun manufacturers that would include a serial number unique to the licensee and to each firearm. The number would consist of 14 characters signifying the manufacturer or importer, the year of import, the firearm model, its caliber or gauge and the serialized numerals of the model produced or imported.

This serial number would standardize the information appearing on all firearms, Hunt said, and would be easily recognizable to police or licensees. The information could be put on existing systems available within the Treasury Department, he added.

In addition to the quarterly reports of transaction and distribution flow, which would be maintained off-line, the system would be used in theft reporting, he said. ATF would use the serial numbers to access the Federal Bureau of Investigation's National Crime Information Center (NCIC) via existing terminals about any firearm thefts.

The firearms would be entered by serial number into the NCIC system. If an individual were picked up after crossing a state line with a stolen firearm, the police could check the NCIC file and determine the licensee from which the firearm was stolen, Hunt explained.

Fear of Gun Control

Although the system would only cover licensed dealers, manufacturers and importers of firearms, a private citizen could participate if he wished, Hunt noted. But most of the letters Hunt has received about the proposal are against the idea because many people feel it is the first step toward gun control, he said.

Other opponents don't want any further computerization and some don't want any new programs created because of inflationary costs, he said.

Legislators oppose the idea because of the strong gun control lobby which influences the constituents they represent, he said, and dealers are against it because they don't want to fill out any more reports or have any kind of gun regulation.

Manufacturers oppose the proposal because it would mean changing their individual serial numbers to a standardized format, and the importers are opposed because they already are required to provide so much information that they don't want any more paperwork, Hunt said.

June 30 is the deadline for comments on the proposed system. After that, an administrative decision will be made on whether to continue with the proposal.

The proposal could be withdrawn, implemented, partially implemented or held in abeyance, Hunt said.

Draft Communications Act Leaves Gaps

(Continued from Page 1)

1956 Consent Decree, which limits it to providing only telephone services. Instead, Bell would be allowed to offer services which are determined to be "telecommunications or incidental to telecommunications . . ."

The Communications Regulatory Commission (CRC), which would replace the FCC, would decide which services fall into this category. But it is not clear whether DP services would qualify as "incidental to telecommunications."

The basic issue of defining a boundary between computers and communications, which is being addressed by the second Computer Inquiry, now pending before the FCC, would have to be answered before one could determine if AT&T were allowed into the DP area, one source said.

The new act does not define "noncompetitive," according to one attorney, but more importantly, it makes no statement about any arm's-length dealings a carrier would have with a nonregulated subsidiary to prevent cross-subsidization.

One of the arguments of anti-AT&T forces in the past has been that Bell has the ability to use revenue from monopoly services to keep the cost of services that are subject to competition at artificially low levels. The legislation would have to guard against carrier subsidiaries in nonregulated areas being subsidized if there is to be fair competition, the attorney added.

A staff source with the Communications Subcommittee agreed that the CRC would have to decide what services are incidental to telecommunications, but the intent is to open up competition in as broad an area as possible. On the question of subsidies, separate nonregulated subsidiaries would not be able to get the benefit of carrier revenues strictly based on normal accounting practices and the intent is definitely that they operate at arms' length, the source said.

Most observers agree that the emphasis on allowing competition is a positive aspect. "This bill recognizes that competition and diversity of suppliers is the only way to go," according to William McGowan, chairman of the board at MCI Telecommunications Corp.

McGowan said he is not sure that Bell would want to offer DP terminals through an independent subsidiary, as the act apparently would allow. He reasons that after having divested itself of Western Electric Co., the phone company would be nothing more than a distributor of terminals and it may not find this an appealing prospect.

Despite Bell's future position, the legislation seems to mandate complete deregulation of all terminal equipment through separate subsidiaries or any other suppliers, he added.

The establishment of a Universal Service Compensation Fund based on access charges levied on carriers such as MCI for using local exchange facilities would be reasonable so long as the "payment were reflective of the actual cost." An additional charge over and above the cost of providing the facilities could be levied only for "social reasons" such as bringing service to outlying areas. If this were administered by the CRC instead of the telephone company, then "we are certainly in agreement with that," McGowan added.

Giant New Competitor

This bill raises the real possibility that both the DP and interconnect suppliers will have to deal with a giant new competitor called Western Electric, according to regulatory attorney Terry Mahn, who added that it will probably be three years before legislation this broad can be finalized. It is also probable that if Western Electric is spun off, Teletype Corp. would remain as part of the nonregulated company. Teletype has been building a field force and introducing DP-type terminals, perhaps in anticipation of a forced divestiture.

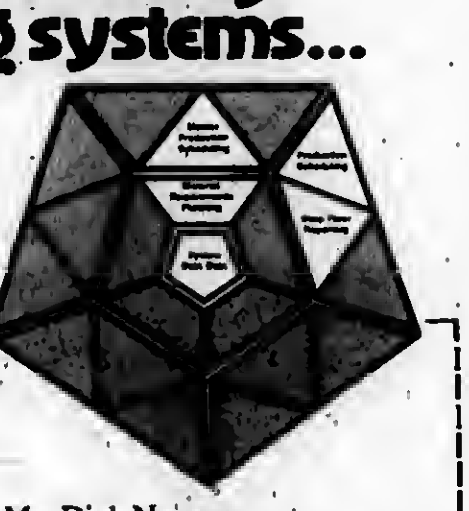
"This is a great opportunity for the telephone companies to expand beyond the phone industry into the teleprocessing business. The net result is a tremendous shot in the arm for the carriers, who can now get into the computer business, according to Charles Johnson, president of General Datacomm Industries, Inc.

But the independent suppliers now have the lead in introducing new technology and there is no reason why they can't maintain this leadership, Johnson said.

Following the bill's introduction, an AT&T spokesman said, "We welcome the bill's declared intent to assure that where competition prevails, it be full and fair competition. On the other hand, there is one provision [the divestiture of Western Electric] that would, in our view, clearly impair the Bell System's ability to serve the public."

One industry source commented that AT&T itself was probably more responsible for the rewrite than anyone else. If Bell had not first proposed the Consumer Communications Reform Act in Congress, the legislative spotlight might never have been cast on the telecommunications industry, he said.

Most industry groups affected by the bill have requested time to participate in its upcoming hearings, scheduled to begin in July. It is not know how much support the proposed legislation has among other members of Congress.



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Informal Access to Bank Records Allowed

Congressman Assails Justice's Privacy Proposals

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — A U.S. congressman has sharply criticized the Justice Department for its proposed legislation to protect the privacy of bank records.

Rep. Peter. H. Kostmayer (D.-Pa.) said at a hearing here recently that the proposed legislation "is an effort on the part of the federal government to know more than it is entitled to know about the people of this country."

The Justice Department's proposal would not stop "informal access" to individual's financial data by such agencies as the Federal Bureau of Investigation, the tax and civil rights divisions of the Justice Department and the Drug Enforcement Administration, Deputy Attorney General Benjamin R. Civiletti testified before the House Subcommittee on Government Information and Individual Rights.

'Revolutionary' Rights

Civiletti did agree that since an individual's life can be completely reconstructed from cancelled checks, some protection against abuse is needed. But he called the individual rights proposed in some privacy bills now before Congress "revolutionary" and maintained privacy protection should not be extended to telephone and credit card records.

"Personal records are the lifeblood of successful investigations of sophisticated crimes and our access to them should not be unduly hampered," Civiletti argued.

"You speak of revolutionary legal rights," Kostmayer responded. "That is exactly what they are. That is why they are so precious, why they must be preserved and why we must stand so diligently against the Department of Justice in this administration or any other administration which continually tries to erode the rights and liberties of the American people."

The Justice Department drafted its proposed financial privacy laws in response to bills put forward in the Senate and to the omnibus privacy proposal, H.R. 10076, in the House.

The Justice Department would like to see informal access to bank records formalized by requiring the investigating agency to request the financial record of an individual in writing to the institution holding the desired information, Civiletti said.

Effective law enforcement demands a waiver of legislative provisions that individuals be notified of the government's interest in their bank records in an emergency situation — such as a kidnapping — or when "notice" will give an indivudual time to go into hiding or to destroy evidence, the deputy attorney general said.

The need for speedy access to financial records in many investigations therefore prompted the Justice Department to recommend that individuals be required to challenge a government request for their records within seven days rather than the 18 days provided in H.R. 10076. Courts, too, should be forced by law to deal with these challenges quickly and immediate appeals should be prevented, he suggested.

In order to avoid "frivolous" challenges to the government's efforts to inspect financial records, individuals should be required to file a formal motion in court, Civiletti stated. He flatly opposed Kostmayer's statement that challenges should be as easy as possible and agreed a citizen would probably need an attorney if the government's interests in his records were challenged.

"You are suggesting that despite whatever lawful basis the government has to investigate and prosecute crimes, if some citizen, wrongdoer or not, says, 'I don't want the government to look at my records,' the government then is forced through a laborious process of delays, showings, costs and expenses with an appeal process Civiletti asked.

"Absolutely," Kostmayer replied.

Originally, the Justice Department legislation exempted federal grand juries, foreign intelligence investigations and Secret Service operations from the constraints imposed by financial privacy laws. But during the hearings, Civiletti made some concessions, agreeing the Secret Service should apply to a court for permission to examine an individual's records, for example.

Also testifying at the hearing, former Privacy Protection Study Commission Chairman David Linowes argued that grand juries should not be exempt from privacy laws and that individuals should be informed of the reasons for government examination of their records.

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Security Should Cover Crime, Accident: Parker

By Edith Holmes
CW Staff

ANAHEIM, Calif. — DP and security managers must learn that the safeguards they institute to protect their installations against accidental threats — errors and omissions in programs or system design — won't stave off attacks by the computer criminal, Donn B. Parker of SRI International said at the recent National Computer Conference here.

By defining the weakest link in the computer system and taking steps to protect that part of the installation from intentional acts, however, DP and security managers can reduce the chance of loss or harm — deliberate or accidental — across the entire DP operation, Parker told attendees at a session on computer crime.

One of the reasons the industry has so much trouble with security is its insistence on dealing with accidental losses and losses from intentional acts in the same way. These problems are different and should be treated separately by managers, Parker stressed.

The researchers noted that errors and omissions tend to be single, isolated acts by a person acting alone. A DP manager can rely on the safeguards he institutes to succeed in protecting the installation from many of the losses caused by errors.

The intentional act against an installation is a completely different animal, according to Parker. Such acts are often complex, they frequently involve collusion, the motives for them are complicated and maximum DP skills are used. The computer crime is characterized by large, undetected losses; a low incidence; a game strategy; and attacks on the system's weakest links — where the risks to a computer criminal are minimal and the paybacks are greatest.

Parker suggested to his audience that the best way to measure the vulnerability of a DP system is to define its weakest links. Where a DP operation is weakest will depend on the skills and abilities of the employees who have access to and work with the installation, he said. These weak spots will also depend on how much the organization will lose if those parts of the system are compromised.

While the probability of an accidental loss is the simple sum of the separate probabilities that specific errors and omissions will occur, the probability of a loss resulting from an intentional act equals the maximum chance of loss at the system's weakest link, Parker stated.

Dealing With Losses

DP and security managers can deal with both kinds of acts and the losses resulting from them by identifying the most probable intentional act — the system's weakest link, he said. The next step in this "idealized safeguard strategy" is to select protections for the system that will reduce the chance of a compromise of the weakest link.

Parker would then have managers identify the accidental acts that would be minimized by these safeguards.

These three steps should be repeated until the probability of intentionally caused loss is acceptably low, Parker said. If the DP manager believes the chances for accidental loss are still too high, additional safeguards should be selected that will reduce this kind of loss to an acceptable level, he stated.

Parker gave the audience a sample of the differences between dealing with accidental and intentional acts by discussing two approaches to password access control in an on-line, multiaccess system.

To minimize accidental loss, a manager would simply install a minimal-length, conveniently remembered password-access system, he said.

The safeguards become much more elaborate, however, when the aim is to protect the system from the computer criminal. Now, the passwords selected must be of sufficient length to eliminate guessing. The system will require random password generation and assignment, Parker said.

Managers should record and verify password use periodically to avoid password theft or unauthorized use. Patterns of password use and failed access attempts should be analyzed for deviations from normal experience to detect unanticipated attacks.

Routine Audit Discovers Welfare Fraud

(Continued from Page 1)

through welfare check deposits, he added.

"The woman is a real professional," Collins said. Most fraud can be detected fairly quickly with a computerized check, but anyone who forges a new identiy makes it more difficult, he admitted.

Williams might have gone uncaught, but she slipped up by using the address of another welfare recipient, he said.

The county computer system is programmed to hit on any person who supplies duplicate information, but because Williams used different identities and had identification cards that appeared legitimate, she was not caught until the address duplication was discovered, the fraud director said.

The system that matched the duplicate addresses was started last year in an effort to find cases where more than one welfare check was going to the same address. While most of these cases are legitimate, the system has caught a few other fraudulent cases, although none involved as much money as this one.

At present, the department collects $1.51 for every $1 spent on fraud detection, Collins said.

Williams allegedly began defrauding the county in 1971 and applied for aid at various intervals after that at different district offices.

In order to qualify for AFDC, each child's birth certificate must be shown and a current local address must be supplied. In each of the 10 cases, a routine home visit to the address listed was made and each checked out, according to Connors. Williams was always at the address with the required number of children, he said.

Williams managed this by using the homes of acquaintances; these individuals are being investigated for possible collusion, Connors said.

"It all seemed legitimate on the surface. There was no way a caseworker could have detected any fraud," he noted.

Williams turned herself in to authorities and will have a preliminary hearing July 10. Bail has been set at $50,000.

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SUPPLIES

Flowcharting Study Urged

(Continued from Page 1)

according to committee chairman Ned Chapin, who noted that such an approach "fails to address the real and significant issues" raised by the general disinterest in the standard.

Along with the serious overhaul of X3.5-1970, Chapin's group recommended that Afips constituent societies and ACM in particular "require that all their publications use flowcharts conforming fully with the ANS standard" whenever they present flowcharts.

Unless the societies enforce the use of standard flowcharts in their publications and the standard is upgraded in line with the committee's extensive recommendations, the standard should be withdrawn "on the grounds of obsolescence and insufficient usage," Chapin said in conclusion.

Reasons for Rejection

The committee found several reasons for the current standard's low standing in the DP community. In the first place, "knowledge of the standard is not common among [DP personnel] except those that hold computer science degrees."

Beyond that, the standard is characterized as too rigid, too cumbersome, too costly and too ambiguous by those who know it but do not use it. The difficulty of maintaining ANS standard flowcharts "is well known," the report continued.

But the fact that there are alternatives, many reputed to be superior to conventional flowcharts, is the main reason the standard is largely disregarded, Chapin's committee indicated.

These alternatives range from hardware vendor-supplied flowcharting approaches, charts produced by proprietary flowchart packages and "Scat diagrams" to Chapin charts, Hipo charts, semicode and pseudocode.

But an independent study of these techniques "has never been done. Even a comprehensive, statistically well-designed sample survey has never been done," the report noted, adding "what should be the subject of an ANS standard is the few techniques that are the most valuable and the least redundant. No hard evidence exists that the current ANS standard flowchart so qualifies."

With CPU, Graphics Equipment

Study to Reckon Date of Next Calif. Quake

By Brad Schultz
CW Staff

MENLO PARK, Calif. — The National Geodetic Survey (NGS) is using a large mainframe and specialized computer graphics equipment to map out a massive portion of southern California that many believe is long overdue for a major earthquake.

The U.S. Geological Survey (USGS) will apply its geophysics expertise to the NGS data analysis and computer simulation to determine the area's seismic trends and estimate when the big shocks might hit.

Called the Southern California Uplift, the 32,000 square-mile area is one of the most seismically active in North America, according to Peter Ward, chief of the USGS earthquake prediction unit here.

The Uplift encompasses most of inland southern California, including the cities of Bakersfield, Palmdale, Pasadena and Riverside. The area gained its nickname because scientists have discovered a consistent increase in "bulges" or "heaves" at numerous sites within the area.

When discovered, the Uplift was localized around Palmdale — on the western edge of the Mojave Desert — near the site of the most violent earthquake in California's history, a fact that excited the federal government's interest, Ward said. Although the heave has since spread, it is still known by some as the Palmdale Uplift.

Four Months of Measurements

Theorizing that California is long overdue for a massive shock in the 7.5 range on the Richter scale, such as the one that devastated Long Beach in 1933, USGS scientists intend to use Uplift data in an attempt to predict when that shock will hit, Ward said.

From January through April this year, about 40 three-person USGS crews measured the elevations of thousands of points in the Uplift. The crews used surveyors' transits to measure the elevations and entered the data in field notebooks. This data was later stored on magnetic tape and sent to NGS headquarters in Rockville, Md., for analysis on the agency's Control Data Corp. 6600 CPU.

The USGS has completed its field work on the project, but is still transmitting the resulting data to the NGS, according to Capt. John Bossler, NGS deputy director.

On the 300,000-word, 64-bit CDC 6600 the data is processed by several editing and formatting programs, Bossler said. It is then "adjusted" to eliminate redundancy errors — multiple readings of a given location — and to make allowances for such factors as the contraction or expansion of field-measuring tools because of temperature shifts.

This "adjustment" yields the definition of certain mathematical functions that comprise a model of the Uplift's dynamics, Bossler explained. The functions are input to Information International, Inc. FR80 computer output microfilm recorders, which then generate graphics simulations of the Uplift topography, according to Sanford Holdahl, also of the NGS.

When concluded, the NGS data analysis will be sent to the USGS at Menlo Park where Ward's earthquake prediction unit will begin its work.

'Superquake' Fears

The greatest shock in California since the record-setter of 1857 was the famous San Francisco Earthquake of 1906. These two jolts exceeded 8 Richter points, far surpassing the Long Beach leveller of 1933.

Scientists' apprehensions about a "superquake" in California have been enhanced by the relative lull in seismic activity experienced by the state since 1971, Ward said, pointing out that such quakes are "inevitable."

Researchers inadvertently discovered the Uplift when they noticed old elevation estimates for the area generally fell short of more recent estimates, he said. However, for coastal southern California, old estimates generally exceed the newer figures, indicating that such cities as Santa Barbara, Los Angeles and Long Beach are slowly sinking.

Elevation records are important considerations in planning the construction of canals and aqueducts on which this primarily desert region depends for its water supply, Ward explained. Although elevation fluctuations over several years are usually on the order of a few centimeters, minuscule changes in slope along the hundreds of miles these structures extend can entail large-scale changes in the money and materials necessary for their construction.

Prior to the USGS/NGS venture, elevation measurement efforts in the area were "sporadic" and uncoordinated, according to Ward. The current effort is the first to attempt a snapshot of the region that will serve as a reference for further studies, he said.

Congress appropriated about $60 million for use in earthquake research and information dissemination via the National Earthquake Hazard Reduction Act of 1977, of which half was tagged for the USGS and the other half for the National Science Foundation.

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Energy Modelers Urged to Think Pragmatically

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — Developers of computerized energy models should broaden their scope of professional concern to include both the practical as well as the theoretical implications of their work, Decision Focus, Inc. Vice-President Dale Nesbitt believes.

Too often in the past, computer modelers have viewed themselves primarily as technical specialists with little or no voice in deciding how — or if — their recommendations should be implemented, Nesbitt explained at the recent National Computer Conference here. As a result he said, a philosophical gulf has formed between the theoretically inclined modelers and the more pragmatic decision makers who apply their work in government and industry.

One way to bridge the gulf is for model builders to revise their professional outlook and see their role "not as clairvoyants but as catalysts for decision making," Nesbitt urged. Fortunately, he added, modelers have already begun to move increasingly into decision-making positions, and he foresees no end to this attempt by the developers to gain greater control over the application of their work.

Nesbitt made his remarks during an NCC seminar entitled "Computer Models in Solving the World's Energy Problems." Other speakers at the session included chairman William Rousseau, an engineer with Lawrence Livermore Laboratory; Arvind Jain, a senior energy modeling analyst with SRI International; Al Miller, a principal of Applied Decision Analysis, Inc.; Philip Schweizer, an engineer with Westinghouse Electric Corp.; and Stanley Sussman, also an engineer with Lawrence Livermore Laboratory.

Reluctance to Communicate

Thus far in its brief history, computer modeling has only slightly affected energy planning and policy-making in the private sector, partly because the technique involves relatively recent technology and thus has gained little credibility among the general population, Nesbitt concluded:

Another reason for the minimal impact is that developers of computer models usually work alone and seldom communicate the results of their work to their professional colleagues. Nesbitt attributed the modelers' solitary working style in part to stiff competition for limited research and development funds.

"Modelers have little incentive to communicate with each other," he explained. "They're hesitant to exchange any information for fear it might benefit someone who's competing for the same research money."

Nesbitt also attributed the modeler's reluctance to communicate to fear of criticism from their colleagues, many of whom specialize and delight in refuting their rivals' work. "It's easy for a modeler to pull something over on a government decision maker or someone else who doesn't know anything about computers, but it's very difficult to fool other modelers," he said. "They're very sophisticated at finding flaws in each other's results."

Among their other work problems, builders of computer models also occasionally face ticklish ethical questions or sense their services are being recruited for narrow political ends, Nesbitt noted. At times, for example, they are asked to rig the results of a computer model to support the views of a vested interest or to perform work that otherwise threatens to compromise their professional integrity.

Elsewhere in his discussion, Nesbitt urged modelers to try to accomplish three objectives in their work. First, they should make sure their modeling projects are headed by individuals who understand the decision-making process in government and industry.

Second, they should direct their efforts toward clearly defined goals rather than toward general-purpose applications. A model that lacks this "decision focus" will probably prove of little or no value to its user, Nesbitt warned.

Third, modelers should try to establish improved lines of communication with the decision makers who ultimately determine the fate of their work, he added.

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DPers' Status Undetermined

Lawyer Explores Liability Issues Linked to DP

By Nancy French
CW Staff

ANAHEIM, Calif. — As technology comes into broader use in all phases of work — from building airplanes to making seat reservations — new liability issues are arising when those processes go awry, according to Lawrence S. Robertson of the Washington law firm of Zuckert, Scoutt and Rasenberger.

Speaking here recently at a National Computer Conference session on legal issues of computing, Robertson explored some fascinating and problematical new territory at a session that drew only about 50 people.

Picking examples from actual cases, Robertson asked, rhetorically, who is liable in the case of a fatal aircraft accident whose cause was blamed on metal fatigue in the plane's wings if the wings were tested using a computer simulation rather than the traditional wind-tunnel testing. Is this a possible case of negligence?

Another somewhat less serious case dealing with computer assisted seat reservations raised some equally interesting questions. According to Robertson, many airline passengers don't actually get the cheapest rate to which they are entitled because the fares change so fast and reservations clerks can't keep up. A tariff display that could be flashed on the CRT screen to aid those clerks is often not used at the request of airlines management because the CPU is overloaded and can't accommodate it.

Perhaps one passenger paying $100 too much for his ticket is not too serious a problem, Robertson said. But suppose the airlines were confronted with a class-action suit involving many thousands of passengers who were overcharged? Could negligence be proved, he asked.

On the other hand, following the standards set in the area of medical liability, could negligence be ruled in a situation in which a computer was not used to do a specific job — and a computer in fact is not the normal standard — but the job could be done better by computer? he asked.

Suppose, he said, that a vendor rushed a computer system to completion without proper debugging and memos documenting complaints about this written by professional employees assigned to do the work are found during the discovery portion of a lawsuit filed by a user. This can be used against the builder of the system, he indicated.

This would be more of a problem to the employer if programmers are judged to be professionals rather than merely employees, session chairman James P. Chandler indicated, adding that still remains to be settled.

Programmers' Status Unresolved

Many such issues will go unresolved or will be ruled on in courts and reversed on appeal until the status of computer programmers is determined, Chandler indicated, and it is inevitable that this will occur, he said.

The unresolved question of "professionalism" vis a vis the computer programmer blurs another area, too.

Every programmer goes from job to job with decks of cards and various computing tools he developed during his career so he won't have to reinvent what he did at the last job, Robertson noted.

Although the materials were developed for an employer, what has not been resolved is what the rights of the program authors should be, he pointed out. Do those program subsets the programmer wrote belong to him or to his boss? What if the employer continues to get the benefit of them after the author leaves?

Employers Liable for Copyright Violations

By Nancy French
CW Staff

ANAHEIM, Calif. — Companies that use copyrighted licensed software packages could be liable to the software vendor if the restrictions on the use of the packages are not spelled out in writing to its employees and one of those employees copies or transfers a program in violation of the vendor/user agreement, Michael S. Nash, a computer scientist with the National Institutes of Health, said here recently.

The framework supporting Nash's argument assumes the programmer to be "an employee" rather than a "professional," National Computer Conference session chairman James P. Chandler pointed out. Chandler is a professor of law at George Washington University.

Nash, who fainted before he was able to complete his presentation, was assisted in its completion by Chandler.

Four Players

According to Nash, in a scenario in which an employee copies or steals a licensed copyrighted, package and then transfers it to someone else, there are a number of players, and each has certain rights. First, there is the vendor, who invested heavily in the product's development; secondly, there is the employer/user, who licensed it.

The third and fourth players are the employee who appropriated it and the transferee who paid the employee for its use.

The rights of each one are not clear, and rulings in specific cases vary from state to state and court to court, Nash indicated. Perhaps legislation rather than the courts will resolve some of these questions, he suggested.

For a vendor to sue successfully to protect the license of one of his packages, he must prove first that he owns it and that it has been validly copyrighted. Then he must prove that the individual accused of appropriating it had access to the copyrighted material and, finally, that the so-called copy is similar to the vendor's original work, Nash said.

Who can be liable? The employee — "or by then ex-employee" — who distributed copies of the copyrighted material; the employer, on grounds of negligence, if it can be shown he failed in his obligation to protect it — even if he made no gains from its transference; and finally the transferee, whose copy of the program can be ordered destroyed even if the transferee paid for it, Nash said.

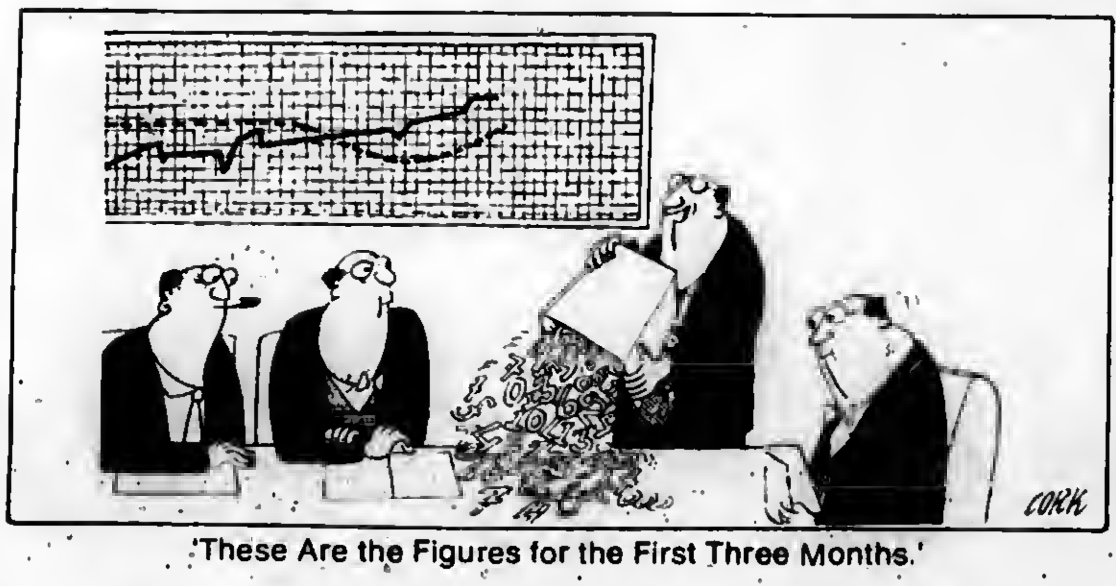
The prudent employer can protect himself by including provision in a DP employee's contract that describes his responsibilities in handling licensed software. This protects him from claims of negligence, Nash indicated.

The federal government, according to Chandler, has strict policy guidelines in this regard. If software is transferred to an agency without specified limitations, it is deemed to be transferred without limitation and treated accordingly.

If the software is transferred with limitations, personnel are urged to consult legal counsel to determine their responsibilities and assure they are fully appraised of the agreement under which the software is being licensed.

In the area of patent law, anyone who copies functions — rather than merely the "expression of those functions" protected by copyright — is liable, Nash said. The employer's liability would depend on whether the employee made the infringing copy at the direction of his employer and whether the employer benefited.

The patent owner has the civil right to protect his property and can sue both the transferee and the employer and be awarded damages from both, Nash said. However, since few programs are patented, this holds less potential danger for the DP manager, he indicated.



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Regulate Selves or Be Regulated, DPers Warned

By Jeffry Beeler
CW Staff

ANAHEIM, Calif. — DP personnel should begin to regulate their profession from within before standards are imposed upon them by the nation's laws and courts, according to Dr. Gary Casper, president of the Institute for the Certification of Computer Professionals.

During the last few years, public concern about privacy threats and other social implications of computers has mounted steadily and fueled growing demands for increased professionalism in the DP field, Casper said during a seminar at the recent National Computer Conference here.

To meet these demands, computer professionals should set minimum standards of competence for their peers and then devise a universally accepted method of testing that competence, Casper advised. Such a method might take the form of a standardized certification exam or even a formal licensing program, although Casper concluded the latter option "is still a long way away."

Whatever method of enforcement they choose, DP personnel must soon adopt a uniform code of professional standards. If they hesitate, the push for increased regulation of DP competence will come from the government or some other source outside the computing field, he warned.

Why have DPers lagged so badly in enforcing high levels of professionalism among their peers? Speaking at a session entitled "What is Professionalism?", Casper partly blamed the apparent resistance to regulation on the phenomenally rapid pace of development in computer technology.

'Future Shock' Victim

"This industry, more than any other, suffers from future shock, the premature arrival in the future," he noted. "No sooner does one development appear on the scene than something else comes along to replace it."

In an industry in which technology changes so rapidly that no individual can master all of it, Casper said, competence eludes easy definition; something that can't be defined can't be measured.

But as the social impact of computers has become increasingly visible and pervasive, the public has begun to expect of DP personnel the same standards of professional competence, accountability and integrity that had formerly been reserved only for the more traditional professions like law or medicine, Casper observed. As an example, he cited recent court cases in which DPers were ruled professionals and thus liable to malpractice suits.

Unfortunately for computer personnel, these rulings only hint at the outside control that awaits them unless they soon begin using certification to prevent incompetents from entering their ranks, Casper said. Not only would a nationwide certification program preempt future attempts by the non-DP world to regulate activities of DP specialists, but it would also reap more positive benefits like fostering high ethical standards in the profession and controlling the quality of computer science curricula, he predicted.

Computer professionals interested in promoting certification should learn more about the concept from an appropriate professional association and then take a certification exam, Casper recommended. After passing the exam, they should join a professional society and further advance the certification cause among fellow members, he said.

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SCS Sets Course On Simulation

LA JOLLA, Calif. — The Society for Computer Simulation (SCS), in cooperation with the program committee of the 1978 Winter Simulation Conference (WSC), will present a professional development seminar covering modeling and simulation for business and industry on Thursday, Dec. 7, the day following the rest of the WSC program.

The seminar has been planned and will be conducted by Professors Paul Gray and Steven Alter of the Graduate School of Business Administration, University of Southern California (USC). The material will be based on a short course, "Managing the Future," given at USC seven times over the past two years for corporate planners, managers and analysts.

Although the seminar is introductory and will not assume sophistication in either simulation or long-range planning, it will cover models for the future, the gathering and use of expert opinion (including Delphi techniques), trend and cross-impact analysis methods and the development and use of scenarios, SCS said.

Gray is professor of decision science and a senior research associate in the university's Center for Futures Research. He has specialized in large-scale problems in transportation and urban fields.

Alter is assistant professor of decision science at USC and received his Ph.D. from the Sloan School of Management at MIT. His areas of specialization include computer-aided decision making, long-range planning.

Further information on the seminar, location, fees and registration will soon be available from SCS, Department PR, P.O. Box 2228, La Jolla, Calif. 92038.

NCC Panelists Agree:

Voice Input Not Yet Viable for Most Users

By **Ann Dooley**
CW Staff

ANAHEIM, Calif. — More research is needed before voice input systems can be considered viable alternatives for computer users, according to panelists at the recent National Computer Conference here.

Chaired by George Glaser of Centigram Corp. of Sunnyvale, Calif., the panel also agreed that some midground will have to be found between very sophisticated systems and isolated word systems.

Wayne Lea, panel member and research linguist at the Speech Communications Research Laboratory in Santa Barbara, Calif., told attendees that voice input has benefits because it is the most natural modality, takes little or no training, allows for fast communication and leaves the hands and eyes free for other tasks.

On the other hand, the problems inherent in voice input are vocabulary limitations, speaker variability problems caused by changes in sex or dialect and environmental noise and distortions. Other problems include the lack of privacy and the systems' high cost, he said.

Lea outlined the various forms of word recognizer systems, such as those that recognize isolated words, sequences of isolated words, connected sequences of isolated words, connected sequences of digits or words in restricted formats.

He also told attendees about the goals and achievements of the Advanced Research Projects Agency (Arpa) voice input project, begun by the Department of Defense in 1971.

Arpa's goal, which has been accomplished for the most part, was to design a system that would accept continuous speech from many cooperative speakers. The system was to accept a 1,000-word vocabulary with artificial syntax and do so with less than 10% semantic errors.

Continued Research Essential

Current recognition systems range from inexpensive hobbyist models to full, expensive, accurate systems, Lea noted.

Continued research is important, however, in order to apply the recognition systems to more difficult tasks, he pointed out.

Lea summed up many of the issues surrounding voice recogniton systems. One controversy is whether continuous speech — or complete sentences — is really needed, especially given the extra work and cost. Other points of debate include mathematical models vs. linguistic representations, what role research should play, how it should be funded and the danger of fraud in voice transactions.

Building, Evaluating Recognizers

Raj Reddy, a professor at Carnegie-Mellon University of Pittsburgh, Pa., commented on how to build and evaluate linguistically developed word recognizers. He told attendees about his work in developing a cost-effective, yet powerful system.

The speech recognition systems are complex graph structures used to convert passive knowledge into active, he said.

An utterance is digitized, put through acoustic units and matched and then the system finds the optimum sequence of matches to find the correct word, Reddy said.

Whatever the matching network method, all the systems still need to be improved for speed and accuracy, he said. Current voice input systems have a much higher word accuracy than sentence accuracy, Reddy noted, adding that more errors occur when more than one speaker is involved. During telephone speech, the error rate triples, he added.

The system's vocabulary size is important as far as memory requirements go, but it is not important for accuracy, Reddy noted.

Continous Speech Experiments

Lalit Bahl of IBM Research in Yorktown Heights, N.Y., told attendees about his experimentation with continuous speech recognition systems. The idea is to perform successively more difficult experiments using more complex language, he said.

The first task accomplished was to design a 7-digit phone number vocabulary with 11 words, he said. From there, the experimentation went on to a finite state language using 250 words and an average sentence of eight words, he noted.

The error rate was very small and the correct syntax was used, but the sentences had no meaning, Bahl said.

The next experiment undertaken was a restricted-domain task designed with the ability to use only certain words and an average sentence length of eight words, he said. In this case, the error rate was even smaller, Bahl noted.

Bahl next tried a laser patent text using sentences read from a particular domain and with unspecified grammar or natural langauge. A text of 1,000 words was used and the average sentence length was 24 words.

With this system, the error rate zoomed upward, he said. It was the same system, in principle, as the others, but it was a big step to go from a system of restricted text to one in which the number of words was limited without limiting the syntax, he said.

It's a difficult problem to go beyond the restricted domain task system which has been proven successful on a limited basis, he said, but there is still a long way to go before a speech pattern recognition system will be developed that will satisfy most people.

Voice Systems Perform Well For Some Security, Business Uses

ANAHEIM, Calif. — Although voice input systems still have many limitations, some systems do perform very effectively in those applications, panelists said at the recent National Computer Conference.

A Texas Instruments, Inc. security system developed for identity verification for the Air Force is "resistant to imposters, flexible, controllable, fast, convenient and efficient," according to George Doddington, a TI researcher.

Called Base and Installation Security System (Biss), the system is used in entry control and has demonstrated 1% user rejection, 3% imposter acceptance and 6.2-sec verification time, Doddington said.

The system was designed so that upon insertion of an ID card, a recorded voice utters four words in a random pattern and the person waiting to be admitted repeats the utterances. The system was programmed to match the voice and ID of the person waiting to be admitted.

Reference data is adapted after each utterance so the voice input system does not misinterpret the voice pattern after just one utterance. If there is any doubt (as there might be if the person had a cold, for example), utterances are repeated until the system makes the correct identification.

Don Connolly, energy researcher at the National Aviation Facilities Experimental Research Center, outlined several possible uses of voice verification techniques in air traffic control work as well as in urban mass transit, the Coast Guard and for air updating and maintenance.

Tom Martin, president of Threshold Technology in Delran, N.J., also suggested voice data entry systems could be used in inventory and quality control work.

A microphone could be used to enter the information directly to the computer in an on-line, real-time mode so if an error occurred, it could be corrected immediately.

Once the price/performance barrier is broken, it will become accepted and voice input use will accelerate substantially, he said. Various other possible uses include visual defect reporting, grading/-sorting/inspection and parcel sorting operations, Martin noted.

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Less 'Hostile' Regulation Seen Stimulating EFT

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — "A less hostile legal and regulatory structure conducive to competition among electronic funds transfer [EFT] service "providers" is an essential element to the success of EFT systems, Robert Zimmer, senior partner in the Washington, D.C., law firm of Zimmer, Egge & Sisk, said here recently. His forum was the session entitled "Legal Issues in EFT Developments" at the 1978 National Computer Conference.

Four areas on which legislators and regulators are presently concentrating are branching, terminal deployment, EFT terminal and system sharing and government operational involvement in EFT, Zimmer said.

Banks, savings and loan (S&L) associations and credit unions are governed by three different sets of branching laws administered by three different regulatory agencies, he noted. Furthermore, in 1976 the Comptroller of the Currency ruled that terminals are bank branches and therefore subject to the same limits as brick-and-mortar branches.

Under existing law, state and national levels also have conflicting legislative rules on remote facilities, resulting in some anomalous circumstances. In Illinois, for example, some banks have deployed EFT terminal systems, but only thrift institutions that share them can use them for services other than check authorization, Zimmer said.

Senate Bill S. 2293, introduced by Sen. Thomas J. McIntyre (D-N.H.), will be adopted in some form by 1980, Zimmer believes. That bill was designed to implement the recommendations of the National EFT Commission and would permit federally chartered banks, S&Ls and credit unions to establish or use an EFT system anywhere, with geographic limitations only on deposit servcies.

According to the bill, out-of-state deposit services could be offered in states permitting such services and, after Jan. 1, 1980, deposit services could be offered throughout an institution's "natural market area," regardless of state law, Zimmer said. The bill also stipulates that an EFT terminal is not a branch.

Congress is also likely to adopt S. 2293's proposals regarding sharing by applying antitrust standards to EFT systems and preempting state compulsory sharing laws in order to avoid conflict between state and federal policies in this area, Zimmer said. There are no federal statutes expressly applicable to sharing EFT systems, but 22 states have enacted legislation requiring some form of sharing. The legislation, however, is not uniform, he noted.

Federal Involvement

Perhaps the most significant short-run trend — and the one that poses an obstacle to the development of EFT in a flexible and competitive environment — is the growth of government operational involvement in EFT, according to Zimmer.

The Federal Reserve recently adopted a plan to provide a nationwide electronic switching service for clearing and settlement through automated clearinghouses (ACH) by the end of 1978. This plan is inconsistent with the commission's recommendation to oppose expansion of government operations beyond regional services currently provided by the Fed, Zimmer pointed out.

"Most of these developments will help decrease the cost of financial services, expand the number of locations at which services can be provided and encourage variety and diversity in services," he concluded. Government operations, however, pose a substantial threat to competitive systems, he said.

Emphasis on Privacy

The National EFT Commission placed heavy emphasis on the issue of privacy and public policy during its 21 months of considerations, according to Jim Howard, consultant to the White House Domestic Policy Staff. Howard acted as general counsel to the commission, which issued its final report last October.

Some general principles guided the commission during its deliberations, Howard said, one of which was maintaining a basic level of consumer protection. The commission also kept in mind that EFT transactions are outside the traditional provisions of the law, he said.

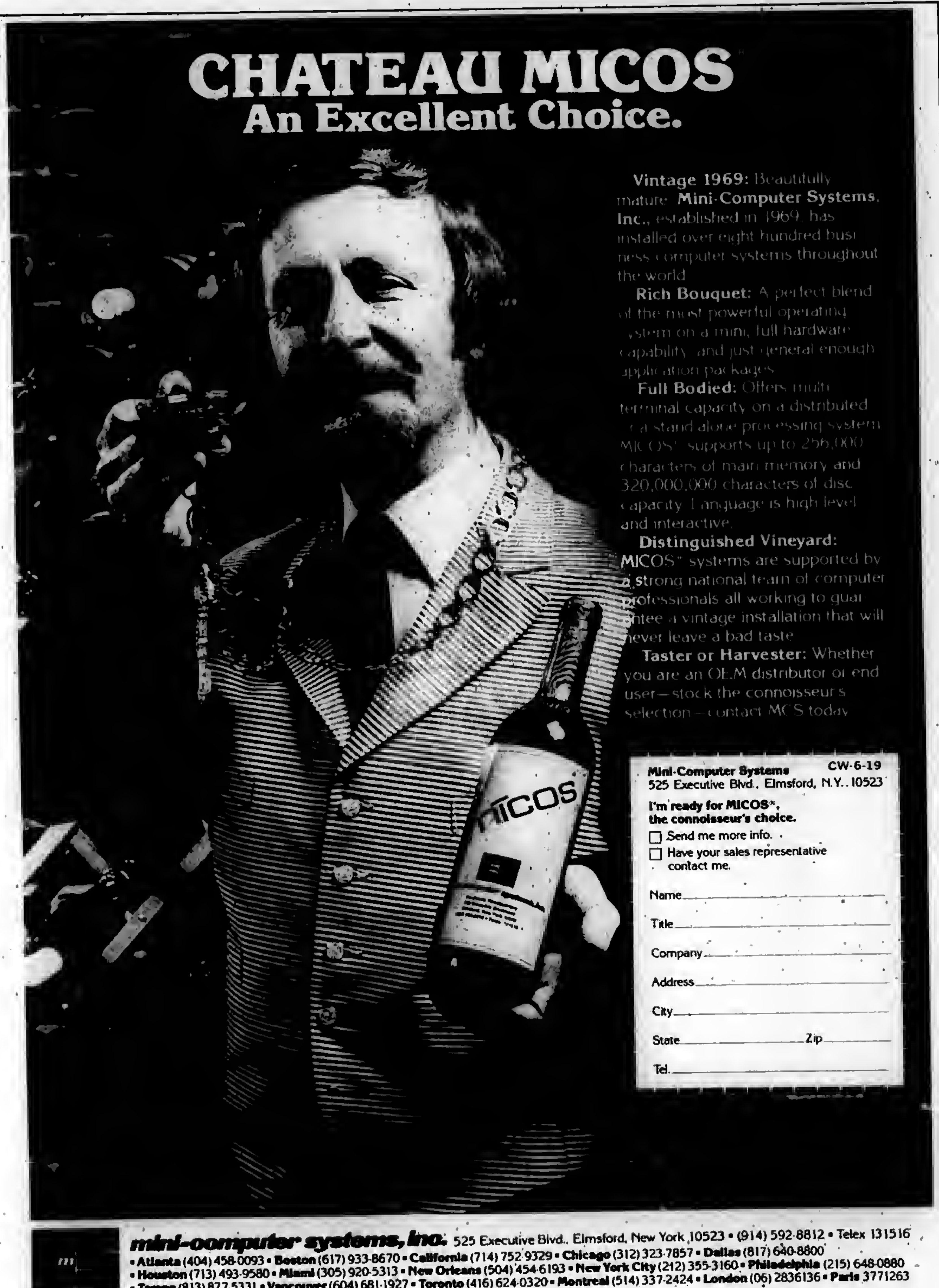
Further, the commission felt "new" technology shuld promote competition among financial institutions and across industry lines and government regulations should be minimized to increase competition in the private sector as an impetus for development, Howard said.

Another area of individual protection is that of liability which, like bank branching law, is legislated differently in different states, according to Roland Brandel, an attorney with Morrison, Foerster, Holloway & Clinton of San Francisco.

Two bills introduced last fall — S. 3156, by Sen. Donald W. Riegle Jr. (D-Mich.) and H.R. 1277-5, by Rep. Frank Annunzio (D-Ill.) — would affect contractual relationships between financial institutions and customers, Brandel said. The bills would establish the Federal Reserve Board as the primary regulator in such contractual matters.

The bills stipulate that the consumer

(Continued on Page 16)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With $4.2 Million Machine

DES Critic Says He Can Crack Code for $23

By Brad Schultz
CW Staff

ANAHEIM, Calif. — One of the most outspoken critics of the federal Data Encryption Standard (DES) has a method that purportedly can crack DES codes at a cost of $23 per solution at a rate of 100 solutions per day using a machine comprised of parts costing $4.2 million.

Stanford University Prof. Martin Hellman announced his findings, which he said have been developed only within the last month, during a session on encryption technology at the recent National Computer Conference here.

In the past, Hellman has maintained that the standard, adopted last year by the National Bureau of Standards (NBS), could be cracked by the 1980s by an organization able to develop a special-purpose computer costing about $20 million in parts at an average cost of roughly $5,000 per solution at a rate of one to two solutions per day [CW, Jan. 8].

The DES relies on a key length of 56 bits, and Hellman claimed his theoretical machine could try every possible combination of 56 bits to crack a particular user's key.

The NBS has vigorously disputed Hellman's claim, arguing the DES cannot be cracked by any organization and is therefore suitable for the protection of the most sensitive kinds of data.

In April, the U.S Senate Select Committee on Intelligence announced some conclusions of a still-classified report on DES, culminating its investigation into whether the standard can be cracked and whether critics of the standard had been subjected to "harassment" by the National Security Agency (NSA) or other components of the U.S, intelligence community.

The consensus of scientists polled by the committee was that the standard could not be cracked for at least five to 10 years. The committee further found that the NSA had not harassed DES critics [CW, April 17].

Brute Force Attack

Hellman has now introduced a model in which a certain kind of brute force attack on the DES, using 1978 technology, can uncover the method used to encrypt a portion of text. However, the model has two important qualifications: the method, or key, cannot have been selected by the encryptor in a completely random fashion; and the encoding must have been performed in plain block mode — that is, without multiple iterations or "doubling back" of the basic encryption operation.

Hellman's attack on the DES would be of the sort known as "ciphertext only," where the attacker relies on a "probable plaintext block." This means the attacker feels confident in assuming that a block of characters in the target data repeats with a certain, roughly reckoned frequency.

Such a block might be expressed in plaintext, or noncoded form, as eight contiguous blank characters or the phrase "CRLogin:," where "CR" denotes carriage return — a phrase commonly found in terminal transactions.

Hellman's scheme requires 100 tape drives costing about $2 million. These drives would read 10^{13} bits of information stored on 10,000 tapes in one day, Hellman told the NCC session, adding that 100 "fast memories" — special-purpose LSI chips — and 10,000 DES chips such as the recently announced Fairchild Semiconductor Corp. DES chip also would be needed.

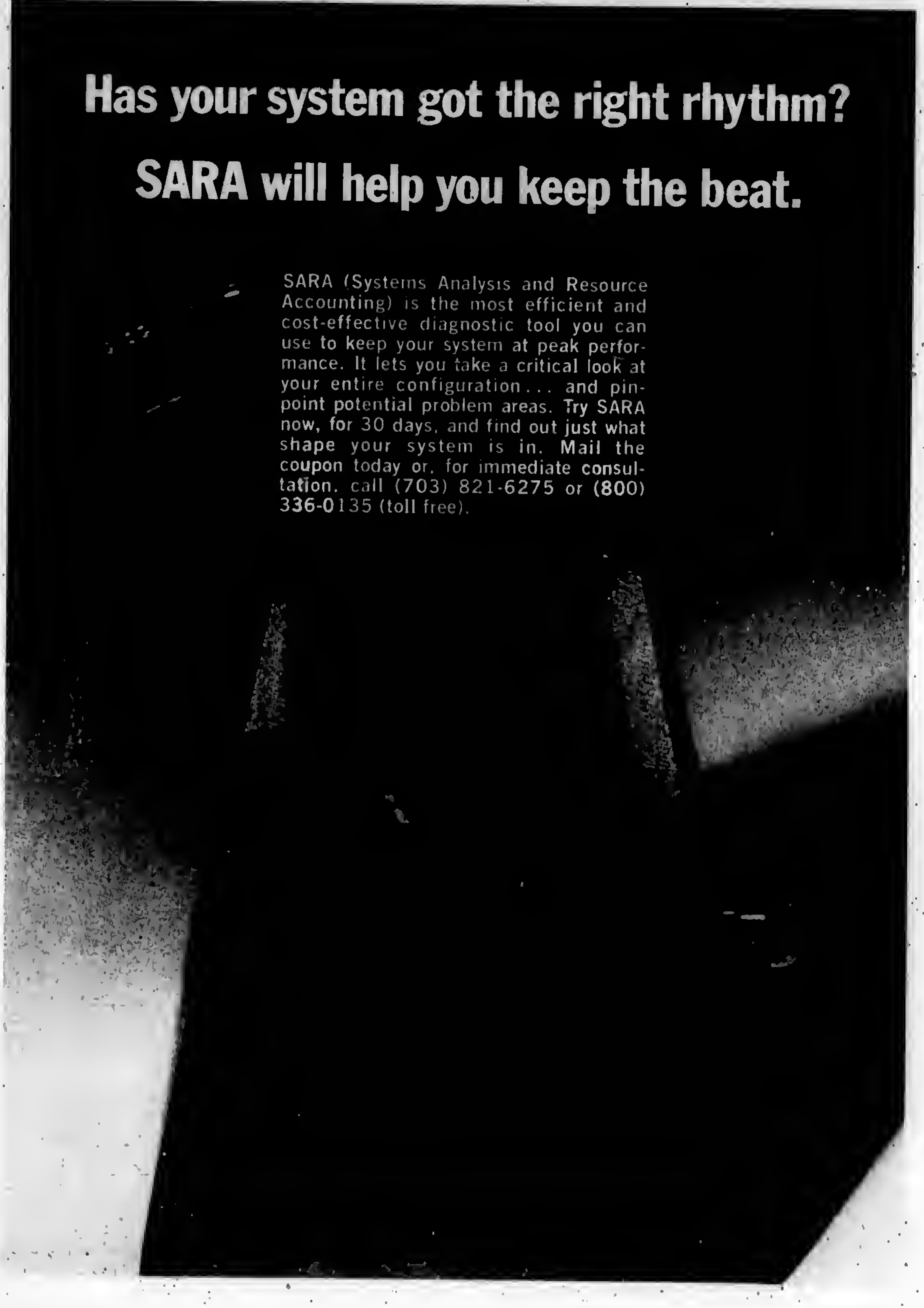
The Fairchild chip, said to encrypt text via the DES in about 10 microseconds per operation and to cost about $100, is the prototype DES chip in Hellman's model.

Hellman claimed his hypothetical system will solve 100 DES "problems" simultaneously. Although his $23-per-solution estimate could be increased by a factor of four when overhead costs were taken into account, it is plausible that cheaper components could be used in the system to achieve a cost-per-solution in the range of $1.

Dr. William L. Tuchman of IBM's System Communications Division, who played a key role in IBM's development of the algorithm NBS adopted as the DES, indicated at the session he was surprised by Hellman's announcement, but made clear his immediate reaction that Hellman's scheme is invalid.

Tuchman, however, did concede in response to a question from the floor that the U.S. Department of Defense may not be using the DES to encrypt its most sensitive data, indicating the department considers the standard of questionable strength in view of recent criticism.

Dr. Dennis Branstad, a former NSA employee who directed the DES project at the NBS and continues to direct the bureau's development of other DP standards, told the session a federal data communications standard is presently under consideration that would limit federal agencies to encryption in character-by-character cipher feedback mode and, for packet communications, to cipher block chaining mode. Hellman agreed this would render text encrypted in conformity with the DES safe from attack by his scheme.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DP Auditor Seen Biggest System Security Risk

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — "The DP auditor is the real key to the security of EFT systems, since there are no controls over him and therefore the highest risk is associated with him," according to Russell H. Dewey, management systems consultant for SRI International.

Chairing a recent National Computer Conference session here entitled "Technical and Social Issues of Electronic Funds Transfer Systems," Dewey noted that 2,000 of the 10,000 cases of missing funds reported annually by financial institutions involve computer abuse.

Half of those 2,000 cases, with an average loss of $20,000, involve collusion among several employees, he added.

"Regulations lag far behind the state of the art for computer cime," Dewey said, noting that dollar amounts in electronic theft far exceed amounts in a teller's drawer. Furthermore, while a teller theft may take minutes, an electronic crime can be committed in milliseconds while the perpetrator is anywhere in the world with a terminal.

The electronic thief has access to vast reservoirs of funds, leaves no fingerprints and is not photographed, Dewey pointed out.

Dewey cited known electronic crimes, such as the modification of credit authorization files, the use of counterfeit credit cards and "piggybacking" of previous EFT transactions in which a customer doesn't sign off properly.

In Tennessee, there was a case in which empty envelopes were deposited into automated teller machines (ATM) and credit was given for the amount claimed. Last month $140,000 was stolen electronically from Fedwire, he said.

DP Professionals Blamed

While personal identification numbers (PIN) help prevent imposter-type crime, while encryption prevents wiretapping and while a locked computer room can prevent physical attack, Dewey claimed most electronic crimes are committed by DP professionals with the necessary skills and access to vulnerable points of a system.

Frequent low-loss theft is committed by EFT customers, ATM clerks and tellers, salespeople and data suppliers, Dewey said. Of low frequency but high loss is theft by data entry personnel, media librarians, computer operators, peripherals and remote terminal operators and systems analysts.

Further, he noted, systems programmers and field engineers have the ability and opportunity to modify systems for theft.

To combat these threats, a number of system audit techniques and application controls are currently available to the system designer and more are under develoment.

In his speech, Dewey cited the booklet, "A Guide to DP and EFT Security Based on Occupations," available from the Federal Deposit Insurance Corp. as a source of general information.

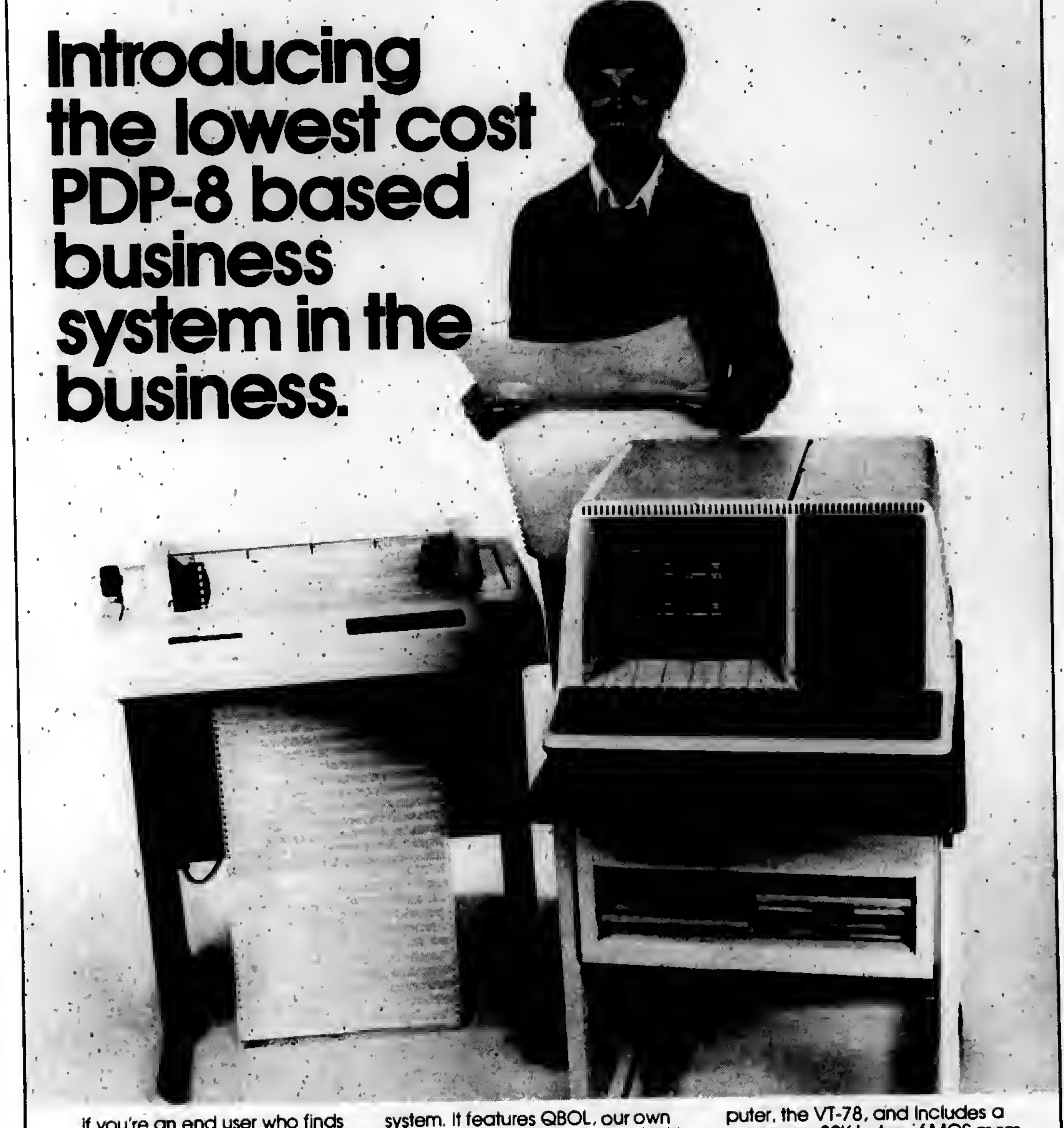
Standards Also Problem

Standards as well as security are a problem in EFT, according to Irwin H. Derman, vice-president in charge of systems development for Visa.

In the Visa environment, Derman said, there are 60 million cardholders, 2.5 million merchants, 200 acquiring facilities (banks that sign up merchants), one national switch and 800 card issuers (such as banks, savings and loan associations, mutual banks and credit unions).

Each of these categories is setting its own separate standards. The International Standards Organization and American National Standards Institute are also working on industry standards, he said.

Derman believes standardization is needed in the areas of terminals, plastic cards (physical characeristics, magnetic stripes and account numbering), the security and privacy of data and the data formats of communications networks. "We must use standards to separate, not confuse," he said.



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Fewer EFT Rules Seen Stimulant

(Continued from Page 14)

be told the "rules of the game" before he becomes an EFT customer, that the customer be sent a monthly statement with specific transactional information and that the consumer be given a written receipt at every transaction, also containing specific information, Brandel said.

The bills also contain strict error resolution requirements in which credit card, checking and EFT transactions are treated differently, he said.

In the area of dollar liablity, the bills place a $50 limit on consumer liability with the rest payable by the institution, except in the case of customer negligence. If a bank improperly processes a transaction, it is liable not for the value of the transaction, but for "approximate damages," Brandel said.

For example, if a fire insurance policy payment were to be mishandled, causing the policy to lapse, and the policyholder's house burned down, the bank would be liable for the price of the house, not just for one premium payment, he explained.

In addition, the bank can be sued for up to $500,000 if it violates the provisions of the bills, Brandel said.

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Proving Real Stumbling Block

Consumer Approval Held Main EFT Challenge

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — The major challenge to the implementation of electronic funds transfer (EFT) systems is that of consumer use and acceptance, according to Robert Halem, financial industry specialist for IBM in Los Gatos, Calif.

Speaking at a recent National Computer Conference session on "Current Developments in EFTs" here, Halem said that while EFT systems have been ballyhooed as "the coming thing" for the past 10 years, individuals and institutions are less willing to accept the accompanying change than had originally been contemplated.

At present, EFT technology makes possible on-line transactions, automated tellers, point-of-sale (POS) systems, bank-at-home arrangements and corporate EFT systems, Halem said. There are many reasons for implementing EFT technology, including the growing volume of banking transactions, the increasing cost of handling those transactions, the pressure to extend banking hours and the demand for new financial services, he stated.

A process of homogenization is taking place among banks, savings and loan associations, credit unions and mutual banks that will allow different types of financial and nonfinancial institutions to offer similar services to the consumer, he added.

In the case of automated teller machines (ATM), Halem noted "people stand in line to use them, even when human tellers are free, because they are predictable." POS, however, has been slow to develop because it offers "zero benefit" to the consumer, he said, while offering recordkeeping benefits to banks and retailers.

In addition to the problem of consumer acceptance, implementation of EFT faces other challenges as well, such as economic justification, the need for a smooth transition from present systems and an effective interchange of formats, content and procedures. Also necessary is adequate security, which is coming, Halem said.

Additionally, financial institutions using EFT systems must satisfy legal and regulatory requirements, he pointed out.

Successful Experiment

A government experiment with EFT, the Treasury Department's direct payment program, has saved money while increasing payment security, according to Robert Thompson, assistant director of the program. The Treasury Department — the nation's "bookkeeper" — has made payments for various retirement plans as well as interest payments for securities by mail.

"In many cases, checks are lost or stolen. Moreover, when the endorsed check comes back, the department must process it again," Thompson said.

Two years ago, the Treasury Department began making EFT payments through the country's 32 automated clearinghouses, which transfer the funds to the proper financial institution for credit to the account of the payee. There is a net savings of 13 cents on each transaction, Thompson said.

Five federal programs are eligible for direct deposit via EFT: Social Security, Supplemental Security Income, Railroad Retirement payments, Civil Service Retirement payments and veterans' benefits. Within these programs, 43 million payments per months are being made electronically.

Coming soon will be military services payments, such as Air Force active duty and Air Force retiree payments, which will amount to six million payments per month, Thompson said. Potential programs include Internal Revenue Service refunds, veterans' educational and insurance benefits.

In order to participate in the EFT program, potential payees must sign up for it, Thompson said. The Treasury Department has made a number of television and radio public service announcements regarding the program, as well as inserting flyers in check-payment envelopes describing the program.

"We always include a notice when issuing a substitute check for one lost or stolen," Thompson said.

Other efforts to publicize and explain the system include slide presentations made before groups of retirees and one-day seminars for financial institutions.

Retailer Not Pleased

Less pleased with EFT developments was Del Olson, assistant controller at Dayton-Hudson Corp. in Minneapolis, who contended that the retailer has not been considered enough in the development of EFT.

Further, he said, the economic balance between the retailer, banker and consumer has not been clearly delineated. Olson believes it is the responsibility of the bankers to do this because they are the developers of EFT.

Olson described the expected development pattern of EFT systems and then proposed his own version of the proper development of EFT. The expected development would involve small and independent retailers first, possibly forcing the larger stores to follow suit, Olson said.

Combination or "look-alike" cards will then probably flood the marketplace, and the last stage will be mandated sharing of facilities, he said.

"Look-alike" cards are such things as those issued by Visa, on which the faces of the cards are identical, but the back identifies it as either a credit card or "banking card" (debit card), Olson explained.

Olson proposed that financial institutions reconsider the use of combination cards, refrain from tying debit cards to credit cards and keep debit cards "local." More than 99% of all checks are written on local banks, he said, maintaining that credit cards negate the need for a national checking system.

Olson feels there should be a balance between the short-term benefits to retailers from EFT systems and the long-term benefits accrued by banks.

Since banks invest in hardware, he said, they experience a return on that investment; retailers, however, experience no return on their investment in people.

Olson suggested that retailers invest in hardware and levy transaction fees on banks — "a dime a time," as he put it.

For retailers to adopt the system, there must be a financial incentive to the retailer and there must be some sort of protection for his investment: further, customers must be trained to use the system so it will be efficient.

In a question-and-answer period following the session, one attendee responded to Olson's comments on local-only debit cards by saying, "The only reason I use a credit card is because I can't cash a check out of the local area." That observation was met with applause by the rest of the audience.

Framingham State College Given DEC Minicomputer

FRAMINGHAM, Mass. — A Digital Equipment Corp. PDP-8/I minicomputer has been given to Framingham State College here for use by physics and computer science majors. The system was the joint gift of George S. Lee Jr., educational liaison officer of Yankee Technical Industries, Inc. (YTI) and of YTI, a spokesman said.

Physics Department Chairman Dr. Arthur Doyle expects to develop at least one additional course involving the PDP-8/I and a Compumedic analog computer recently given to the school's physics and mathematics/computer science departments.

The Compumedic machine was given to the school by the Naval Air Reserve through the efforts of Charles Viau, a computer science major at the college and a member of the Naval Reserve.

A spokesman for the school said computer science majors and others working on hardware/software projects will be engaged in directed study assignments, as well as internship projects at the company plant.

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Models Reported Having Little Sway in Policy

By E. Drake Lundell Jr.
CW Staff

ANAHEIM, Calif. – The effects of computer simulation and modeling on policymaking in the public arena have been "slight," Dr. Granino A. Korn said at the recent National Computer Conference here.

Korn – speaking at a session on "Large-Scale Simulation: Can Large-Scale Models Alleviate World Resource Problems?" – said models rarely make valid predictions about large social systems and therefore have little effect.

At the same time, however, the University of Arizona professor noted models do give policymakers a quick look at various ideas and can prevent some bad policy decisions, particularly when a model is limited to a fairly short-term prediction.

But "the cumulative effect of unknown variables" makes modeling not particularly useful for longer range projections, he said. He criticized in particular the doomsday models of Dennis Meadows for the Club of Rome, published as *Limits to Growth,* that predicted the world would run out of resources in the next century.

Furthermore, Korn said such predictions and models turn off the general public to modeling and may mislead the general public.

Too Late to Help

Another panelist, William E. Cundiff, a researcher with the Institute for Research on Public Policy in Montreal, said he feels models can help the world overcome its resource problems. But he is worried that by the time the models gain acceptance by policymakers, it might be too late to have that effect.

In order to make such models more effective, more communication between models and model makers is necessary, Cundiff said, suggesting a worldwide communications network to link separate efforts going on around the globe.

Such a network could accelerate the validity testing of large-scale models, he said, and serve to check out models when they were in the discussion and development stages, rather than after they had been developed and implemented.

In another area, James N. Hartley, a senior development engineer for Battelle Pacific Northwest Laboratories, said modelers also need to gain a better understanding of the terms and the applications on which they rely.

In some cases, he indicated, models have come up with dire predictions just because the model makers did not fully understand the meaning of some of the data they fed their models.

For example, he noted, some have used the figures on the "reserves" of various minerals as the total amount of minerals left in the world for resource models. This is not valid, he said, explaining the reserves are just that portion of the resource that can be exploited by available technologies and at current prices; while the amount of "resource" left is much higher.

NCC Interpreted For Deaf DPers

ANAHEIM, Calif.— Through the efforts of Dr. Steven Jamison of IBM in Palo Alto, Calif., three interpreters were on hand at the recent National Computer Conference to translate verbal messages into sign language for eight deaf attendees..

The service has been offered at NCC for the last five years and is part of an effort to pave the way for the deaf to enter the DP field, according to Rick Hernandez, one of the interpreters.

When asked how nontechnical interpreters handle technical material at NCC sessions, Herandesz said it is very difficult. Architectural configurations, technical descriptions and buzzwords give an interpreter the most trouble.

Since signing consists of either conceptual signs or time-consuming finger spelling, and since many technical phrases are made up of a string of letters and numbers, an interpreter often finds himself spelling out of a considerable portion of a speech, Herandez explained.

Because signing requires such a "kinetic involvement," according to Herandez, the NCC interpreters worked for 20-minute periods followed by 20-minute breaks.

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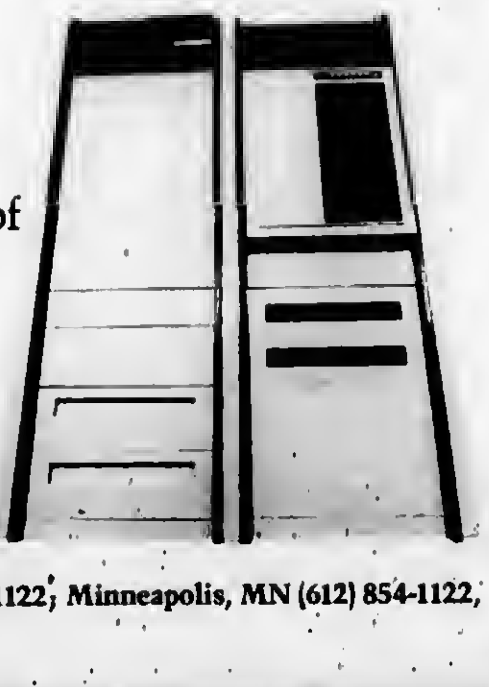

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'Living History' at Stake

DPers Urged to Preserve Papers for Posterity

By Howard A. Karten
CW Staff

ANAHEIM, Calif. — "Save your notes, technical papers, anything related to your projects," Jean Sammet urged attendees at a National Computer Conference session here recently on the history of programming languages. "You never know what their value will be in 20 years."

Leading the session devoted to the problems and results of the History of Programming Languages Conference held in Los Angeles immediately prior to NCC, Sammet — the chairman of that conference — recounted some of the problems encountered by participants.

Two of these, she said, were the inability to locate old files and notes and the difficulties faced by the invited participants, most of whom are currently involved in research, in getting away and in justifying to their organizations their participation in the conference.

Sammet's co-panelists at the NCC session agreed that the conference, which was held by the Association for Computing Machinery's Special Interest Group on Programming Languages (Sigplan), had been a valuable learning experience, but was not without its difficulties.

Recounting his own efforts in gathering material and preparing his paper for delivery, Ralph E. Griswold of the University of Arizona cited the work involved in sifting through "a small mountain" of documents, which he said included handwritten notes and memos, 25 file drawers and a considerable amount of machine-readable material.

'Inaccuracy of Recollection'

Griswold, who was a pioneer in the development of the Snobol language, said writing a historical paper is difficult and demanding when compared with writing a technical paper because of the need to often rely on memory. Pointing to "the inaccuracy of recollection," Griswold said he was helped significantly by his wife, who not only has some background in computer languages, but a degree in history as well.

Offering a slightly different perspective on the problems encountered in collecting "living history" from those involved in making it, Henry Tropp of Humboldt State University in Arcata, Calif., said the problems of historical research are by and large the same regardless of the specific nature — social or technical — of the subject.

Tropp, a historian of science, agreed with the other panelists that perhaps the main problem involved in writing a living history is that of "distortion of the past, based on what you know today."

An overall view of the Sigplan conference was given by James J. Horning of the Xerox Palo Alto (Calif.) Research Center, who said two recurrent themes could be discerned: the "oh-it-was-done-in-a-hurry" theme and the idea that committee-developed languages differ in significant ways from author-developed languages.

While not elaborating on the nature of the differences, Horning said the lesson to be learned is that committees should not be established to solve technical problems, nor should individuals expect great success in attempting to solve political problems.

Two morals regarding the endurance of languages can be drawn from the "in-a-hurry" idea, according to Horning.

The first is that "languages often last longer than we intend them to" and greater care should therefore be given to initial development efforts; the second is that software techniques developed "just as a tool for our own use" have a way of becoming disseminated — an observation familiar to many programmers and analysts.

Further, Horning stated, "technical excellence in a language is important, but is neither necessary nor sufficient to establish language vitality." Other factors, such as ease of learning, government support and the total system in which a language is embedded, ensure the use and survival of programming languages.

Recording Tricks

Jan Lee of Virginia Polytechnic Institute and State Univeristy in Blacksburg, Va., who served as administrative chairman, of the Sigplan conference, spoke of the tricks he used in trying to record that conference. Since the organizers of the sessions wished to be as unobtrusive as possible in doing the recordings, microphones were secreted in table decorations.

This strategem worked so effectively that panelists tapped their cigarettes and pipes against them, unaware of the effect they were having.

Murmurs of approval and then laughter swept through the audience as Lee told of applying one of the principles of DP — redundancy — in preparing for the conference. Three separate sound systems — two for audio and a third on videotape — were used to capture the comments of all participants. The audio and video tapes will be kept for subsequent use by scholars, and edited versions may be made available for purchase by interested parties, he said.

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Editorial

FCC Should Survey Users

Hardly a day goes by during which some government official does not invite comments from the public on pending issues. The Federal Communications Commission (FCC) spokesmen are no exception in that they urge users to speak out on important questions whenever the opportunity arises.

Inevitably, pleas for more input are made by FCC staffers at industry conferences such as the recent meeting of the International Communications Association. At these conferences, all parties agree that the user's viewpoint must be heard and many promise position papers.

Some large users do take the time to get involved with regulatory affairs but most give this type of effort rather low priority. However, the federal bureaucracy can be rather intimidating and some don't know where to begin in what appears to be only a time-consuming effort.

It therefore becomes clear that regulatory agencies such as the FCC bear an obligation to actively seek out the opinions of the regulated.

If the FCC really wants an objective overview of user opinion on a specific topic, there is nothing to stop it from surveying the people from which it wants to hear. In the private sector, especially among consumer-oriented product vendors, somebody is always quoting survey figures to back up product popularity claims.

Admittedly, surveys can be overdone. But in a controlled environment, and conducted under the direction of the FCC staff, a phone or mail poll from a government agency would be hard to ignore — especially if a user's business interests were affected by the issues being surveyed.

In the past, the FCC has gone to third-party consultants for its studies such as those on economic impact. But these investigations are usually complex.

The FCC needs a director of public opinion who could make up 10 specific questions to be asked in a brief phone call or in a short questionnaire.

The FCC will probably claim it has neither the time nor the resources to undertake such a program. But the commission must be brought more in touch with the views of those who subscribe to regulated communications facilities.

Communications issues are becoming too wide-ranging to allow the same vested interests to continually bend the ears of government regulators.

As the commission deals with issues that will affect the DP and communications areas for years to come, it is hoped that user surveys will be implemented. The same users who have a stake in the decisions being made are the taxpayers who underwrite the government. Surely they would welcome a simpler method of expressing their views.

Data Past

Five Years Ago
June 20, 1973

WHITE PLAINS, N.Y. — IBM expanded the capabilities of its 3340 disk storage subsystems to allow users to intermix the newer storage with 3330-type disk subsystems. In addition, IBM added three other features to the 3340 to provide additional flexibility for 370 virtual users.

— — —

NEW YORK — A school board election using computer-prepared voting lists was challenged in the State Supreme Court here on grounds that some citizens were denied their right to vote. The list was substituted for a file-card system which contained the signature of each of the city's registered voters. In the conversion process, some voters' names were omitted, and those who were who came to vote without proper identification were turned away.

Eight Years Ago
June 24, 1970

EAST ORANGE, N.J. — Computers should not be part of an image-making display for their owners, according to Joseph Wasserman, president of Computer Audit Systems, Inc. "When so many groups are anticomputer, it is deliberate carelessness to make a showpiece out of a DP center," he said.

— — —

WASHINGTON, D.C. — The first of perhaps 500 computer programs was approved for patenting under the Bernhart-Fetter policy of the U.S. Patent Office. That policy, reached in November by the Court of Customs and Patent Appeals, said that computer programs could no longer be automatically rejected by the Patent Office. Shortly thereafter, a "notice of allowance" was given to applicants Walter D. Bernhart and William A. Fetter.

'. . . The DP Department, What Else?'

Letters to the Editor

Disappointed About Omission

Software House was disappointed at the omission of our System 1022 data base management system from the excellent series of data base articles by Ronald G. Ross [CW, May 22, May 29].

System 1022 is classified as an inverted data base management system with support for interfile relation, according to the table and list of criteria in Ross's first article. System 1022 runs on all models of Decsystem-10s and Decsystem-20s under the Tops-10, Tops-20 and Tenex operating systems.

System 1022 was released in 1973 and is installed at dozens of sites in the U.S., Canada and Europe. It is also available for use on the major commercial time-sharing systems.

Eugene Shklar

Software House
Cambridge, Mass.

'User' vs. 'Customer'

"Close Encounters of The First Kind: Technician vs. User" [CW, May 15] was a winner with one exception. It includes the word "user" 36 times and never once uses the term "customer." If DP personnel are ever to achieve their zenith of effectiveness, this thinking must change.

"User" connotes an ill-informed individual who has been permitted to avail himself of the wonderfully sophisticated, state-of-the-art, space-age technology we have created. Users are to be tolerated and are frequently a nuisance.

"Customer," on the other hand, connotes a person or department that is paying for products and services, but only for so long as they are to his satisfaction. A customer enjoys the option of taking his business elsewhere in the event his supplier cannot adequately address his needs.

In dealing with customers, the supplier must use salesmanship and express himself in terms they understand. Customers keep suppliers in business, enable them to collect paychecks and feed our families. They must be catered to and are "always right."

James E. Rushing

Chicago, Ill.

Disagrees With Distinction

We disagree with the main inference of "Desktop Computer, Mini Differ Widely" [CW, May 8].

We feel it is possible for a system to be both a desktop system and minicomputer system. The General Robotics Corp. MVT/X3 is such a machine. It is the first of a new breed of desktop-sized computer systems that bridge the gap between conventional desktop computers and minicomputer systems.

The article's accompanying table that was meant to point out the differences in systems does in fact support our claim. It is apparent from it that the MVT/X3 is able to meet the criteria of a desktop computer and yet be easily expanded to meet the criteria of a minicomputer system with the addition of terminals, disk and communications — all the usual peripherals of a larger minicomputer system.

Digital Equipment Corp.'s very successful RT-11 operating system has simple Basic for desktop-style operation at one end of the spectrum, ranging to Fortran IV, Pascal and APL at the other. To this we can add a time-sharing executive that allows 10 users simultaneous use of RT-11.

David F. Stubbs
Vice-President
Marketing

General Robotics Corp.
Hartford, Wis.

Reader Commentary

Story of 'Flops' Points Out What Not to Do

By Ronald B. Smith
Special to CW

Once upon a time there was a system design project called Field Labor Operational Payroll System (Flops). Flops started out as a good project, but ended up as a lemon and is still hobbling along. The purpose of this article is to show how things can go wrong and what lessons can be learned from them.

A division of a large conglomerate manufactured copying machines. The division's headquaters was located next to the conglomerate's headquarters. This division had branch offices in all of the major cities in North America. Each branch office had a terminal that was part of the conglomerate's communication network, which was hooked up to the main computer:

All the branches hired maintenance people from the local union to maintain its customers' copying machines. Each union had different pay rates and fringes for each job classification.

The scope of Flops was to transmit the mechanics' weekly work data from the branch terminals through the conglomerate's communication network so that the mechanics could get paid. Flops would also produce labor distribution reports.

Project Log

Following is the sequence of events during the systems development process of Flops:

January 1975. The feasibility study began and a user project manager, a user project leader and two part-time analysts from the DP department were assigned to the project.

May 1975. The recommendations from the feasibility study were approved by the users and the systems design began. The entire project was to cost $50,000.

October 1975. The division elected a new president.

November 1975. The analysts gave a design presentation for the users. The president rejected the systems design because the turnaround time of the communications network was too long. The project was put in a hold position, and all work on it stopped.

March 1976. The systems design began again with a new cast including a user project manager (president), a user project leader and a full-time analyst from the DP department.

April 1976. The DP department upped the project price tag to $100,000 and set a completion date of Dec. 31, 1976. Also, the DP department decided for the sake of saving time to have programming concurrent with systems design.

May-September 1976. The following events took place during the redesigning and programming phase:

- The user project leader (president) was too busy with the normal duties of his office to be actively involved with the project.
- In effect, the new user project leader was an interface between the users at the local branches and the analyst. The user project leader spent more time designing the system than gathering the requirements. Also, the requirements were forever being changed. Many of the controls the analyst wanted were diluted or deleted by the user project leader.
- For reasons unknown, the programming manager didn't like the analyst. This created a difficult internal environment for the analyst to work in.
- The scope of the project was enlarged.
- Because of the other factors and the fact the analyst was trying to meet the implementation date of December 31, the analyst's interpersonal relationships became strained.

October 1976. Systems design was completed on schedule.

November 1976. Final programming estimates were made. For the second time, the cost of the project was raised, this time from $100,000 to $250,000. Also, the implementation dates were changed from December 31 to the following June 30. The users became very unhappy and as as aftermath, the analyst was replaced with another analyst from the DP department.

February 1977. With the start of system testing, many problems were encountered:

July 1977. Testing and parallel runs were completed and the system was implemented.

August-December 1977. The following took place:

- The users were still modifying the system.

(Continued on Page 24)

The Human Connection

Small Businesses Can Hit Snags With Large Clients

By Jack Stone
Special to CW

There must be literally thousands of us small business people in this industry, rushing about from one job to another. And, quite frankly, it's a great life.

At least most of the time. Occasionally, we run into situations in which we become frustrated, and they always seem to be related to the failure of certain large customers or prime contractors to meet commitments.

I don't think these few organizations really have malicious motives or insidious incentives toward small business, but I must say it sometimes appears that way.

Here are several examples from my own experience. Many months ago, I completed a long-term contract for a firm well-known in the industry. Despite my repeated billings, I have yet to collect a small balance of my fee, plus reimbursement of expenses I incurred on the firm's behalf nearly a year ago.

In another case, a major electronics firm called me in to handle a crash consulting job which was to span almost a year.

Partial payments were scheduled at various points along the way. However, because of the customer's archaic purchasing and accounts payable systems, I never received one dollar until after the job was completed.

But compared with the experiences of David Collins, I've had smooth sailing. Just read his story, which I've extracted from an article in the *Wall Street Journal*:

Collins is president of a small electronics firm by the name of Computer Identics, Inc. The company's major product is an optical scanner for the railroad industry. It is positioned alongside railroad tracks to identify cars by reading coded labels fixed to the side of the car.

The Association of American Railroads (AAR), which represents a majority of companies in the industry, was impressed with the device all the way back in 1967. Over the years, around $150 million was spent by the industry setting up Collins' scanners and attaching labels to keep watch over the rolling stock, according to *Wall Street Journal* estimates.

Unfortunately, the association recently voted to scrap its requirement for color-coded labels because the system using the scanner does not work well enough to continue its support. The problem did not appear to be in the scanner; rather, the consensus seemed to be that the problem resulted from the labels.

Because the environment is dusty and dirty and sometimes contaminated with fumes from corrosive chemicals, the labels

(Continued on Page 22)

The Taylor Report

'Terminal Booths' Would Benefit Occasional Users

By Alan Taylor
Special to CW

Recently I looked through the list of offerings by computers connected to the packet-switching network operated by Telenet. The impressive catalog showed that users can gain quick, cheap access to systems that provide bibliographic information, process financial data and handle architects' needs as well as mundane business applications.

Telenet had just introduced a new flat-rate tariff which, while it does have some volume discounts, is much better organized for the occasional or small-level user. The network had taken the tariff to the Federal Communications Commission for the normal approval and I was checking to see just what impact it might have.

One of the entries in the catalog interested me because it specifically said it caters to occasional users. Looking at this and looking down the list of offerings, I found that a few actually restricted the access to large organizations. In some cases, this is reasonable because of professional affiliations. A good case, for instance, can be made for requiring a certain level of expertise in providing some types of professional services.

However, often the weakness that requires such restrictions is in the software or in the manuals themselves. In fact, with regard to networked time-sharing services, generally we are at about the same stage as packaged programs were some 10 years ago — they succeed when you work really hard with them, but very frequently they just aren't worth the trouble involved.

Impulse Markets

But this is not necessary. As any check on available systems indicates, there is a great deal of possible "impulse buying" for information, processing, education and training. All of these markets are actually accessible at the end of anyone's telephone and at very reasonable charges per call. Of course, the total charge isn't simply the connect charge or the network charge. In addition, there are the data base royalty charges — and that is where a major part of the problem lies.

Normally, these charges start with some form of contract — three months, six months, etc. — and single step charge in the range of $500 or more. Of course, this $500 buys many references and many uses of the data base, but is this really necessary?

Why can't the public buy a single use of a data base on an as-used basis? Why can't we have the equivalent of telephone booths, "terminal booths," set up in each office of any network system and paid for by credit card

(Continued on Page 23)

Reader Commentary

DPers, Managers Need Broad Career View

By Dean A. Slone
Special to CW

Outside of their field, DP personnel run up against many barriers to advancement that are created by tradition, company reporting structure and by the DPers themselves.

The original DP professional was, by necessity, technically inclined so he could "communicate" with the early computers: These people came, and still come, from every educational discipline — finance, engineering, math and the arts and sciences. The only requirement DP made of them was that they be able to think logically. Their management skills were ignored under the prime directive to "get something we can use out of that thing."

Historically, computers in America are an outgrowth of the early unit record equipment and as such are looked upon as very fast accounting machines. The direct result of this line of thought is that computer facilities and personnel have traditionally been assigned to the financial operations.

By its nature, financial management must go into all areas of a company in order to extract the information necessary to perform its function. Problems can arise when DP attempts to perform its function for areas other than finance while reporting through the financial arm. For example, a manufacturing process system developed under direction of finance has a good chance of becoming a price/cost system that does not fulfill the needs of manufacturing.

Realization by management that DP is not simply financial reporting and number crunching but an information resource, with definite and unique functions, would help to establish it as a more viable career path to general management.

Those business professionals who have chosen DP as their entry career and wish to go beyond it also have to do their homework. They must be willing to go back to school and seek out training in the management sciences.

Those who wish to branch out into general management will not make it because they know about computers but because they have become involved in the development of systems relating to a broad range of business issues and because they were willing to obtain knowledge beyond their technical expertise.

Slone is a senior DP analyst on the corporate staff for Emhart Corp. in Farmington, Conn.

ICL Responding to U.S. Users' Needs

By G.D. Rowett
Special to CW

"Cross Took ICL Through 'Awe-Inspiring Years' " [CW, May 8] presented a confusing account of International Computers Ltd.'s (ICL) European operations that, unfortunately, leaves a reader somewhat bewildered about ICL's activities in the U.S. The following should help clarify for CW readers ICL's goals and direction in America.

ICL is a British-owned, worldwide corporation with offices in 83 countries and manufacturing plants in three continents, employing 33,000 people, with revenues exceeding $750 million. It is the eighth largest computer firm in the world (by almost any measure) and the largest outside of the U.S.

The growth pattern of the computer industry clearly shows that demand for large and small systems is increasing faster than that for medium-size units. For this reason, ICL acquired the System Ten and 1500 series of small computers from Singer Business Machines in 1976.

This acquisition formed the foundation for its U.S. operations. Also, the former Singer product line was operationally similar to ICL's other products and used the same terminal-oriented approach to solving business problems.

ICL's U.S. policy is to supply system services to the marketplace and to improve its products continually to meet market requirements. One such step was its purchase of a 20% interest in Computer Peripherals, Inc., a firm jointly owned by ICL, NCR Corp. and Control Data Corp. This operation develops and manufactures more advanced, efficient printers, disks and tapes, some of which are already being used in ICL products.

Just a few months after acquiring the Singer System Ten, ICL took this product a significant step further by introducing the 220 series, which offers improved performance and greater expandability.

In summary, ICL is in the U.S. because no world-class computer supplier can afford not to be here if the firm wishes to grow and develop. ICL has the experience of nearly 70 years in the business equipment market and in systems applications.

Rowett is president of the marketing division of ICL, Inc. in E. Brunswick, N.J.

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TONE

Businesses Hitting Snags

(Continued from Page 21)

often were not clean enough to be read accurately. One railroad reported a correct read rate of only 80% where 90% was deemed necessary to make the system economically justifiable.

When the AAR dropped the system after a decade of Collins' efforts, Collins entered the courts, charging that certain elements of the industry "conspired in restraint of trade" to keep the automatic car identification (ACI) system from permanent operation.

Specifically, Collins is suing Southern Pacific, a railroad holding company, and Strong Wishart & Associates, a consulting firm in the railroad industry, alleging that these two organizations had a conflict of interest as related to his scanner. Seems as though Southern Pacific has 80% ownership and Strong Wishart 20% of a firm named Tops On-Line Services, Inc., which markets a railroad car identification and control system known as Tops. Collins claims that ACI and Tops are competitive.

Back in 1974, the U.S. Railway Association (Usra), a nonprofit corporation set up by Congress to develop a rail plan for the eastern U.S., let a consulting contract to recommend a freight car control system. The *Journal* noted, "Computer Identics says Usra had plenty of consultants to choose from but chose Strong Wishart, even though it knew that Strong Wishart had a financial interest in Tops On-Line Services and thus a conflict of interest in advising on a freight-car-control system for Conrail. As it happened, Strong Wishart recommended a system incorporating Tops and failed to mention ACI systems as even a possible option."

The *Journal* went on to say "Computer Identics also charges that Southern Pacific used its position within the AAR to create doubt as far back as 1975 as to whether the trade group would continue to support ACI."

Computer Identics petitioned the Interstate Commerce Commission to force the railroads to maintain their ACI labels, but was turned down. The company is now appealing.

Southern Pacific and Strong Wishart deny all of Collins' charges.

'Amused' at Misinformation

User Recalls Days of Univac I at Census

By Louis A. Benton

Special to CW

When reading "Smithsonian Sparks Memories of DP Roots" [CW, May 8], I was sparked to remember the old elementary school game of whispering a word down a row of students to see what came out the other end. I am sure the misinformation contained in the article provoked more amusement among those of us who were around at the time than the intentional humor.

If Anthony Constable was accurately reporting Dr. Merzbach's information concerning the Univac I, he has crushed my fondness for an institution at which I spent many boyhood days. I feel compelled to correct those errors for which I have some firsthand knowledge.

The Univac I at the Bureau of Census had absolutely nothing to do with paper tape. Except for operator I/O, the Univac I used only magnetic tape for I/O.

In reality, the Unityper was a key-to-magnetic tape unit, a device which became popular when it was reintroduced about 20 years later. It finally caught on because there were enough "naive" computer users who lacked the sophistication to know how important punch-card unit records were to business. (But then, IBM couldn't educate everybody). The Unityper was for input only.

Printed output was originally generated by the Uniprinter, a magnetic tape-to-typewriter device which was agonizingly slow. Imagine filling up 200 pages of data at about 10 char./sec!

There was also an on-line typewriter for control output to the operator.

'Card-to-Trash' Unit

For the bulk of data input, we all fondly remember a card-to-tape unit (less fondly referred to as card-to-trash) which, when it worked, was used to transfer data from punched cards to magnetic tape for input to the computer.

The "very low density" of the Uniservo was 50- and 100 char./in. It is a shame Dr. Merzbach did not mention the excitement the Uniservo would generate when the nylon fishline used to string the tape path pulleys would break and the resultant loss of servo control would cause the tape to go shooting off the spool at full speed.

Reader Commentary

Maybe someone else can help you more precisely, but my recollection is that a full-sized tape held about 800 ft of tape and weighed more like 10 lb. A smaller tape, used with the Unityper, was probably about 200 ft of tape.

It might be of interest that the heater switches on the console were used to energize heaters that precisely regulated the delay of data through the mercury tanks that served as the only CPU memory. Data was stored in these tanks as ultrasonic waves.

Benton is president of Staff Computer Technology Corp. in Del Mar, Calif.

Booths Could Aid Net Users

(Continued from Page 21)

or in cash on a per-call basis?

I think these "terminal booths" could be provided without any changes in the regulations if the network owners would simply invest in one "public" subscription to each of the data bases (or to enough of them so that some form of public service could be provided).

I am sure there would be enough demand across the country for use of the New York Times Information Base or the Bibliographical Retrieval Services (to mention two at random) to support the $1,000 or $2,000 investment.

How about it? I see a great deal of benefit in having services available on a reasonable per-call basis. Wouldn't "terminal booths" be in the public interest?

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CW 6/19/78

'Flops' Story Demonstrates What Not to Do

(Continued from Page 21)

- The internal auditors audited the system and were very unhappy with the loose computer controls and the absence of the noncomputer controls.
- Top management wanted to know why the project cost so much, why it took 2-1/2 years to implement, why the system was still being modified and why the overall controls left a lot to be desired.

Learning From Flops

If the project has pre-agreed deadlines and those deadlines are continually being pushed back, the chances of success will be minimal: The project should also have realistic implementation dates.

The users play key roles during the systems development process. To be really effective, the user project manager has to have the time to be involved. He can't reverse roles and play the part of designer while the analyst gathers the user's requirements.

The users can make the difference between a good or bad system design.

If the analyst who designs the system is working under a "tight implementation schedule," it might be better if he were the test analyst because of his familiarity with the system. This could also shorten the testing phase.

Otherwise, especially from an auditing standpoint, it would be botter if the system designer and test analyst were different people. For example, the user could he the test analyst. In addition, the analyst should be the type of person who doesn't allow oxtreme pressures to get the best of him.

The internal auditing department should be involved in all phases of the development process. This should help educate users and impress upon them the importance of good controls.

A project will become unstable if there is a large turnover of users and analysts working on the system. The continuity, interaction and transfer between the phases of a project will usually not be compatible. This also leads to much duplication of effort.

Concurrent programming with systems design on large projects has its benefits and drawbacks. The main benefit, if everything works, is saving time. The main drawback is that the analyst may change some of his specifications on something that has already been programmed.

Because of changes in the business environment, there will be changes in the original requirements of the project. Because of changes in the technological environment, there will be changes in the project's design. The point is, the longer the duration of a project, the more unknowns and corresponding costs will be encountered.

The DP department should produce a systems development process (SDP) pamphlet for the department, management and current/future project users.

SDP is a structural approach to building information systems. The SDP is simply a sequence of rational and logical thoughts and actions regularly used by everyone in making decisions.

The SDP is an essential tool for increasing your contribution in project planning and development and ensuring project success.

The point is that the user has to be educated in his role in tho SDP, his decision points and his risks.

"The DP department should produce a standard control form to be signed by the user if he wants changes to his requirements during the SDP. In this way, the user and DP department will have documentation on one of the reasons why a project might go over its original cost.

The DP department currently has four or five phases in the SDP. This lumps a lot of activities into a single phase. The numher of phases should be expanded or have individual steps within each phase.

Also, it would he much easier to cost individually more phases or steps within phases. The following phase descriptions could be used:

- **Definition Phase.**

a. Initial Investigation. This step identifies the problem or opportunity and determines the need for further study.

b. Preliminary Systems Study. This step provides an economic evaluation and first definition of the proposed system. The economic evaluation includes the "ball park" costs of designing and implementing the system along with the operational costs of the current and proposed system.

The first definition describes all major features of the proposed system. The study includes the scope, objectives and constraints. It identifies, evaluates and recommends alternatives and plans the next step.

c. Systems Analysis. This step describes the proposed business system in user terms. It provides a business solution to satisfy the user's requirements, assures that a technical solution can be developed and plans the next step.

- **Development Phase.**

a. System Design. This step describes the proposed husiness system in technical terms that detail the logical system. It also develops plans for conversion design and user procedures. The conversion design builds a bridge from the current to the new system. The user procedures prepare the users to operate the system. The next step is planned.

b. Programming. This step defines the programs and the modules within the programs and translates each module definition into machine-executahle code. Finally, the programs are tested individually and as a complete system.

- **Implementation Phase.**

a. Testing and Installation. All aspects of the business system are tested to the satisfaction of the user and data center in a "live" environment.

b. Project Evaluation. The system is reviewed as to how well it meets user business objectives. Recommondations are developed for upgrading the SDP. This review should take place one to six months after the system becomes operational.

All projects $25,000 and more should utilize the Project Evaluation and Review Technique or the Critical Path Method approach starting with the preliminary systems study.

On big projects, more work and the corresponding costs should be spent up front during the preliminary systems study than is done for small projects. If not, the big project could exceed its budget, extend beyond its implementation dates and be poorly designed.

Just as planning of a project must take place at two levels, so must budgeting. A firm budget is developed and a commitment made for the next step or phase.

As the project proceeds, the estimate range narrows. Management is not asked to commit resources for the complete project until a clear picture of the solution is available. A complete solution might be clear after the first step, or it may take the first four steps within the SDP.

Since it is his system, the user must be made to realize he has to have complete responsibility for the controls. All too often, the user doesn't know all the controls and doesn't even realize he should be responsible for them.

The analyst in the example couldn't impress upon the user project leader the importance of good controls being built into and around the system. The analyst shouldn't try to mediate or correct a situation over which he hs no control. In short, it might solve nothing and create ill feelings.

Most working people report to one master. They are paid to take orders and are not responsible for what they do.

An analyst has two masters — DP management and the users. Sometimes the analyst is told to do things by DP management that are not in the best interests of is users. Since the analyst represents the users, it's his responsibility to let his management know of the possible consequences.

If DP management decides to take no action on the situation, then there is nothing else the analyst can do. Therefore, he must not he put in the position of trying to serve many masters. More often than not, the requirements or rules of the different masters could be in direct conflict with each other.

Flops was missing one main ingredient that brings stability to a project. That is loyalty — loyalty to each other and to the project.

No single person or event hrought much harm to Flops. But as one can seo, the combination of people, time and events can contribute to implementing a poor system.

Smith, who hos o degree in occounting, is o senior systems onolyst at Corrier Corp. in Syrocuse, N.Y.

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NCC Panelists Agree

Data Base Design Defies Automation

By Don Leavitt
CW Staff

ANAHEIM, Calif. — There are tools under development to simplify and improve the design of data bases, but all the panelists at a recent National Computer Conference session here on data base design methodology admitted their research projects — even if they work out as well as they hope — will not completely automate the design process.

"We plead guilty," Prof. Dennis G. Severance said. "We haven't solved the entire problem. We still have to know what the user is trying to accomplish."

The work he has under way at the University of Michigan can help the designer/analyst to recognize what factors have to be considered in planning a data base. But, he added, it's more to help the analyst avoid bad design options than to show what design would be the best.

Earlier he reminded the attendees there are five basic factors that have to be considered: the hardware environment, a logical data description, each of the users' transaction profiles, design constraints and, finally, the software environment.

Design Problem Complex

None of these are terribly hard to describe, the professor noted, but the way they interface with each other make the design problem one with great complexity.

There are many criteria typically used to define what benefits are wanted from a data base system, but they generally can be narrowed down to nine, according to Severance. The first three — response time, storage requirements and maintenance requirements — can be quantified and therefore easily measured, but the others are increasingly qualitative and therefore subjective, he said.

System development cost comes closest to being measurable before the fact, "but how can you measure data redundancy, data security, reliability, flexibility or simplicity?" he asked.

(Continued on Page 26)

Option Eases CICS Coding

NORWALK, Conn. — The Message Management Feature (MMF) now available as an option with the Key/Master package from Turnkey Systems, Inc. is said to simplify the creation of on-line applications in an IBM Customer Information Control System (CICS) environment.

MMF removes all CRT formatting and editing from an on-line application program. Display formats are created in an interactive session using Key/Master's Format Description Facility, a spokesman explained, emphasizing no programming knowledge is needed to build new formats.

Formats and editing criteria can be tested for usability long before any coding is begun, and the resulting on-line programs need only perform the relatively simple functions pertaining to data manipulation, he continued.

MMF makes every on-line program smaller, easier to write and more efficient, the spokesman claimed. All incoming data is edited by MMF before any application logic is invoked and error messages are returned to the terminal operators without application processing.

As a result, demand for both system resources and response time is minimized, the vendor asserted.

Previously developed for and still available with Turnkey's Task/Master teleprocessing monitor, MMF requires no change in either the on-line control or the operating software.

With MMF, editing of incoming messages is more than simple presence/absence or type-of-data testing. Fields may be generated, operated upon arithmetically, range-tested, verified against on-line tables or certified as having a valid check digit, according to the spokesman.

Nearly every validity test short of actual checking against a data base can be performed external to the application program, the spokesman stressed. Users have reported savings of better than 50% in the time needed to create new applications as a result of using MMF, he claimed.

MMF costs $14,000 or $390/mo. Key/Master's Data Entry Feature [CW, Feb. 12], costs $12,000 or $265/mo, Turnkey Systems said from 111 East Ave., Norwalk, Conn. 06851.

N.Y. Conference to Compare DBMS

NEW YORK — The four-day National Symposium on Comparative Data Base Management Systems (DBMS), to be held here next week, will provide attendees with the opportunity to hear presentations, see demonstrations, ask questions about and evaluate all the major DBMS now available, according to AMR International, which is sponsoring the conference.

On Monday, June 26, George Schussel, vice-president of American Mutual Liability Insurance Co. and a long-time observer of the DBMS scene, will open the meeting with a presentation on the problems and opportunities facing the data base world.

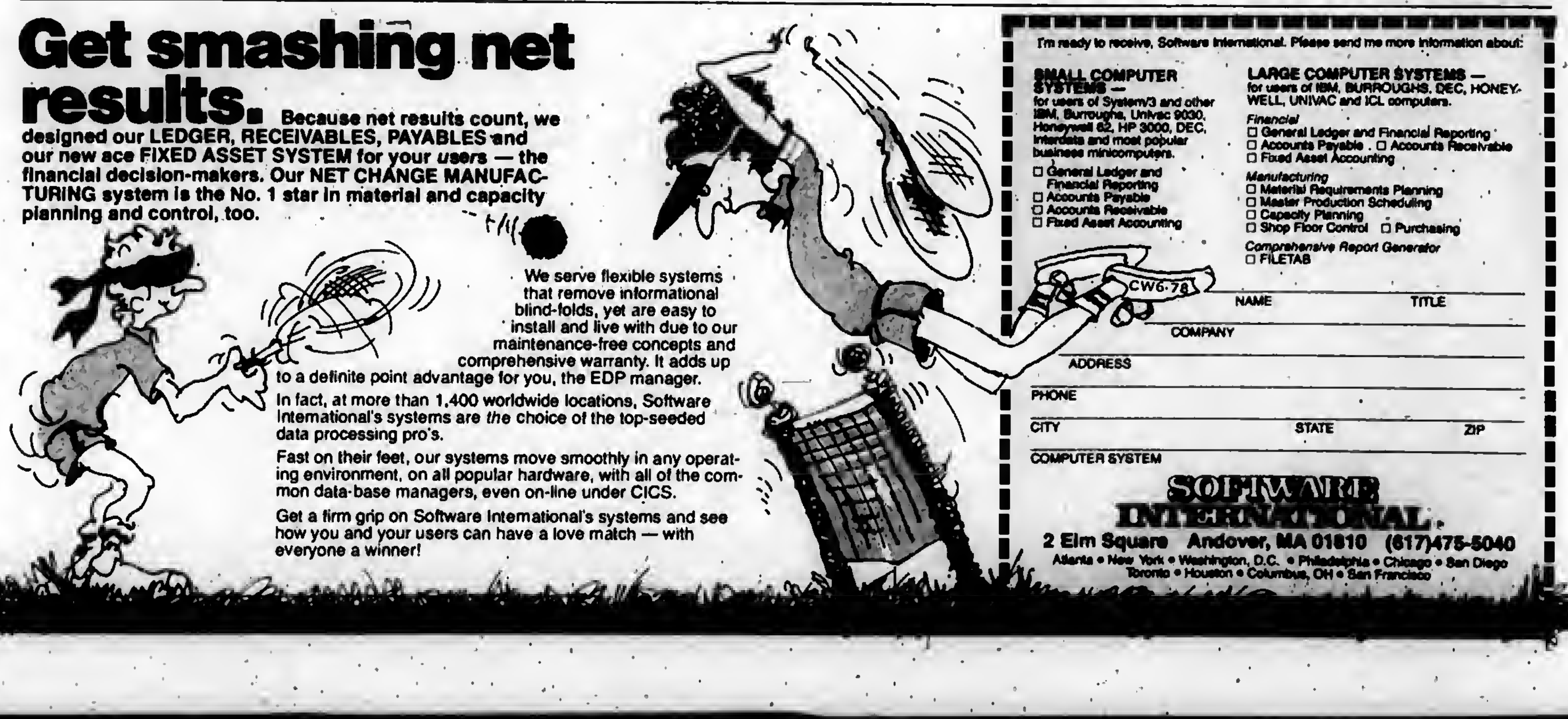
After that, individual vendors will offer technical discussions of their products and, in many cases, demonstrations through terminals. Schussel noted the roster of presenters includes technical representatives of all the major suppliers, as well as some speaking for new and relatively unknown products.

Unlike some conferences, this one will not provide attendees with any precompiled cross-reference guide to product capabilities. Material such as that takes a long time to gather and is often out of date as soon as one vendor puts out a new release, the symposium leader explained.

The products on display will come from hardware vendors such as Burroughs Corp., Control Data Corp., Honeywell Information Systems, Inc., IBM and Univac and from software houses such as Cincom Systems, Inc., Cullinane Corp., Computer Corp. of America and MRI Systems Corp.

Representatives from Infodata Corp., Informatics, Insyte, Mathematica and International Data Base Systems Corp. will also have time at the podium, along with people from minicomputer firms such as Data General Corp. and Prime Computer, Inc. and firms with products related to data base, such as MSP, Inc. with its Datamanager, Schussel said.

Scheduled for the New York Hilton hotel, the conference costs $395/person. Further information is available from AMR International, 1370 Ave. of the Americas, New York, N.Y. 10019.



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'Impact' Simplifies Financial Models, Reports

MORGANVILLE, N.J. — Impact from MDCR, Inc. is said to enable the professional, non-DP manager to define application requirements and to use a computer as a tool to build reporting systems, perform analyses and design financial models.

Impact is available on various remote computing service networks or as a package for installation on IBM, Itel Corp., Amdahl Corp. or Univac mainframes that support virtual storage. Both interactive and batch versions are available, MDCR noted.

The software supports all three major reporting categories — planning/forecasting, "actuals" and control — so users can match future objectives with resources, opportunities and goals, on the one hand, or highlight where actual operations deviated from expectations, on the other, a spokesman noted.

Impact is said to allow the user to communicate with the computer through English-like phrases, business terminology and simple mathematical expressions in order to create a variety of financial and marketing applications.

Described as a self-contained product having its own report generator, model builder and editor and execution and testing commands, Impact supports customized reporting and formatting, built-in business and forecasting functions, "what if?" analysis capabilities and multireport processing in a single run.

A general-purpose plotting package designed to show data graphically on an interactive terminal or line printer is included. Impact also provides the ability to produce histograms from data contained in a model.

Written in PL/I and Assembler, Impact runs under IBM's Conversation Monitor System (CMS) or Time Sharing Option (TSO) in the interactive versions and under IBM's OS/VS and compatible operating systems for batch work.

The time-sharing version is available for $39,500 or $1,250/mo; the batch version costs $32,500 or $1,000/mo. Use of the software on a remote network can be arranged through MDCR, P.O. Box 29, Morganville, N.J. 07751.

DOS Accounting Eased

PITTSBURGH, Pa. — The Westinghouse Electric Corp. Job Monitor/II was designed for use on an IBM 360 or 370 operating under DOS or DOS/VS that supports the IBM job accounting option, a Westinghouse spokesman said. The package interfaces with the DOS or DOS/VS supervisor to store accounting information accumulated for each job step.

It also merges supervisor and Power/VS accounting records into a complete, unified file, he added.

Job Monitor/II edits the collected records to ensure the validity of the data and produces a series of operational and center management reports, utilizing the processing day as the basis for report breaks, the spokesman noted.

Reports generated by the package enable the user to check operations from virtually any perspective. In addition to chronological listings, there are summary reports by job utilization and phase utilization as well as multiprogramming histograms.

Job Monitor/II costs $3,500, including documentation and the first year of maintenance. The subsequent annual maintenance charge is $350, the vendor said from 2040 Ardmore Blvd., Pittsburgh, Pa. 15221.

Design Still Proves Problem

(Continued from Page 25)

"We can easily estimate the data base will require X amount of storage — and that has a value — but how satisfied can we be if we know the data hasn't been stolen in 15 hours?" he asked again.

Severance said his project creates a design data base for the analyst. It includes a data base edit routine that validates the description of his wants, a hardware environment calibrator and an existing file analyzer.

But it also includes a number of algorithms. The data encoding algorithm shows what fields are used in printed output and that can be an important factor.

Most fields are never printed, so they can be compressed and never need to be decompressed — saving a lot of space, he said.

In his presentation, Prof. Toby J. Teory described the creation of a data base design evaluator which he said is written in Fortran and is "fairly transportable" from the Honeywell Information Systems, Inc. IDS setting in which it was developed to any Codasyl-type environment.

The objectives of the evaluator are to provide resource utilization and elapsed-time estimates, a trade-off analysis for alternate designs and sensitivity to major parameters; it leads toward an optimization of the physical design, he added.

The models it creates allow a number of data base features to be evaluated, Teory said, adding that "any access" via a logical data base structure, currency, distribution of record types and sizes and basic physical parameters are among the things that can be modeled.

It misses a number of factors, he said, but the net effect is that users can sense which of several possible designs will probably be best. In one case, he noted, his staff found choices that were orders of magnitude more cost-effective than the original design.

Panelist R.R. Brown of Hughes Aircraft told the professors he was impressed with what they had done, but he was also disturbed. Neither approach took into account the fact that a data base should be a model of whatever enterprise was using it, he said.

Beyond that, he added, there is an implication that the real world is static and that one design would be best for all time — and that's just not the way things are.

Ansi Mumps Offered by DEC

MARLBORO, Mass. — Designed for use on mid- and large-scale Digital Equipment Corp. PDP-11s, Digital Standard Mumps (DSM-11) is said to be a complete implementation of the Mumps language specifications sanctioned by the American National Standards Institute (Ansi) last year.

A data base-oriented, high-level programming language originally developed at Boston's Massachusetts General Hospital, Mumps has been adapted by a growing number of users to commercial as well as medical applications. The DSM-11 package includes a Mumps interpreter, an operating system and a hierarchical file system, DEC said.

DSM-11 requires 32K words of memory and one of DEC's disk subsystems, with a minimum 7.5M byte capacity. Additional disk storage and I/O devices are supported.

Digital's Standard Mumps is available under license for $16,500.

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Blindly Following Piper? — Part 1

User Programming Sounds Good — But Flawed

By Charles A. Gravitt
Special to CW

The idea of distributed programming or "personal computing," presently being pushed by some hardware vendors, envisions programming being done by individuals in user departments as a sideline to the performance of their primary missions.

That sounds simple enough, but the pitfalls and long-range perils to the user's business need to be studied and analyzed before blindly following this latest piper's tune.

Summary acceptance of the disperson of corporate computer responsibility without first examining its ramifications could require substantial, unforeseen capital outlays in the future to attain the same level of computer service previously attained with centralized resources.

Reasons for Caution

First, it is important to focus upon the premises on which the recommendation for caution is based:

- DP is a corporate resource and does not enjoy an immunity to things fiscal and real. It is a direct operating cost item which requires funding and must produce a cost-effective product within limits of return on investment.
- DP exists for what it can do for the corporation, not for a mission of its own.
- It is generally more economical to have specialized forces produce specialized work products for end users. This is fundamental in the American assembly line productivity system; it is the reason why products are assembled by components and the reason why we have repairmen, accountants, printers and others dedicated to producing one work product per trade.

One could suppose that personal computing is perhaps an extension of the "do-it-yourself" philosophy currently in vogue. However, a corporation composed of many specialists, each doing a job contributing to the corporate objective, must be careful to fully understand the effects of upsetting the deliberate separation of duties which, acting in concert, produce the corporate product on time.

Programmer Selection

The personal computing concept encourages the hypothesis that "anyone" can program and use the computer. This overlooks one of the paramount considerations in achieving productivity and positive return on investment in data processing.

This sort of thinking is comparable to the idea that everyone has the capability to become a jet mechanic; it completely ignores the fact that not everyone has the ability or inclination to be a skilled mechanic.

Personnel selection for data processing is the most important factor in ultimately securing a high level of effective programmer productivity. It sets the tone for everything that happens later.

Candidates must possess the ability to think logically and systematically and must have good abstract reasoning and critical judgment powers. Some argue that these qualities are innate to a large degree, and a student trainee can improve only a relatively constant amount above his own beginning level.

Many companies spend hundreds of dollars using intelligence and aptitude testing, sometimes by outside professionals, in selecting a single programmer candidate. This is done because experience has shown that only a few people in a hundred members of the general population have the interest and aptitude to become a truly successful and productive programmer for the corporation.

On an obvious note, the very basic test for potential programmers is called the Programmer *Aptitude* Test (PAT).

The point is that the designation of persons to program in user departments after a terminal is installed has sometimes been rather naively cavalier. People have been selected randomly to program.

Being good at one's regular job does not mean one will be a good programmer. This random approach does not guarantee that the personnel selected to write programs will even rise above mediocrity.

In fact, unless one is extremely lucky, mediocrity or at least some inefficiency is virtually assured.

The intrinsic interest in a new toy sometimes overrides user department personnel's attention to their regular duties. This creates a constant problem for management.

Managers responsible for data processing, whether it be central or distributed, have a perpetual duty to make sure documentation standards, programming conventions and other records are observed and maintained in such a way that the systems upon which the corporation relies can be adequately supported in the future.

Documentation Need

The capability must exist for another person to carry on the work of someone whose services are lost without having to re-create what has been done or spend too long studying a system to find a problem.

This is just not possible without complete and adequate documentation. One of the things that can hurt a corporation most is the inability to support the programs upon which it has come to rely.

The more personal computing sites there are; the more this problem is compounded.

Gravitt, an attorney who served on the DP Study Staff of then-Governor Jimmy Carter's Georgia State Reorganization and Management Improvement Study, has more than 10 years of DP management experience. In his next article, he will detail some of the ways in which the support problem is compounded by personal computing.

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NATIONAL **–SPECIAL LEAR SIEGLER ISSUE–**

INFORMER

June 19, 1978

PROJECT X AWES THOUSANDS AT NCC

Inside!

Exclusive Interview With VDP-1000 *Page 26*

★ ★ ★

Autograph Hounds Mob Dumb Terminal At NCC. *Page 16*

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ADM-31 & 42 Discuss Their Roots *Page 11*

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Project X Perpetrators Still At Large *Page 30*

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At-home Interview With Garry Strohmeyer *Page 5*

★ ★ ★

Electronics Pundit Says of Project X: "I Don't know of Anyone but LSI Who Could've Pulled it Off" *Page 35*

Surging crowd of excited onlookers deluge Lear Siegler's NCC booth, hungrily pressing forward to grasp at more information on Project X.

INFORMER PHOTO

Lear Siegler, Inc., forced by overwhelming pressure to declassify its super-secret Project X, is still reeling from its staggering success at the NCC.

The Project X wonder devices, revealed to the public for the first time at Anaheim Convention Center, left thousands speechless. LSI's booth was at times so crowded that it was difficult to get even a brief glimpse of the devices, causing hundreds to queue up around the display. Heightened security in and around the booth tried valiantly to stem the human tidal wave, but finally gave up its efforts as futile.

The ADM-31, ADM-42, 300 Ballistic Printer, VDP-410, and VDP-1000 are the devices that the wizards at Project X labored on so long and so strenuously. And by the reactions from people in the crowd, they were well worth waiting for.

Glenn deYong, an intense, bespectacled free-lance science writer, told INFORMER reporters that the ADM-31 was "...the most eagerly-awaited terminal of the year." Richard Sturm, a doctoral candidate at the Rhine Institute in Germany, said of the VDP-1000: "There's practically nothing you can't do with it. It's fantastic. And the price is so affordable." Of the new VDP-410, fashion model Karen Herbert said, "It's a true building block for just about any system you want to put together."

From this smattering of on-the-scene reactions, it should be clear that Project X's success at the NCC eclipsed even LSI's well-founded expectations of dominance. Attendants at many other surrounding booths could only gape, stunned, as conventioneers flocked to booth #1519 in proverbial droves. Reports that the booth was partially dismantled by overzealous fans are highly exaggerated, however.

Originally hatched in secrecy to insure their domination of the NCC, LSI's Project X was for weeks the subject of intense curiosity and lingering rumors. The INFORMER's relentless campaign to expose the project then ended in the unexpected move by LSI to open Project X to the public. The entire array of wonder devices was instantly applauded, and the success at the NCC has left LSI and the computer world breathless.

And now, with its declassification and brilliant victory at the NCC, Project X is history. The wonder devices, secreted for so long behind locked doors, are now out in the open and ready to go to work. And the INFORMER, true to its pledge to follow Project X to the end, has comprehensive information on all of them.

For complete details, just turn the page. And remember, you read it first in the National INFORMER.

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LEAR SIEGLER

ADM-31 Proves 2 Pages Are Better Than One

The ADM-31 is a low-cost, high-reliability desktop CRT with full editing, formatting and *two pages of display.* Not as an option, but as standard equipment. Which means the ADM-31 affords twice the display potential of terminals costing up to twice as much. And that's a pretty clever idea.

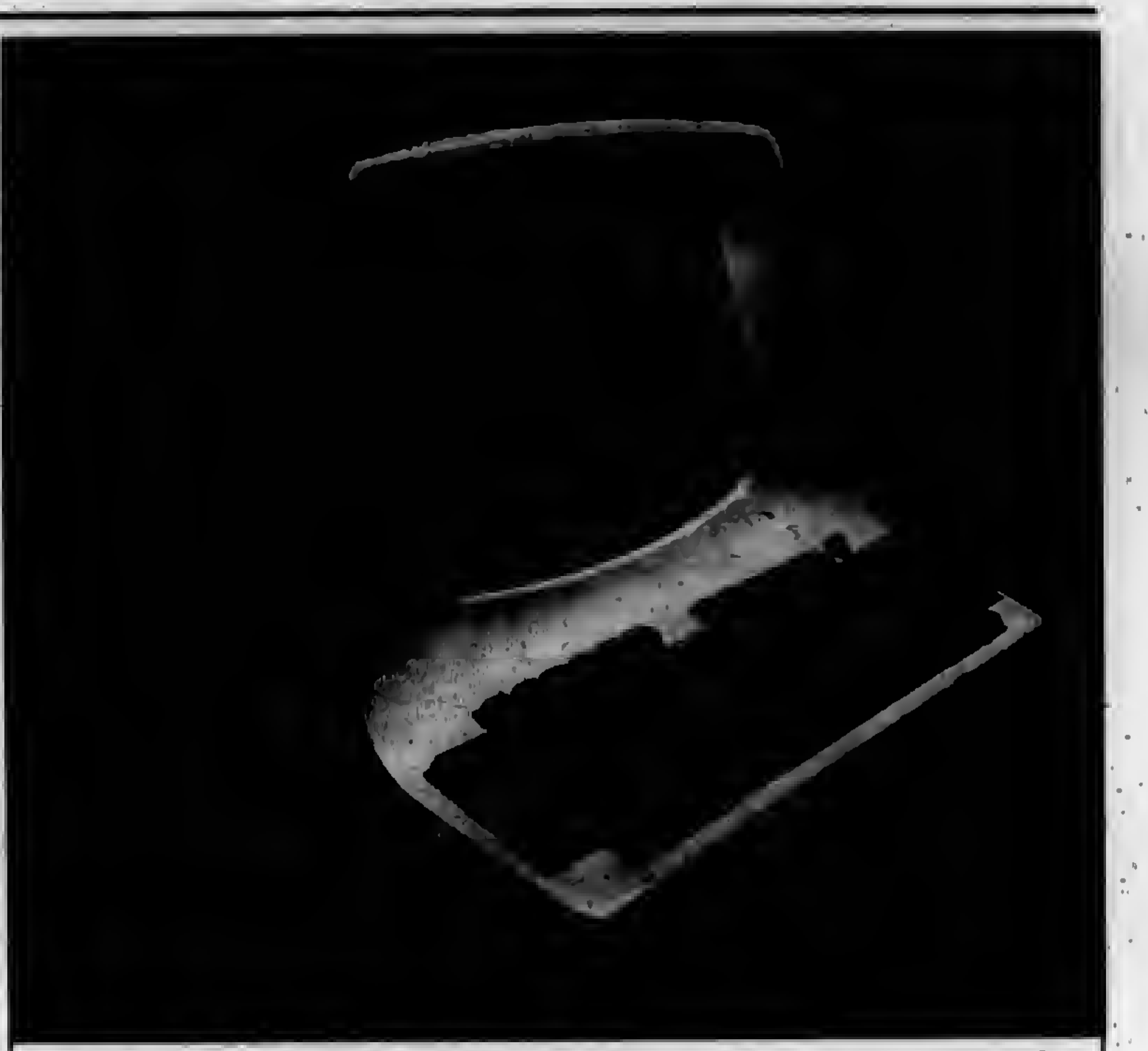
The ADM-31 is completely self-contained, with a keyboard, control logic, character generator, refresh memory, and interface. What's more, it incorporates a microprocessor which augments its reliability while making it even easier to use. Block transmission and *protected fields* are standard. And the terminal also comes with a printer port option, if you require printouts along with your readouts.

The ADM-31's amazing 90-key keyboard is actually capable of more functions than are now available on the ADM-1. What's more, the keyboard itself is integrated with the main logic, and is capable of generating all 128 ASCII characters (upper and lower case, numerics, punctuation, and control). Among other things, it features an integral numeric pad, with period, comma, tab, minus, and numerals arranged in a familiar calculator format. And it also includes a caps lock key (to lock the keyboard into upper case display).

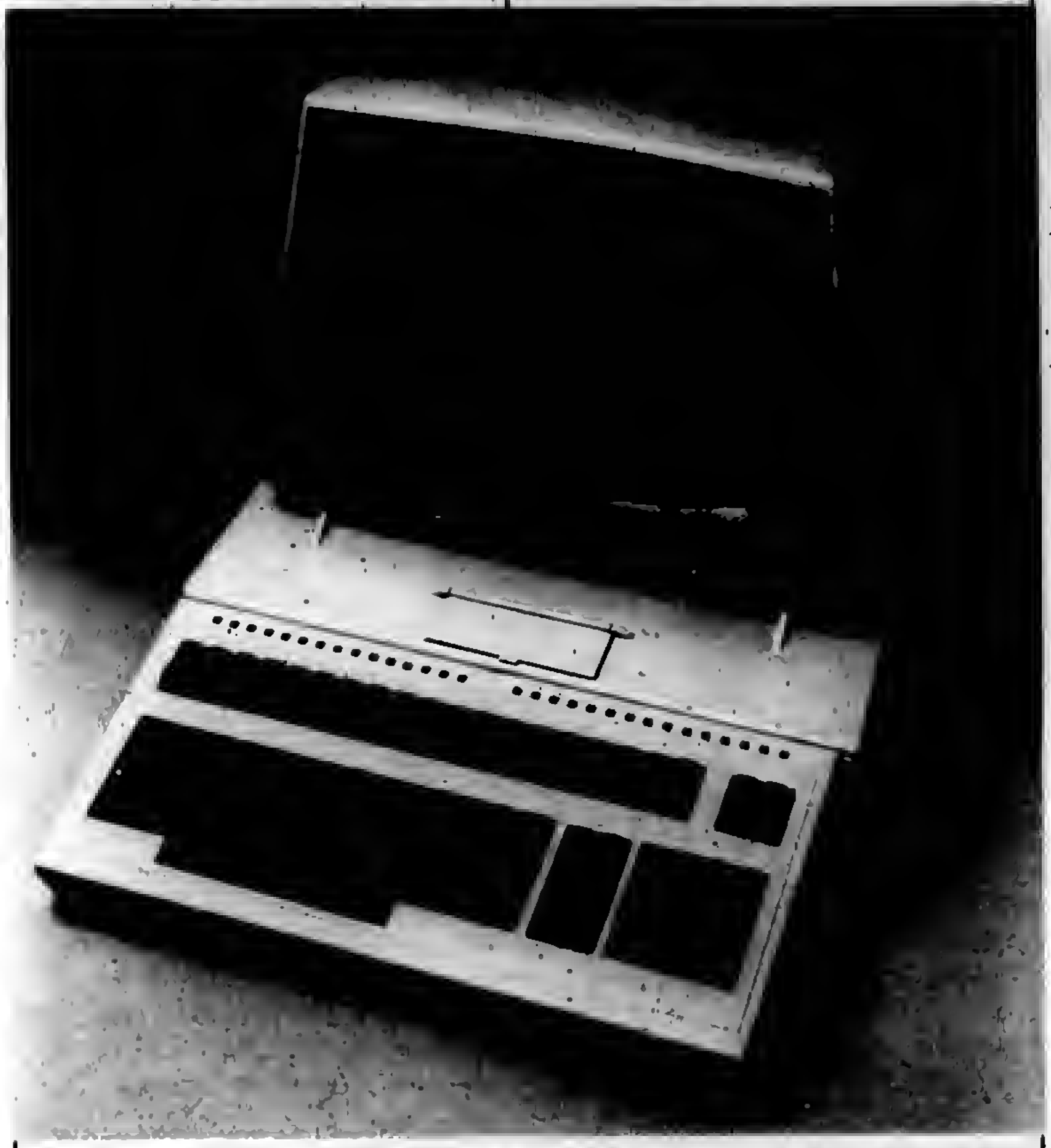
The ADM-31's editing capabilities let you clear the screen, or use a destructive cursor for a character change. Read and load cursor permits sensing of the current address, and direct, absolute addressing to any X-Y coordinate. The controls let you skip protected fields, backspace, forespace, move up, down, return, home, and new line. And you can store the Control Characters, and they'll display as a reverse image.

The ADM-31 comes with *character insert/delete,* line insert/delete, erase to end of line/field/screen, and back tab. All standard equipment. The ADM-31 can also clear to protected spaces, clear to unprotected nulls, and set and reset copyprint.

Who says a machine can't edit?



Project X's new ADM-31 desktop CRT, seen here with 90-key keyboard and Caps Lock Key. *PROJECT X PHOTO*



Project X's amazing new ADM-42 is a semi-intelligent terminal designed for a host of computer-related tasks... *PROJECT X PHOTO*

ADM-42 All But Thinks For Itself

The ADM-42 is a semi-intelligent terminal that gives the user flexibility of format, security, editing, interface, and transmission. Like the ADM-31, it features a full two-page display as standard equipment. And it also comes with an optional extended memory capable of adding data space in 2-page increments up to a maximum of 8 pages.

The terminal boasts a bright, easy-to-read, 2000 character display, a full 128 ASCII character set, 16 function keys for 32 separate commands, and five separate cursor control keys. You can also order an optional Programmable Function Key feature that lets you define the function keys. An alternate character generator with line drawing set is also optionally available.

The ADM-42's status displays on-screen disclose a wide range of information at a glance, and special symbols indicate the entry of all control characters in memory. The ADM-42's Field Protect Mode also allows rapid data entry into forms or instruction pages.

Like the ADM-31, the ADM-42's displayed data is formatted in 24 lines per page, with 80 characters per line. In addition, it offers something the ADM-31 doesn't. It has an 80 character 25th line, established and reserved exclusively for status indicators, or special messages.

An additional special capability of the ADM-42 is Field Blanking/Underline. You or the computer can designate areas of the display as blanked fields, and the designated areas are then blanked from the display. Or an Underline attribute may be substituted for Field Blanking by switch control.

With Field Blinking, you or the computer can designate areas of the display as blinking fields. These areas of the display will then blink on and off.

And with Reverse Field, you or the computer can designate areas of the display as reverse images. These areas of the display will then reverse on and off.

The ADM-42, like all LSI products, is upward compatible. That means when you upgrade to the ADM-42, you don't worry about rewriting your software, or replacing any other peripherals. Just plug the ADM-42 into the system you've been using all along.

You'll discover this terminal is a truly efficient, cost-effective step upward that'll enhance your system out of all proportion to its price.

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REVEALS ALL!

Ballistic Printer™ Tougher In The Long Run

The 300 Series Ballistic Printer is a low-cost, 180 cps printer with a built-in microprocessor that gives you 15 switch-selectable form lengths, 15 perforation skip over formats, and full horizontal and vertical tabulation control. Space and blank character compression. Interface control for serial, parallel, or polling and addressing operations. Plus a nonvolatile forms retention system that retains these programmable settings when power to the printer is turned off.

The 300 Series has a character buffer that's optionally expandable to 2048 characters. With the 2048 buffer, the printer can fully buffer a 1920 character CRT screen of data without waiting for the screen to transfer to the printer on a line-by-line basis. And the buffer affords quick dumps of full 1920 character CRT screens.

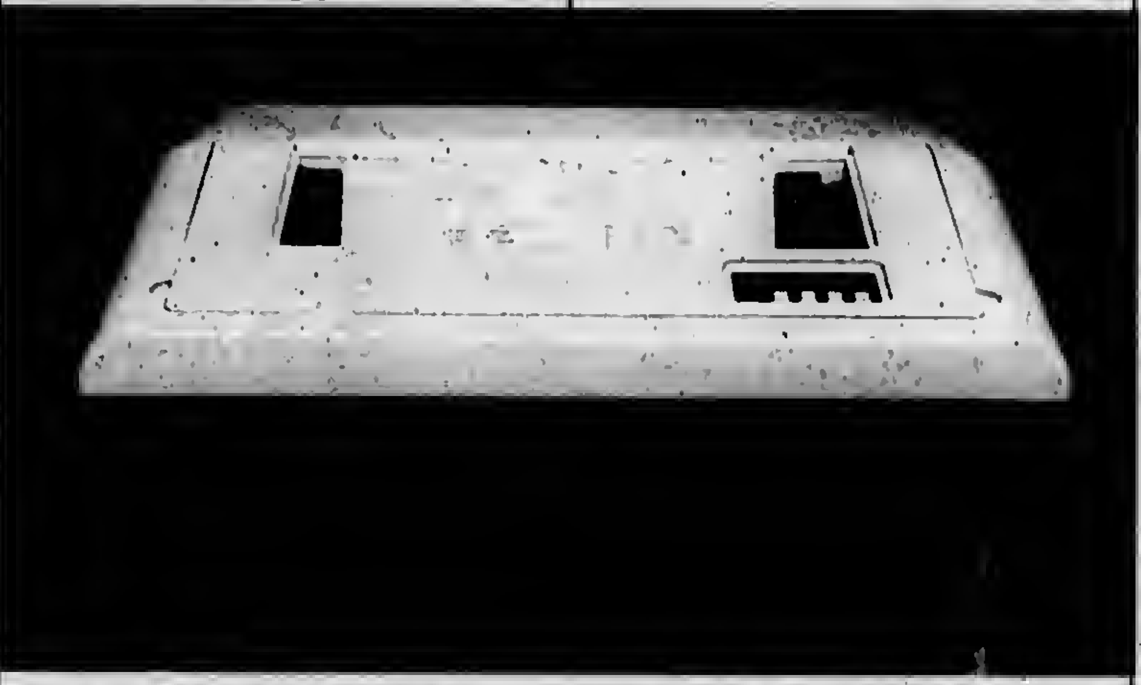
Like all LSI Ballistic Printers, the 300's dependability and negligible duty cycle restrictions originate with its ingeniously simple, patented Ballistic print head. It actually operates without moving cores attached to its print wires. Instead, it uses small armatures that propel its matrix wires in free flight to the platen.

The 300 Series comes with a full 96 ASCII character set, with up to 128 printables optionally expandable to two sets of 128. The printer has, in addition, an elongated character capability, and 10 pitch with 12 and 10/16.5 dual pitch options.

This printer isn't built just simply. It's built simply to last.

Project X's new VDP-410 does just about anything you want it to do.

PROJECT X PHOTO



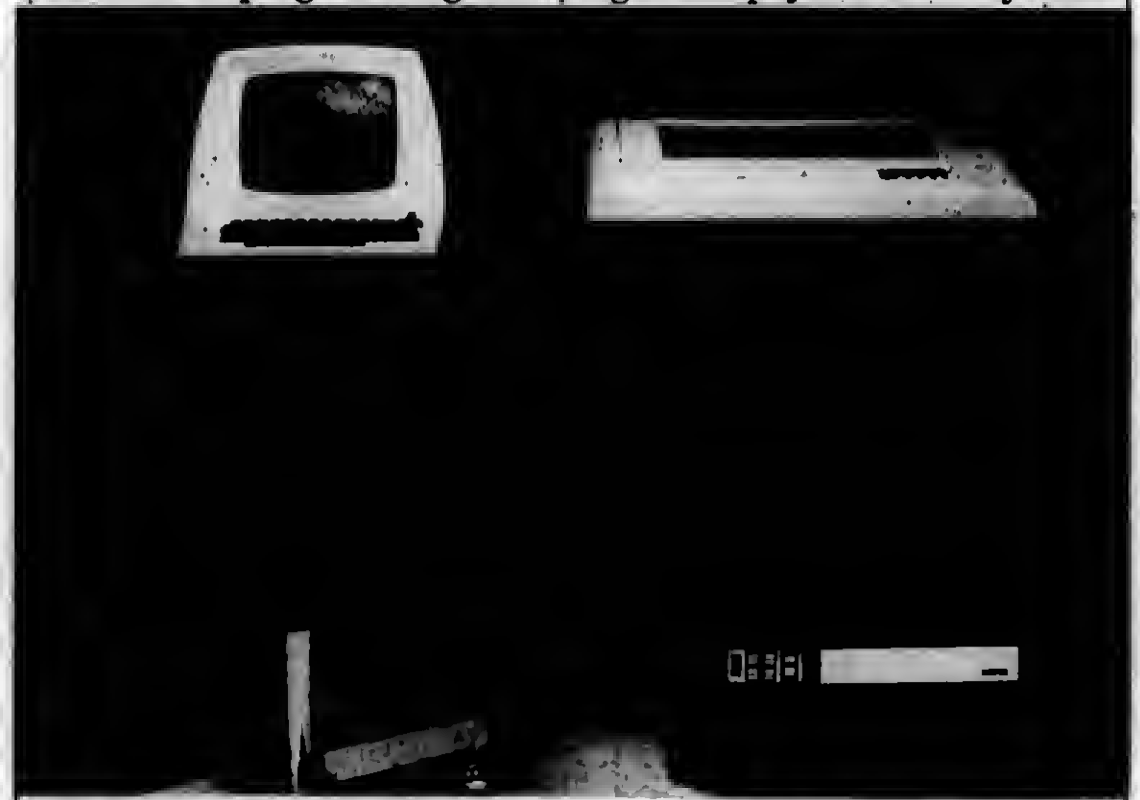
Project X's 300 Series Ballistic Printer must be seen to be believed.

PROJECT X PHOTO

VDP-1000 A Complete Small Data System

The VDP-1000 actually features many attributes commonly associated with larger systems costing many times more.

Attributes like BASIC, COBOL, and ASGOL programming languages for business and system applications. A virtual memory operating system (VMOS) that lets you develop stand-alone or segmented programs without regard to physical memory size.



Project X's incredible data system gives you all the features you need, at a price lower than you'd expect.

PROJECT X PHOTO

And up to 40 megabytes of disk storage capacity. You start with a choice of two disk systems and three languages, and configure your system from there.

The basic VDP-1000 consists of a 16-bit CPU, 32K, 16-bit words of dynamic RAM, the world-renowned Dumb Terminal,™ a 180 cps, bidirectional 300 Series Ballistic Printer, and either a 10 megabyte cartridge or 1.25 megabyte floppy disk. All of the electronics, CPU, memory, and disk come in a full-size, wood-grain desk that leaves the surface clear for the console and printer. And there's also convenient work area for the operator.

Once you have the basic system, you add additional storage as you need it. Or want it. Up to four 10 megabyte disk drives or 5 megabytes of floppy capacity. You can upgrade the console with a choice of five smart terminals. And you can add a second or even a third programming language as your needs change or multiply.

The VDP-1000 is exactly the system to meet your needs exactly.

VDP-410 An Intelligent Building Block

Meet the VDP-410.

It's a low-cost, 16-bit CPU with enough speed and ports to support a variety of peripherals. It provides OEMs with the flexibility to configure a multitude of systems. From communications controllers without external storage capabilities, to sophisticated time-sharing systems with a string of terminals, printers, and disks.

The 410's DMA channel provides easy expansion. You can even get a cable and an expansion chassis with five slots for 15" cards and a hefty power supply. LSI also offers a disk controller and 10-megabyte disk that complements its entire line of terminals and printers.

The basic system consists of a CPU with 200 nanosecond instruction cycle time, and 16-bit, 32K word memory with a 250 nanosecond access time, and I/O capabilities for communication with three external devices. The CPU, by the way, also includes an expansion port with serial/parallel I/O capabilities.

The VDP-410's instruction set, memory organization, and I/O architecture are compatible with hardware made by Data General and other manufacturers. Operating systems, file management systems, and programming utilities are available from leading software houses as standard packages, so it doesn't take any custom configuring to please the VDP-410.

The VDP-410's instruction set is Nova* compatible, and provides memory access, arithmetic, logical, and I/O functions. It's augmented with load/store-byte, inclusive/exclusive OR, exchange accumulators, multiply/divide, and block mode. And this offers the OEM an incredibly powerful instruction set for tasking and data management.

How To Order

Lear Siegler products may be ordered through any Lear Siegler sales office or distributor. Your sales representative will be pleased to discuss your application with you, and provide any additional information you may require. Specifications subject to change without notice.

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Infotech Reports on Structured Analysis Efforts

PENNSAUKEN, N.J. — *Structured Analysis and Design*, a two-volume state-of-the-art report, is now available from Auerbach Publishers, Inc. in conjunction with Infotech International.

The report examines recent work done on systems and software development techniques, focusing on the stages between problem definition and the actual design work.

These intermediary stages are said to include requirements analysis, requirements specifications, data structures creation and the selection of criteria for problem decomposition.

Other topics addressed by the report include the economics of software development, documentation and representation techniques, computer-aided design techniques, requirements engineering and structured design costs and benefits, Auerbach stated.

The report also features invited papers with titles that include "The Technique and Practice of Structured Design, a la Constantine," "Input/Output Tables in Structured Design," "Requirements Problems in Large Real-Time Systems Developments," "The TOPD System for Computer-Aided System Development" and "Software Design Using Softech's Structured Analysis and Design Technique (SADT)."

Structured Analysis and Design is the first of eight reports in the 1978 Computer State-of-the-Art Reports Series published by Infotech International. It costs $260.

The entire series is priced at $1,470 and can be ordered from Auerbach at 6560 N. Park Drive, Pennsauken, N.J. 08109.

'TSS' Eases Access to RDOS Capabilities

BOULDER, Colo. — Designed for use under Data General Corp.'s unmapped RDOS environment, TSS, the time-sharing system from Polymorphic Computer Systems, Inc., supports up to eight simultaneous terminal users, giving each independent RDOS capability, a Polymorphic spokesman said.

Each user has independent access to RDOS and can run Fortran, Algol, Basic or Assembler programs. System activities supported at the terminal include program development, compilation or assembly and execution.

Beyond that, TSS is said to allow a user to detach from a running program and to switch to a different time-sharing line. This "virtual user line" feature allows a user to control several simultaneously executing programs, the spokesman noted.

TSS requires 32K bytes of memory and one of several choices of DG communications hardware. The Polymorphic package is available for $3,500 from P.O. Box 3581, Boulder, Colo. 80307.

'Secure' Guards Vsam Data Sets

SUNNYVALE, Calif. — The capability of supporting IBM's Vsam has been added to Boole & Babbage, Inc.'s Secure data access security system. Release 1.1 of Secure is said to provide protection from theft, alteration, disclosure and other abuse of Vsam and standard OS data sets.

Secure has always supported standard sets, but Boole & Babbage decided to add Vsam support to the system in view of Vsam's increased popularity, according to a spokesman.

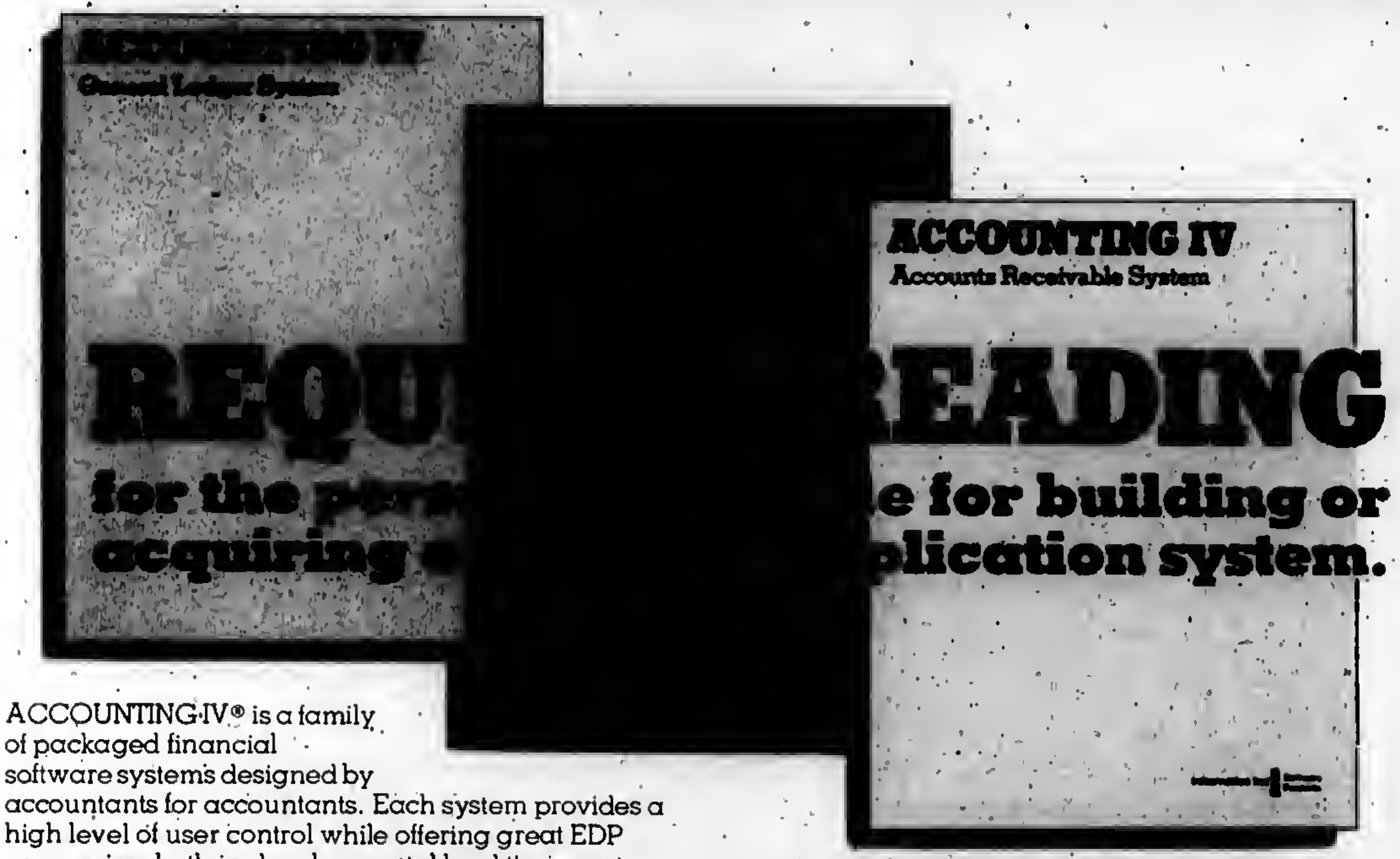
Secure costs $12,600 for one CPU with a 50% discount for a second CPU and a 75% discount for a third CPU at the same site, Boole & Babbage said from 510 Oakmead Parkway, Sunnyvale, Calif. 04086.

Tape Manager Linked To CICS for Queries

NEWPORT BEACH, Calif. — Tfast/VS, the tape management system from Tower Systems, Inc., has been enhanced. Features added with Release 6.0 include on-line query and update via IBM's CICS of the tape library file, a spokesman said.

A recorder file which supports recovery and an audit trail of all tape-processing activity is also part of the package, which runs under Software Pursuits' DOS/MVT or Computer Software Co.'s Extended DOS as well as under IBM's DOS/VS, the spokesman said.

Tfast/VS costs $6,500 or $225/mo for 12 months, Tower noted from 3901 MacArthur Blvd., Newport Beach, Calif. 92660.



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NCC Panel Points Out

Common Method for Local Nets Lacking

By Ronald A. Frank
CW Staff

ANAHEIM, Calif. — Local area data networks have great potential, but little work has been done in this area to develop common approaches, a panel at the recent National Computer Conference here agreed.

Although many similarities exist between global and local networks, local systems possess some distinct features, according to Ira Cotton of the National Bureau of Standards, who chaired the session. One major distinction of local networks, which are those that connect a limited number of sites in a campus environment or within several corporate locations, is that the user maintains total control.

In a global network, the user has access to a public facility and has to operate within the structure set up by the carrier; in a private net, however, the user can tailor the protocol and other parameters to meet his specific requirements, Cotton explained.

Some type of standards will have to be developed for local nets, he said, although this may not be an issue with which standards-making bodies will get involved. At the least, a local network protocol should be developed so it will be attractive for vendors to produce in chip form, Cotton said.

David Mills, senior scientist at Comsat, reviewed the available technologies that can be implemented for local networks. These include satellite links; short-range radio using shared frequencies, such as the Aloha network in Hawaii; and the possible use of certain scanning lines within the raster of TV signals.

The TV option relates to Line 21 of the TV raster, which has been used for digital coding in several new applications, Mills said. Another option is the use of power systems in buildings, which are one of the most readily available sources and can provide up to 10K Hz bandwidth for local distribution purposes.

Layered Approach

Speaking on potential protocols that could be used for local nets, Stuart Wecker, a member of the research and development group at Digital Equipment Corp., said a layered approach similar to that of X.25 would probably lend itself to local nets.

Some of the characteristics that would be required in a local net that are common to other nets include end-to-end addressing, a transport mechanism such as virtual circuits or datagrams, guaranteed delivery of messages, sequencing and flow control, an interrupt facility and failure recovery mechanism, Wecker said.

The more unique attributes of local nets include high bandwidth requirements, low delay and a short packet lifetime, an absence of errors, the ability to be tailored to an application, high network usage, central management and a high level of interconnection, Wecker said.

Although the layered approach provides a good framework, current standards are not optimal for use on local nets, he added. The second or data link level should be more simple than X.25, since it is probable that many messages will not have to be handled at any one time. A small sequence number

(Continued on Page 37)

Vested Interests Seen Thwarting Regulation of Communications

By Ann Dooley
CW Staff

ANAHEIM, Calif. — Attempts to regulate the telecommunications industry are difficult because of the tension, confusion and reluctance of some groups to relinquish the status quo, according to members of a panel at the recent National Computer Conference here.

Philip Nyborg, panel chairman and president of the Computer & Communications Industry Association (CCIA), said in an outline of the current federal regulatory environment that the Federal Communications Commission (FCC), the U.S. Postal Service and the banking industry compose the three regulatory jurisdictions whose functions overlap and are often at odds with each other.

The growth of what is called "electronic mail" has increased these overlaps, Nyborg noted. The term "electronic mail" is inappropriate since it really doesn't mean anything, he said.

The term does, however, presuppose that such systems would be under the jurisdiction of the post office; a better term to use would therefore be "electronic message systems," Nyborg contended.

Tensions are apparent between the Postal Service and the FCC in the jurisdiction of mail and electronic message systems, he said. Although mail was once completely under the jurisdiction of the post office, the mailgram moved the total jurisdiction away from that branch, he noted.

Congress should act on the complex issues involved in this regulation problem, but so far it has not. The post office, in the meantime, is developing its own system to avoid letting in any competition, he said.

Several smaller companies are about to develop electronic message systems, including both hardware and software, but they are hesitant to proceed before some regulatory decisions have been made, according to Nyborg.

Another area of overlapping authority is between the post office and the banking industry, Nyborg said, because of the large numbers of paper transactions that take place daily.

A third area of jurisdictional overlap oc-

(Continued on Page 36)

Harris' IBM 3270-Type CRT Among Product Debuts at NCC

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — Numerous communications-related products were introduced at the recent National Computer Conference here. In addition to IBM 3270-compatible terminals introduced by other vendors [CW, June 12], Harris Corp. showed its 1670 distributed processing system and its switchable 3270-type CRT terminals for the first time.

A typical configuration including processor with console, 150-card/min card reader, 300 line/min line printer, two or three key stations, 6M- or 12M-byte disk drive and two communications links (one batch and one interactive) would sell for $1,500, according to a spokesman.

Three Winchester-type disk drives for the Harris 1600 series of distributed data processing systems were also shown for the first time. The units provide increased on-line storage capacity and performance for remote-batch processing, data entry, source document entry, inquiry/response and local batch processing, a spokesman said. A 12M-byte disk drive costs $8,008; 24M-byte, $10,120; and 80M-byte, $28,160.

In addition, Harris introduced a 1,000 line/min chain printer with 64-char. set. The Model 1653 impact printer is said to offer

(Continued on Page 34)

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Harris 3270-Type CRT Among NCC Debuts

(Continued from Page 33)

printing speeds from 730 line/min with 96-char. set to 1,200 line/min with 48-char. set. Alphanumerics, Ebedic and Ascii chains are available and standard line width is 132 characters. The printer is priced at $34,760.

The Harris Series 500, shown at NCC, consists of the S550 and S570 vitual memory systems. The S550 can reportedly support 48 interactive terminal users, while the S570 can support 64 interactive terminal users. With Vulcan operating systems, each can perform concurrent time-sharing, multistream batch, remote job entry and real-time processing. The S550 costs $225,000 and the S570 costs $370,000.

Harris also introduced a multiuser APL language that allows the use of data files created by other languages, the firm said. File I/O is managed by a system function that provides data management and manipulation abilities outside APL workspaces, a spokesman said. Harris APL will be available for a license fee starting in the fourth quarter.

Harris introduced the S123 entry-level system including virtual memory CPU, with 144K bytes of MOS memory and 768K bytes of virtual address space, operator's console, 40M-byte storage module disk drive, 9-track 800 bit/in. tape drive, 300 line/min printer and a communications processor with a choice of either four asynchronous ports or one synchronous port. It can reportedly satisfy the needs of eight interactive users. Price for the system is $120,000.

Digi-Log Systems, Inc. showed its so-called "brilliant" terminal system, Microterm II, with software capabilities including multitasking, Isam, diskette file control, sort, IBM 2780 and teletypewriter communications emulators, utilities and an enhanced interactive software development system. Microterm II is a desktop workstation including dual microprocessor direct-memory-access architecture with up to 80K random-access memory, 24 by 80 line CRT, program keyboard and single or dual minidiskettes with up to 784K bytes of storage. A typical dual diskette configuration sells for $4,950 in quantities of 100.

Digi-Log also showed the DLM II tape trap data line monitor that provides programmable unattended monitoring techniques for fault isolation. It is settable to record one track (250K characters) and stop; record the whole tape (1 million characters) and stop; or record continuously in an endless loop format, the firm said. Prices start at $3,000 for the rack-mounted DLM II.

Megadata Corp. introduced its Model 700 Universal Emulating Terminal System (UETS) developed for users of large numbers of computers and terminals. The 700/UETS is a programmable intelligent terminal containing a 12-bit microprocessor, a 15-in. diagonal display screen and a 126-station keyboard with up to 71 function keys, 12 status indicators and an audible alarm. It has one basic operating procedure and reduced maintenance complexity, according to a spokesman for the firm. The unit with an intelligent terminal with 32K memory, dual floppy disk and a 55 char./sec printer sells for $14,500.

Teleprinter Debut

Centronics Data Computer Corp. introduced the Model 765 KSR and Model 765 RO teleprinters at NCC. Features include a bidirectional "logic-seeking" print head, a 1K RAM data buffer, tabbing up to 600 char./sec for any space of 10 characters or more and a blank field skip capability. Transmission rate is 1,200 bit/sec. Standard features include 96-character Ascii set, operator-selectable 6- or 8 line/in. vertical feed, 15 in./sec slew rate, adjustable tractor feed and full- or half-duplex selectable operation.

The KSR unit sells for $2,975 and the RO is priced at $2,800.

Intelligent Systems Corp. (ISC) introduced its Intecolor 8080 development system, equipped with 19-in. color CRT, eight foreground and background colors, 48 line by 80 char./line format, an Intel Corp. 8080 microcomputer, one RS-232C serial port and editing features such as Erase Page, Erase Line and Page Roll Mode. Also standard is 110 char./sec bidirectional impact matrix printer, an external dual minidisk drive with 160K bytes of data storage and a 2708/2716 programmable read-only memory/erasable programmable read-only memory programmer, the firm said. The unit costs $6,500.

ISC also introduced the Intecolor Series I business systems, models 8070 and 8071. Both have an 8080A microprocessor, 48 line by 80 char./line format, eight-color background and foreground, 110-char./sec bidirectional impact printer and an external dual 8-in. floppy disk drive. The 8070 has a 19-in. color CRT while the 8071 has a 13-in. color CRT. The 8070 costs

(Continued on Page 37)

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DP Dialogue

Notes and observations from IBM
that may prove of interest to
data processing professionals

These huge cranes are specially designed to unload containerized freight. Pacific Ocean vessels sail 90 miles up the Columbia River to Portland, Oregon, to use the ultramodern facilities operated by the city's shipping authority: the Port of Portland.

DL/1 Runs 'A Dozen Systems in One' for Portland

"Our OCP service has built Portland into one of the largest shipping ports on the Pacific Coast."

Gabriel Vallicelli, director of finance and administration for the Port of Portland, Oregon, explains that Import Cargo Distribution/OCP (Overland Common Point) refers to the common point of entry of freight en route to widely separated inland destinations.

"For shippers using the service, we act as their inventory managers and physical distributors in the U.S. We break down their container loads, warehouse their goods and ship to their destinations over much of the U.S.A.

"Many of our biggest shippers could use other Western ports at the same freight rates, but our OCP service saves them money by relieving them of those chores here."

The port agency has placed control of inventory and physical distribution for OCP operations on its computer, using Data Language/1-Entry (DL/I-Entry), a data base management system for smaller IBM System/370 installations.

"The huge variety of products we handle presents us with difficult system design and implementation problems: One shipper identifies merchandise by serial number; another follows a 'first-in first-out' policy and specifies goods by volume or weight. The structure of each inventory record and bill of lading is different, and some of them change frequently. It's like running a dozen different inventory control systems in one."

The system was designed so that personnel can query the data base in the System/370 Model 125 from a terminal to answer a customer's questions about a shipment. It can identify the truck carrying it and tell him where that truck is. The system is currently being expanded to identify the location of items in the warehouse.

DL/1-Entry allows for handling variable-length records and such wrinkles as breaking up a shipment and "drop-shipping" or delivering directly to customer's customers.

Without reprogramming, by using simple data base entries, handling of any customer's inventory can be changed to add or remove data segments from his record structure.

"Since OCP is a marketing tool, special service to the customer is vital," Vallicelli notes. "We've attracted business that used to reach the East by the Panama Canal. In fact, we have so much OCP business that we have built a $14 million warehouse just to handle it.

"Yet, even without counting all the additional containers it has attracted to Portland, OCP is earning money for us now as a separate profit center."

Computer Designs and Fabricates Computer Circuits

Today's high-speed, high-capacity computer systems depend on advanced electronic devices using Large Scale Integration technology. This micro-miniaturized circuitry puts thousands of memory or logic circuits into a space a quarter-inch square or less, making possible speeds of billionths of a second.

At IBM's General Technology Division facility in Burlington, Vermont, the computer itself is instrumental in the design and production of these advanced semiconductor devices. Engineers there are using a System/370 Model 168 and IBM 2250 Graphic Display Terminals to design and produce the high-precision photo-masks that are critical to the fabrication of integrated circuit "chips." Intricate patterns are successively overlaid using a lithographic process to build a finished chip containing thousands of individual memory cells.

To create a tentative design for a mask, an engineer draws lines with a light pen directly on the face of a graphic display terminal connected to the Model 168. The system automatically resolves the sketch into a precise pattern of straight lines and geometric shapes.

"It's easy to move elements around on the screen, trying alternative layouts until we find the optimum use of the space available on a chip," says Paul Serednicky, manager of computer-aided graphics. "We can rapidly try so many alternatives that we are finding much more efficient layouts than we ever could manually on a drafting board.

"Since the finished device usually consists of one memory cell pattern repeated many times," Serednicky adds, "the engineer can develop it once in detail. The system then replicates it the required thousands of times, automatically rotating it, generating mirror images and adding interconnections.

"Perhaps most significant, though, is that the computer generates a tape that guides automatic production of the mask itself in the final size. Previously, we had to draft the design by hand, and then use it as a guide in the preparation – also manual – of an oversized mask.

"Any change forced us to start over again from the beginning and repeat the manual process. Now we can go back at any time and make a change or improvement in the mask design. We can accommodate an engineering change in minutes instead of weeks."

When computer-aided design of the integrated circuit chip is complete, a computer-driven plotter draws a three-color layout of the circuit in large scale.

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Vested Groups Thwarting Communications Regulation

(Continued from Page 33)

curs between the banking industry and the FCC since the issue of who will regulate electronic funds transfer (EFT) has not yet been resolved.

There is a real problem in changing regulatory jurisdictions in areas that have traditionally been regulated by one certain agency, Nyborg admitted, but a public policy needs to be made.

Nyborg suggested a policy to the audience which he devised for the jurisdictional regulation disputes. Monopoly practises should no longer be extended, he said, and the forthcoming electronic message systems should be open to competition and not just fall under the post office.

The post office should not be the developer of those systems or underlying systems, he added.

Since regulatory uncertainty has caused several companies to hesitate before developing these systems, it is important that the government minimize regulations and make them more coherent as soon as possible, Nyborg said.

Phil Walker, president of Telenet and another panel member, outlined several proposals that have recently been brought before Congress to regulate the common carriers. Although competition traditionally has played a minor role in telecommunications, various changes have occurred to open up the industry somewhat, Walker said.

But "Ma Bell" complained about these changes to the FCC and, when this failed, took its case to the courts, where it failed again; it ended up taking it to Congress, where it died last year, Walker noted.

The Consumer Communications Reform Act, commonly known as the "Bell Bill," was promoted as a consumer bill but would have been a disaster to competition, he said.

Computer Inquiry II

Prof. Donald Dunn of Stanford University described the Computer Inquiry II bill on the FCC docket which would apply to carriers involved in transaction network services. The unregulated firms, excluding both underlying and resale carriers, offering services such as electronic mail could be considered carriers and be subject to tariffs under the bill, Dunn said.

Most of the major carriers object to the idea since it would mean major changes in the ways carriers offer their services, he said. The FCC is expected to decide on the bill very soon.

NCR Series Includes Special Basic

ANAHEIM, Calif. — A special version of Basic is included with a series of intelligent terminals introduced by NCR Corp. at the recent National Computer Conference here.

The NCR 7500 series can be implemented as a formattable data entry system, media converter or freestanding user-programmable processor, according to a spokesman.

The series offers a version of Basic, known as NCR Basic +6, designed as a medium for user-developed, cassette-based business applications.

Three models are offered in the series: the 7510, 7520 and 7530, all of which include 20K bytes of user-available memory, upgradable to 24K bytes.

The series offers optical character recognition (OCR) Type A font. Merchandise tags printed in that font can be automatically read by NCR scanning devices at the point of sale, the spokesman said.

An expanded 7500 system including a processor with 24K bytes of user memory, flexible diskette, magnetic tape unit and 125 line/min printer costs $28,100 and can be rented for $814/mo under a five-year rental agreement.

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Common Approach to Local Nets Seen Missing

(Continued from Page 33)

would probably be adequate in this regard, he said.

The use of contention mechanisms seems to be feasible and simple; fast hardware — probably implemented on an integrated circuit chip — should be utilized, Wecker suggested.

The network or third level may be more complex than current standards and some type of dynamic addressing scheme would probably be required. The need for data security would be application-dependent and, for the most part, simple broadcast mechanisms would suffice, he said.

Local Characteristics

Local network application characteristics were discussed by Gary Donnelly of Interactive Systems Corp., who said users will want to have 24-hour availability and will need to know when scheduled maintenance is to be performed.

It will also have to be determined whether files can be damaged, especially during periods of limited network availability, he pointed out.

The local net should be totally transparent to users and control characters should be transmitted through out-of-band signalling so data bandwidth is not impacted, Donnelly said. Different failure modes will have to be implemented because while global nets tend to fail locally, local nets fail globally, he noted.

The possibility exists that multiple local nets will eventually be interconnected, according to Richard Sherman, principal research engineer at Ford Motor Co. Such internetwork connections can be implemented through network schemes.

The gateways will have to be familiar with the total topology of the nets they are handling. They will need to retransmit packets through some type of address filtering scheme to be sure messages are routed correctly, he said.

Path-building functions, flow control and error control should be included in the gateway capabilities, according to Sherman.

The NCC panel was based on a meeting held in 1977 at the National Bureau of Standards. A paper discussing the conference and the work being done on local data networks is available in a publication entitled "Local Area Networking" that is available from the Government Printing Office, Cotton said.

CRTs Make NCC Debuts

(Continued from Page 34)

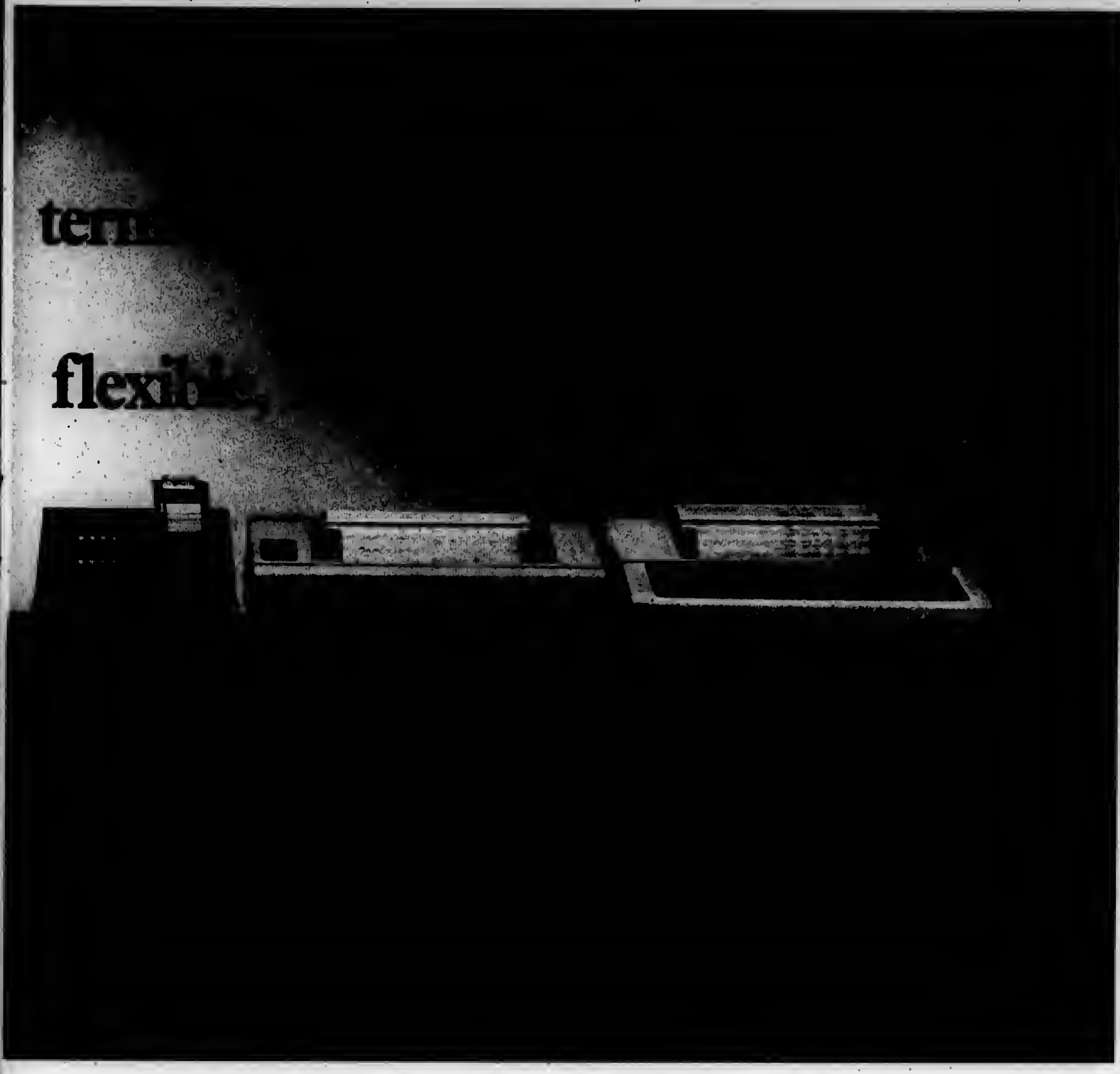
$7,000 and the 8071 costs $7,500.

Ramtek Corp. introduced two systems at NCC, the 6110 and 6310 Colorgraphics computer terminals. The systems feature modular, microprocessor-controlled architecture and teletypewriter-compatible interfacing. The family is upward- and downward-compatible in software, options and peripherals, according to the firm.

Ramtek's resident control software supports the communications interface, keyboard and joystick and incudes a teletypewriter emulator and graphics language interpreter.

Options include graphics subroutines and patterned vectors, according to the firm. All communications with the host computer are serial asynchronous and in the form of printable Ascii text strings.

The 6110 is priced at $5,500, and the 6310, designed for high-resolution applications such as scientific research and computer-aided design, sells for $25,000.



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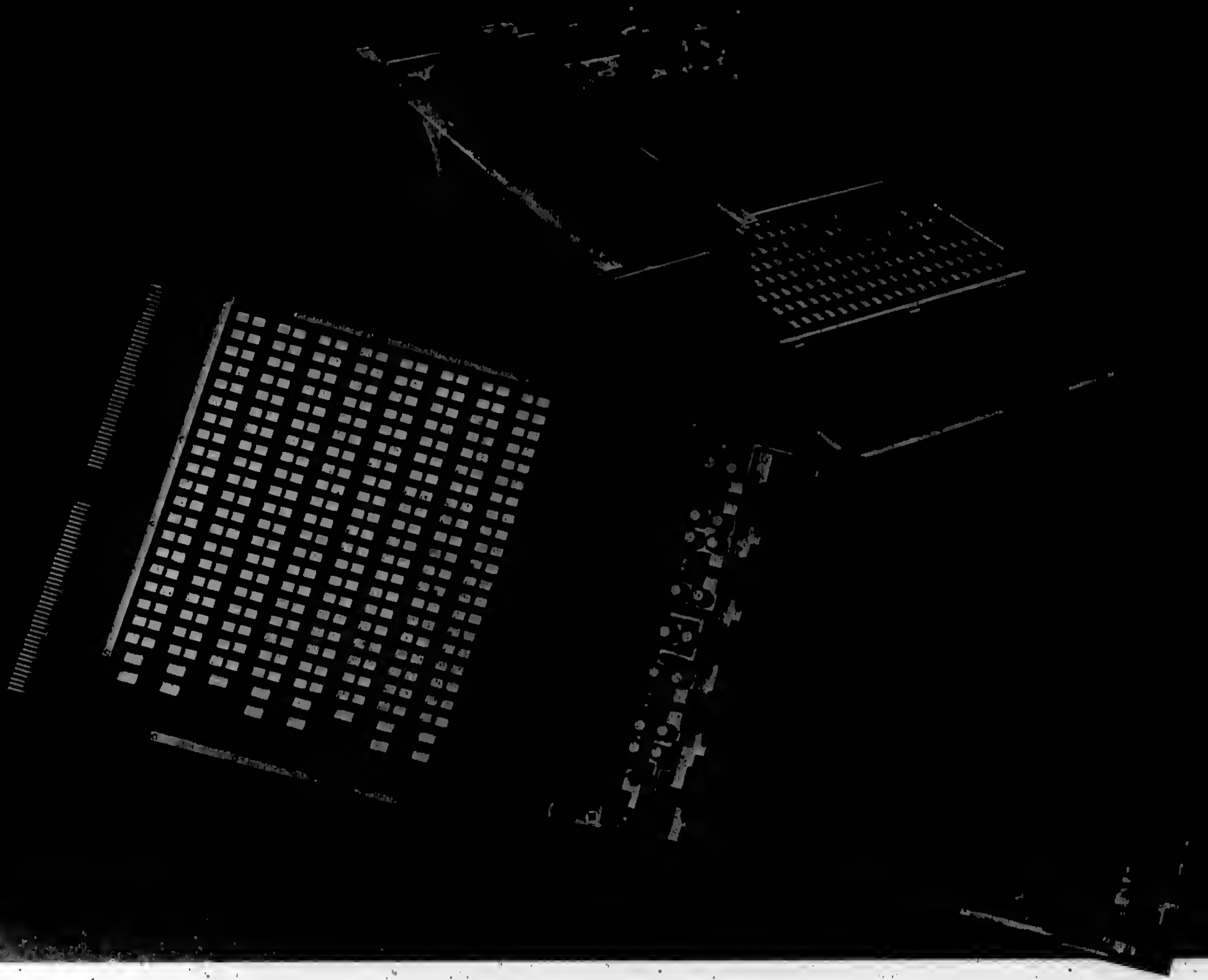

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Two Functions on One Chip?

VLSI Eyed as Future CPU Memory Key

By Howard A. Karten
CW Staff

ANAHEIM, Calif. — Very large-scale integration (VLSI), in which 5,000 or more gates are placed on a single chip, will have an almost unimaginable impact on future microprocessors and CPU memories, according to speakers at a recent National Computer Conference panel here.

Speaking before an overflow crowd, Dr. Frederico Faggin of Zilog Corp. noted the cost of solid-state devices has been steadily and significantly decreasing, even while their capacities and capabilities have been increasing. Faggin expects this steady price drop to continue into the 1990s, with a concomitant decrease in power dissipation, physical size and propagation delay.

Citing a typical example of the price drop, Faggin said gates, the most basic element of large-scale integration (LSI), cost approximately three cents each in 1971 but now cost approximately 10% of that. Typical gate densities are now in the range of several thousand, Faggin pointed out, predicting that 10,000 gate/chip densities will be a practical reality in the next few years and that 1985 will see densitites of 45,000 gate/-chip.

SOS Wave of Future

Limitations imposed on current technology by physical phenomena may mean that silicon-on-sapphire (SOS) technology is the wave of the future, the Zilog engineer said. These limitations include the problem of channel length, which is currently limited by hot electron phenomena to .25 microns in length; problems involving supply voltage, which is currently limited by thermal noise to .3V to .4V; and gate oxide thickness, which is currently limited by oxide breakdown phenomena to 100 angstroms.

Two additional limiting factors, Faggin said, are minimum line width, also currently limited by MOS technology to .25 microns in length, and power dissipation, currently limited to 1 watt at a frequency of 100 mHz.

SOS technology has several advantages over current CMOS methods, Faggin said, but cost is not one of them. While propagation delay for SOS is only half that of MOS, the cost is three times as much.

Possibly offsetting this, however, are the power dissipation abilities of SOS, which are said to be approximately 10 times that of MOS. Nevertheless, Faggin said, he expects the more advanced technology will be highly important in the latter part of the 1980s.

Function Integration

Continuing on the theme of integration of separate functions on a single chip, copanelist Ron Whittier predicted microprocessors and memory will eventually be commonly found on the same chip.

The Intel Corp. manager showed attendees examples of chips that had been advanced technology items in 1977, when they were produced, but which he said were already obsolete. His own company has already started producing chips with memory and logic in one package.

Looking into the future, Whittier foresaw several trends in chip manufacture and design. Future trends for dynamic random-access memory (RAM) will continue to include the 16-pin DIP packaging, a single 5vdc power supply, TTL input/output and the continuation of power dissipation requirements and higher performance; the speed of dynamic RAM devices should eventually go down to the 50 nsec to 75 nsec range, he predicted.

Attempting to look into the late 1980s-early 1990s time frame, Whittier predicted chips will become standardized packages containing both software and hardware, forming the basic building blocks for the future. Program storage will exceed data storage in the future, he augured, and complete memory packages will dominate small machine applications.

Moving-Head Disk Storage Seen Stable for 10 More Years

By Ronald A. Frank
CW Staff

ANAHEIM, Calif.— Moving-head disks will continue to satisfy the needs of mass storage growth without being impacted by any new technology during the next 10 years, according to Thomas Murnan, an engineer with Magnetic Peripherals, Inc.

Semiconductor and solid-state memory technologies are expected to impact the fixed-head disk area; but they will complement the growth of higher recording densities within moving-head disk systems, Murnan predicted at a National Computer Conference session here recently.

Improvements will be made to these disk systems in the areas of recording heads, the recording medium and head positioning systems, serving to widen the performance gap between moving-head disks and tape devices, Murnan said. At the same time, moving-head disk systems will maintain a significant advantage in cost/byte over solid-state memories, he added.

There is no foreseeable innovation in moving-head disks that will reduce the cost per megabyte as effectively as increasing the recording densities, Murnan told the NCC session on future developments in peripheral devices. Future disk systems must maintain or improve performance over today's systems while at the same time reducing storage costs through increased recording densities. While this is happening; reliability and maintainability must also improve.

To achieve higher recording densities, designers must make heads fly closer, thin the recording medium and make positioning systems more precise with circuits which have better timing and encoding characteristics.

While progress is being made in the development of memory technologies such as bubble memories and charge-coupled devices (CCD), these still are not cost-effective for use in disk systems. Some moving-head disk systems will be replaced by solid-state memories, but only where the system needs the added reliability and the cost premium can be justified, Murnan believes.

In the coming years, moving-head disk drives will be available in more configurations with fixed-media drives being used mostly on medium to large systems. Removable media drives will continue to play a significant part in small to medium-size systems, Murnan said.

Nonimpact Printers

Reviewing printer technology, Donald Swatik, director of engineering with Computer Peripherals, Inc., noted nonimpact devices are receiving a lot of attention because they have the ability to print high-resolution images in a very dense dot matrix format at relatively high speeds. This combines the high print quality obtained from solid-stroke impact printers with the font versatility of the matrix format.

Ink jet printing technology generally includes the continuous ink jet and drop-on-demand ink jet types. The ink jet printer represents a modular building block that can be configured in many ways to yield a broad spectrum of printers, Swatik explained.

The number of characters printed per second varies inversely with resolution, so speed can be traded for resolution, he said.

The highest speed printers employ electrophotography and lasers. The large number of steps in this process and their relative complexity leads to an expensive mechanism, but the technology is cost-effective at high speeds, Swatik noted.

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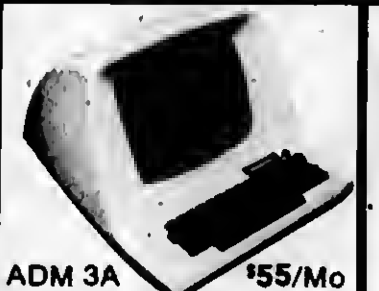

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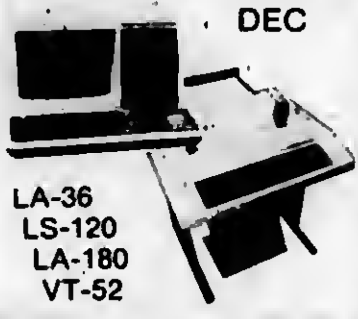

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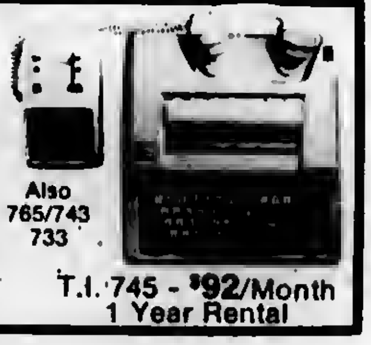

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Modeling of CPU Performance Termed Science Rather Than Art

By Tim Scannell
CW Staff

ANAHEIM, Calif.— Computer performance modeling is mistakenly considered by many DP analysts to be more of an art than a specific science. In reality, computer modeling — or comparing "what is to what should be" — is based on common methods of evaluating a computer's performance, according to Dr. Tom Giammo of the Social Security Administration.

Performance evaluation in its essence is prediction, and within DP prediction implies modeling, Giammo said at a panel here at the recent National Computer Conference. There exists a basic "underlying structure" to the operation of each computer system as it goes through the various stages of input and output, Giammo stated, and, as a result, certain approaches can be taken.

The first step is to isolate and define the individual elements of the computer's architecture. This involves treating the system as a collection of "semiautonomous components" rather than as a single machine, Giammo explained.

The analyst should follow the flow of data as it is passed through the computer and compare the speed and efficiency that each component attains as the data is transferred.

The organization and interaction of the various components within the computer as new jobs are input and the resulting priority assignments should also be recognized by the analyst and a "queueing network methodology" be adopted, Giammo said. In the area of computer performance modeling, it should become natural for the analyst "to treat the whole thing as an interacting, queuing network."

Although there are several laws that govern the physics of software and the action that occurs within the CPU, these laws have the disadvantage of being "too detailed" and performing "too slow," Giammo said. On the other hand, analytical techniques using mathematical algorithms have proved to be "very fast."

Ideally, the analyst should "do as much analytically as he can get away with," Giammo noted.

Number of Tasks

Efficient computer performance depends upon how many tasks are currently seeking service within the CPU, Giammo continued. The effective distribution of service among job classes is directly dependent on what priorities are assigned to the active list of DP jobs in the system.

To arrive at the correct assignment of the various priorities, an analyst must know the workload at each particular station — a job that, for the most part, is based on approximations, Giammo stated.

Evaluation of a system's performance must be preceded by establishing the approximate size of the computer's workload, job by job. When the priorities are ascertained, the programmer or analyst has to build specific analytical assumptions into the program.

For instance, when a Class A job enters a CPU which contains other jobs of various levels, the other jobs, instead of being preempted, will "jump ahead" a few steps and continue at a fairly steady rate of speed, Giammo said.

Dr. W.W. Chiu of IBM's T.J. Watson Research Center agreed with Giammo's contention that laws should not be taken at face value and added that computer modeling should have as its goal an accuracy rate of 15% or less, simple input requirements and fast run times.

An analyst developing a computer model must strive to thoroughly study the logic of the system involved and avoid complexity in his designs, Chiu said.

Chiu pointed out the differences between simulated computer models and theoretical models. Although simulated models have extremely high running costs because of their level of detail, Chiu said, theoretical models have at least three difficulties.

First, they require the need to analyze complex workload scheduling algorithms; second, there exists the problem of monitoring memory contention or swapping; and third, there is no way to account for the effects of different algorithms in a total system model.

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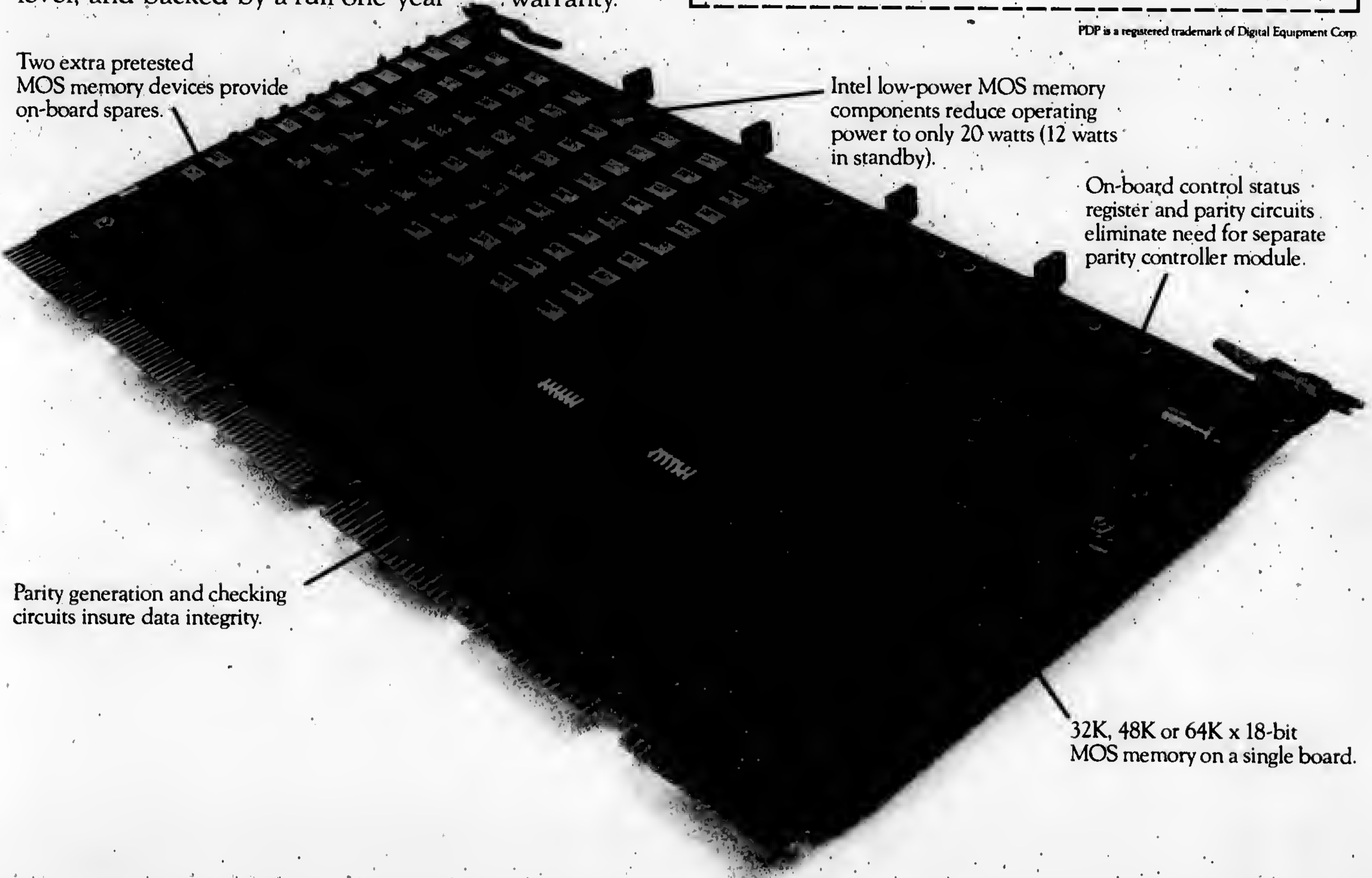

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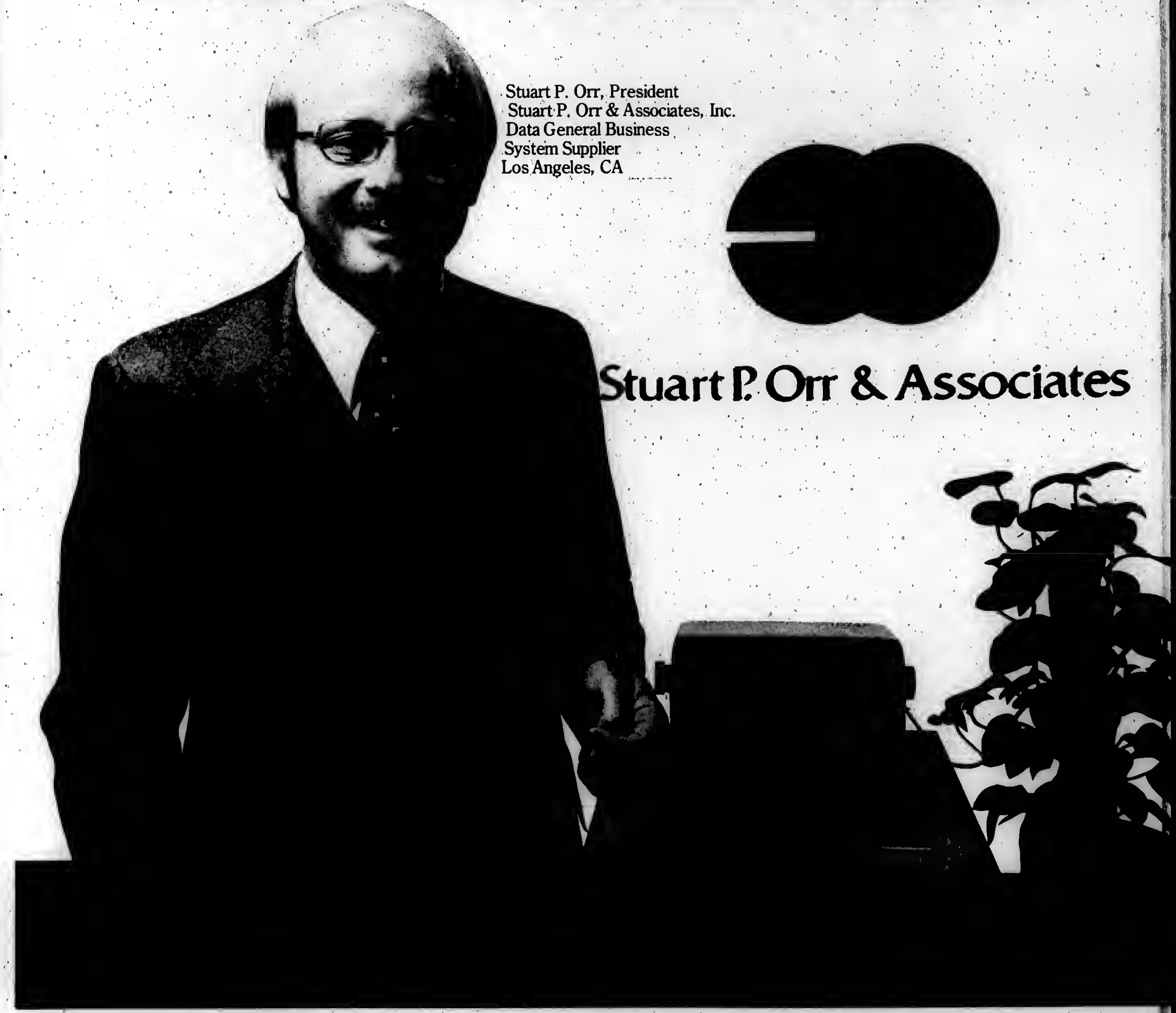

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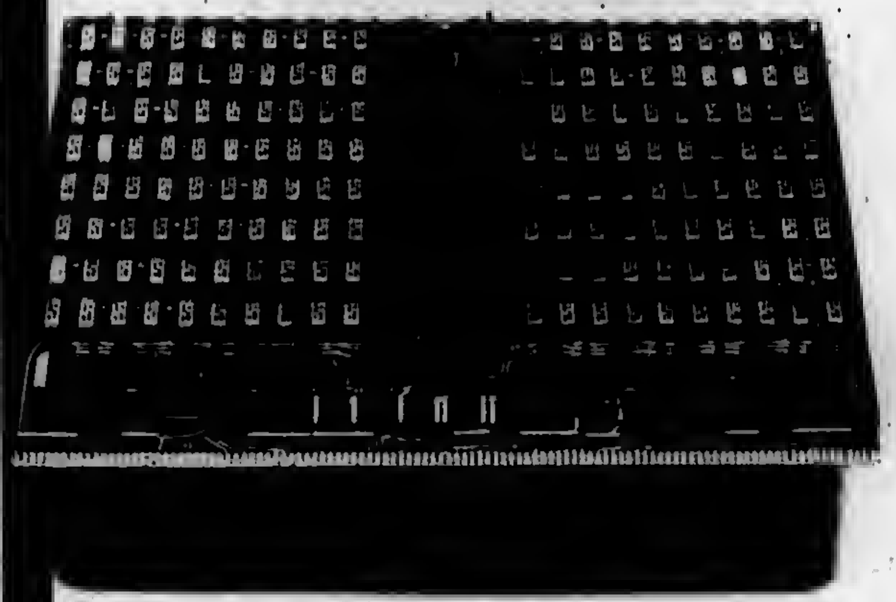

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Cummins-Allison Additions Support Check Processing

GLENVIEW, Ill. — The Cummins-Allison Corp. has introduced a family of check reader-sorters and extended its distributed data processing (DDP) equipment with what it said represents major enhancements to its line of check-processing systems.

The 6400 distributed processing system announced by the company is an extension of the 5400 system. It is faster than the 5400, according to a spokesman, and can be equipped with a maximum of 192K bytes of MOS static random-access memory.

The 6400 can support a maximum of 32 CRT keystations with concurrent data entry routines, utility programs and user-written Cobol or RPG programs, he added. Communications modes include Burroughs Corp. remote job entry protocol and IBM 2780, 3780 and 360/20 Hasp workstation protocols.

13 DMA Channels

The system, which is said to be fully compatible with the 5400, has a 400 nsec access time for 1 byte of main memory, 800 nsec CPU cycle time and a data transfer rate of 2.5M-byte/sec. It features 13 direct memory access (DMA) channels, all independent, to prevent channel queueing delays, the spokesman explained.

A maximum of 25 devices can be attached to the system, including up to two printers, a maximum of eight disks and a maximum of eight tapes (7- or 9-track, single or dual density).

Prices for the 6400 system start at $800/mo including maintenance; it carries a purchase price of $29,500.

Micr Reader/Sorters

The four magnetic ink character recognition (Micr) reader/sorters announced by the company range in speed from 830- to 1,400 document/-min. The Model 6260 has six pockets, a speed of 830 document/min and a price tag of $52,650 or $1,200/mo including maintenance.

The intermediate-speed Model 6285, with 14 pockets, has a price tag of $97,375 or $2,215/mo, also including maintenance.

The largest reader/sorter, the Model 6290, has 14 pockets and reads 1,400 document/min. A version of the 6290 is expandable to 34 pockets, according to a spokesman.

The company expects two additional features to be available for the Model 6290 in the first quarter of 1979: non-impact printing on one or both sides of the document, fully controllable by software, and a microfilming capability.

The 6290 sells for $101,250 and leases for $2,330/mo, the company said from 800 Waukegan Road, Glenview, Ill. 60025.

Scanner/Digitizers Offered For COM Graphics Units

CHELMSFORD, Mass.— Two scanner/digitizers reportedly capable of scanning up to 240,000 point/sec and compatible with most standard computer output microfilm (COM) graphic systems have been introduced by Optronics International, Inc.

The company said its image enhancement technology enables the devices, called the Commander Model 810 and the Commander Model 1722, to produce digitized data even when working from less-than-optimal-quality graphics, such as discolored or mutilated originals.

Among the COM units with which the Commanders are said to be compatible are the Information International, Inc. Comp/80 and FR 80 and Dicomed Corp.'s D48.

Standard Resolutions

The Model 810, which accepts up to 8- by 10 in. size, has a standard resolution of 50 microns, or 500 line/in., while the Model 1722 accommodates graphics up to 17- by 22 in. at the same resolution. Optional resolutions available on both models are 12.5-, 25-, 75- and 100 microns, a spokesman said.

The Model 810, which uses both reflection and transmission, can digitize 15 graphic/hour and costs $31,550. The Model 1722 works on reflection only, taking 6.5 minutes per graphic; it costs $136,300.

A machine capable of scanning a newspaper-sized sheet is also available with a request for quotation (RFQ), the company stated.

Both devices can be used with magnetic tapes or disks, according to the spokesman, and both use data compression techniques to permit rapid scanning and minimizing of the storage media needed. In addition, both devices have color capabilities, the spokesman noted.

The Commander family incorporates automatic calibration control that is said to guarantee drift-free measurements. An additional feature is a "standard white" calibration strip for background density reference.

Optronics can provide interfaces to all standard minicomputers on an RFQ basis, as well as an 8-bit, 16K minicomputer and an 800 bit/in., 7- or 9-track tape drive, the spokesman said from 7 Stuart Road, Chelmsford, Mass. 01824.

Protective Cartridge Fits IBM 2315 Types

WOODLAND HILLS, Calif.— Data Devices International, Inc. has introduced a protective bottom cover designed to fit IBM 2315-type data cartridges.

The device, called the Guardian, is said to prevent lateral movement of the disk within the plastic, protect the cone and diaphragm by completely covering the bottom of the cartridge and minimize the possibility of contamination from dust or other foreign matter.

The product comes in boxes of six, priced at $45/box, from the company at 6301 Desoto Ave., Woodland Hills, Calif. 91364.

Hospital's CPU Dispenses Pharmacy Control

By Howard A. Karten
CW Staff

FORT SMITH, Ark. — A community-oriented medical center here has found multiple benefits in using a medium-scale virtual memory system in its pharmacy. The CPU, which keeps track of medications dispensed to patients for medical and billing purposes, has proved helpful to all parties involved — pharmacist, doctors, nurses and patients.

The Sparks Regional Medical Center is a teaching hospital associated with the University of Arkansas Medical School. In 1974, the hospital decided to apply DP in the pharmacy and began investigating systems available for that application.

Working with the hospital administrators and the hospital's director of DP, Mathew M. Griffin, director of pharmacy services, began investigating various alternatives.

"We agreed in the beginning that it would be a pharmacy-oriented system and not a system to which the pharmacy would have to conform," Griffin said, of his software search. "We wanted it designed strictly around our needs. I took a strong role in the software selection because, after looking at what was available, I hadn't seen what I wanted. I wanted a system that could be flexible."

Modification Possible

Although he found no system which he felt met those criteria, Griffin and his group felt they could obtain a workable solution by modifying IBM's Health Care Pharmacy System and incorporating the American Society of Hospital Pharmacists' Drug Product Information File. The Drug Product Information File lists all medications available in this country, along with pertinent information such as method of administration and trade and generic information and assigns a unique number to each product.

Although they began work with the IBM software, the group could not get it to work at all. "I feel it wasn't ready to be marketed," Griffin said. However, since they recognized the value of IBM's approach, they decided to attempt to modify the package to get it in production. "Our DP people felt they could modify the system and get it into production much faster than starting from scratch."

One of the major omissions of the IBM package, he added, was that it did not include the ability to process information on intravenous (IV) medications or additives to IV solutions. Although IV therapy is common in many hospitals, the IBM package could not add IV medications to the patient medication profile or do some of the relevant calculations for them.

Since the system has been implemented, Griffin feels it has facilitated all phases of the pharmacy's daily work.

One of the benefits he cited is the reduction in time nurses must spend preparing and ordering medication. "Prior to the introduction of the system, nurses spent about 22% of their time in preparing and ordering medication. The pharmacy system now generates the medication orders for each patient, at the start of each day, thereby freeing the nurses for other tasks. This time savings is one of the ways we can cost-justify the system," Griffin explained.

Another important benefit is the tighter control the pharmacy has achieved over inventory. Since each dose of medication is accounted for — by the pharmacist when entering and filling the medication orders of the physicians and by the nurses when dispensing them — pilferage has been reduced, and the hospital has achieved tighter control over narcotics.

Another advantage is in patient billing. The drug records of each patient are centralized and itemized.

A patient's contact with the system begins on admission. Information obtained during the admitting process is sent to the pharmacy, where it is entered into the system by the pharmacist. Using an identification number assigned for data security purposes, the pharmacist enters all pertinent information such as allergies, diagnosis, drugs presecribed, dosage, method of administration and any special instructions.

Since some physicians have standard regiments for particular diagnoses, which might consist of as many as 12 or 13 different drugs, these are stored in the computer with mnemonics.

Unlike similar systems in use elsewhere, the Sparks system does not have the capability of checking two or more drugs for dangerous or untoward interactions. That is presently done manually by the pharmacist. However, Griffin has plans to add that capability.

The hospital's equipment consists of a 1M-byte IBM 370/135 running under DOS/VS, 3340 disks, 3420 tapes and 3272 CRTs. In addition, it has Genesis One Computer Corp. G-77 CRTs and Genesis G-165 printers.

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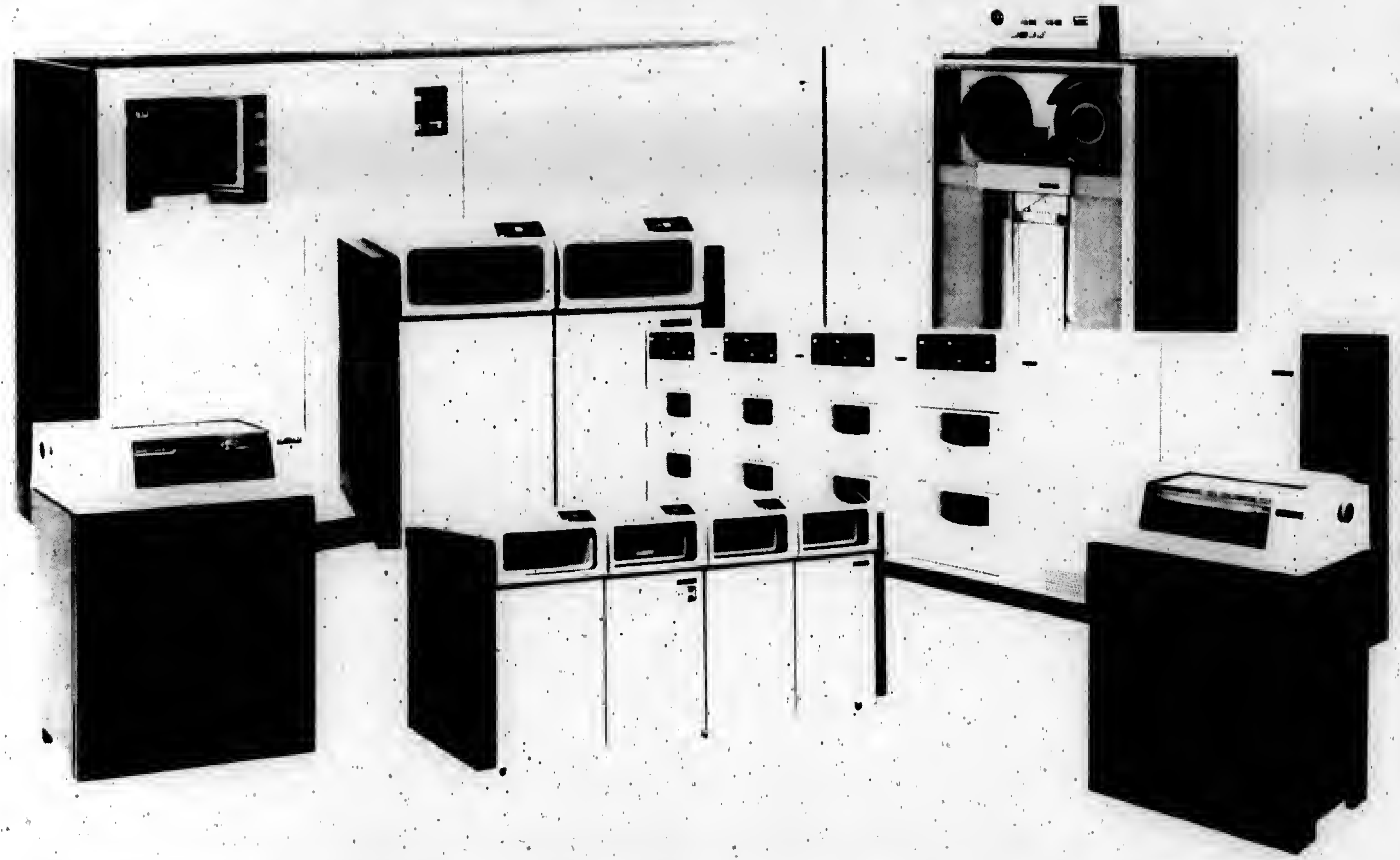

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Software Also Enhanced

Three CPUs Join Burroughs B1800 Line

By Jeffry Beeler
CW Staff

DETROIT — Burroughs Corp. has added three CPUs and an enhanced operating system to its B1800 series of systems products.

With the introductions, the B1800 family now encompasses four computer models: the previously announced B1860 and its sister systems — the B1825, B1835 and B1865.

The B1825, an entry-level system, fits in a cabinet and incorporates 96K bytes of 4K N-channel MOS memory expandable to 256K bytes, according to a Burroughs spokesman.

Compared with the low-end system, the B1835 offers 70% greater throughput as well as a 128K-byte error-correcting memory expandable to 512K bytes, the official said. A basic B1835 also comes with a 4K-byte bipolar cache memory, he added.

The B1865, meanwhile, provides three times more throughput than the B1825 and holds 256K bytes of 16K N-channel MOS memory expandable to 1M byte, the spokesman noted. Like the B1835, the top-of-the-line system also reportedly offers a 4K-byte cache.

At the same time, Burroughs also announced an enhancement to its B1800 Master Control Program. The enhancement, a memory priority management system, provides a choice of four management schemes users can select to suit their individual applications requirements.

The schemes, which range in power from First In First Out to a technique that assigns a decay factor to each code segment in memory, allow frequently used memory segments to reside permanently in main storage.

Depending on a user's job mix and CPU capacity, the memory priority management capability is said to boost system throughput 8% to 18%. The feature comes standard with the B1825, B1835 and B1865 and is available as an optional enhancement for B1860s already in the field, the spokesman said.

Operating Software

As part of the same announcement, Burroughs also introduced additional operating software and an interface for the company's Data Management System (DMS-II). With the two products, RPG users can reportedly interface their systems to a DMS-II without first having to convert their programs to Cobol.

Elaborating on the features of its latest small- and medium-scale systems offerings, Burroughs credited the B1825, B1835 and B1865 with occupying 50% less floor space and consuming 25% less power than the B1860.

Because all B1800 series systems are object-code-compatible with each other, a program written for one model can operate — without software changes — with any other member of the line, the company official said. The B1800 systems are also said to run the same programs as any of Burroughs B1700s and can operate under the Computer Management System software used by the company's B80 and B800s.

With the memory priority management capability, the B1825 can support up to four communications lines, compared with a maximum of 32 for the B1835 and B1865, the official said. The three systems accommodate any mix of six communications capa-

(Continued on Page 48)

Latest Addition to B1800 Line

At Housewares Maker

Mini Speeds Warehouse Operations

BARRIE, Ont. — Inventory that used to take as long as four days to receive and store can now be placed in stock in less than an hour thanks to a minicomputer-based control system installed six months ago at the Housewares Department of Canadian General Electric Co. (CGE).

The inventory control system has freed 6,000 sq. ft. of storage space in CGE's warehouse by allowing the housewares manufacturer to consolidate like materials, a company spokesman said.

It has also allowed the firm, which manufactures more than 150 models of household appliances, to calculate how many items of each product type can be assembled from its existing inventory of more than 100 kinds of parts.

With this information, materials managers can predict when they will have to replenish their parts inventories to keep pace with production demand.

As a result, CGE no longer experiences production slowdowns or shutdowns because of parts shortages, the spokesman said.

Switched From Card Files

Before it acquired the current system, the company controlled its inventory manually with a large card file. For each type of part it stocked, CGE maintained a card showing the amount of the item on hand and its locations in the warehouse.

Before they began production of any product, company employees searched the card files, warehouse and assembly lines to decide whether enough parts were available. In this effort, they received some help from a GE-115 batch computer, which they updated weekly to monitor the firm's inventory levels.

Unfortunately for CGE, the batch computer's weekly parts counts, while suitable for purchasing requirements, were not nearly accurate or timely enough for production scheduling, a company official recalled.

As a result, materials managers never knew whether they had enough parts to produce a useful volume of a given product. In fact, at times they had to halt production and temporarily lay off workers because they had exhausted their original stockpile of parts and could not obtain immediate replacements.

And even when they did have enough parts, managers often could not find them because CGE's previous inventory control system did not provide for a systematic arrangement of materials inside the company's warehouse, the spokesman reported.

To overcome these problems, CGE's managers decided to modernize their outmoded, manual inventory control system with a computerized counterpart. After evaluating several alternatives, the company eventually opted for a system built around a 192K-byte Hewlett-Packard Co. HP 3000 Series II.

CGE chose the HP model over rival systems primarily because other users had recommended the computer's Image/Query data base management software, the spokesman explained.

Dubbed On-line Stock Control and Receiving (Oscar), the system automatically updates its data base to reflect changing in-

(Continued on Page 59)

Get It Off Your Chest

Many users and industry officials have worthwhile things to say to their colleagues but are seldom heard because they lack an appropriate forum.

If you're one of those individuals, here's your chance to get those important opinions off your chest and out into the world where they can do some good. *Computerworld* is now seeking reader contributions for its August "Special Report on Minicomputers and Small Business Systems."

Maybe you're a user who found an ingenious small systems solution to a crucial business problem or who has an unusual installation experience to relate.

Or perhaps you're a company official with industry tips or prognostications that users should know about.

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Contributions should be four to eight double-spaced, typewritten pages long and should be submitted no later than than July 20 to Jeffrey Beeler, *Computerworld*, 797 Washington St., Newton Mass. 02160.

LSI-11 Gets Bulk Core

CRANBURY, N.J. — A bulk core system from Dataram Corp. attaches to the Q-bus of the Digital Equipment Corp. LSI-11 and PDP-11/03 and emulates DEC's RF-11 fixed-head disk system, according to Dataram officials.

Software-transparent to all DEC's standard operating systems, the Model BC-203 reportedly comes in 7-in. and 15.75-in. chassis versions that store up to 512K bytes and 2M bytes, respectively.

A 7-in. or 15.75-in. BC-203 costs $7,600 with 256K bytes and $12,400 for 512K bytes. A 15.75-in. system with 1M byte sells for $22,000, compared with $37,600 for a 2M-byte configuration.

Dataram is located at Princeton-Hightstown Road, Cranbury, N.J. 08512.

RK05-Compatible Unit Debuts

HARTFORD, Wis. — Compatible with the Digital Equipment Corp. RK05 storage system, a cartridge disk unit from General Robotics Corp. holds 20M bytes on one removable platter and three fixed platters, according to the product's developers.

The removable platter can be a 5M-byte double density platter or a 2.5M-byte RK05 platter. Built around a DEC LSI-11/02, the CD/X3 accesses in 52.5 msec and incorporates a 62K-byte MOS random-access memory, company officials said.

A serial asynchronous I/O port allows the unit to interface RS-232-, 20mA- and TTL-compatible hardware, while a 16-slot backplane accommodates an additional nine expansion slots, they added.

Empty sockets on the CD/X3's bookstrap module are said to permit the attachment of additional programmable read-only memory or erasable programmable read-only memory for expanded programming capabilities. The bootstrap module also stores firmware diagnostic programs, the spokesman said.

The CD/X3 uses DEC's RT-11 operating system, which includes file utilities, assemblers, macroassemblers, linkers and loaders, they added. The software also reportedly supports high-level languages like APL, Fortran, Basic and Dibol.

CS/X3 costs $18,000 at 57 N. Main St., Hartford, Wis. 53027.

CPUs Join B1800 Line

(Continued from Page 47)

bilities, including standard asynchronous lines operating at 1,200 or 1,800 bit/sec, standard synchronous lines operating at 2,400-, 4,800- or 9,600 bit/sec and bisynchronous lines with the same transmission rates as their synchronous counterparts, the official said.

Basic B1825

A basic 96K-byte B1825 with an operator display console costs $48,000 or leases for $1,575/mo under a one-year contract. A minimum 128K-byte B1835 with a display console sells for $69,700 or leases for $2,260/mo under a one-year contract.

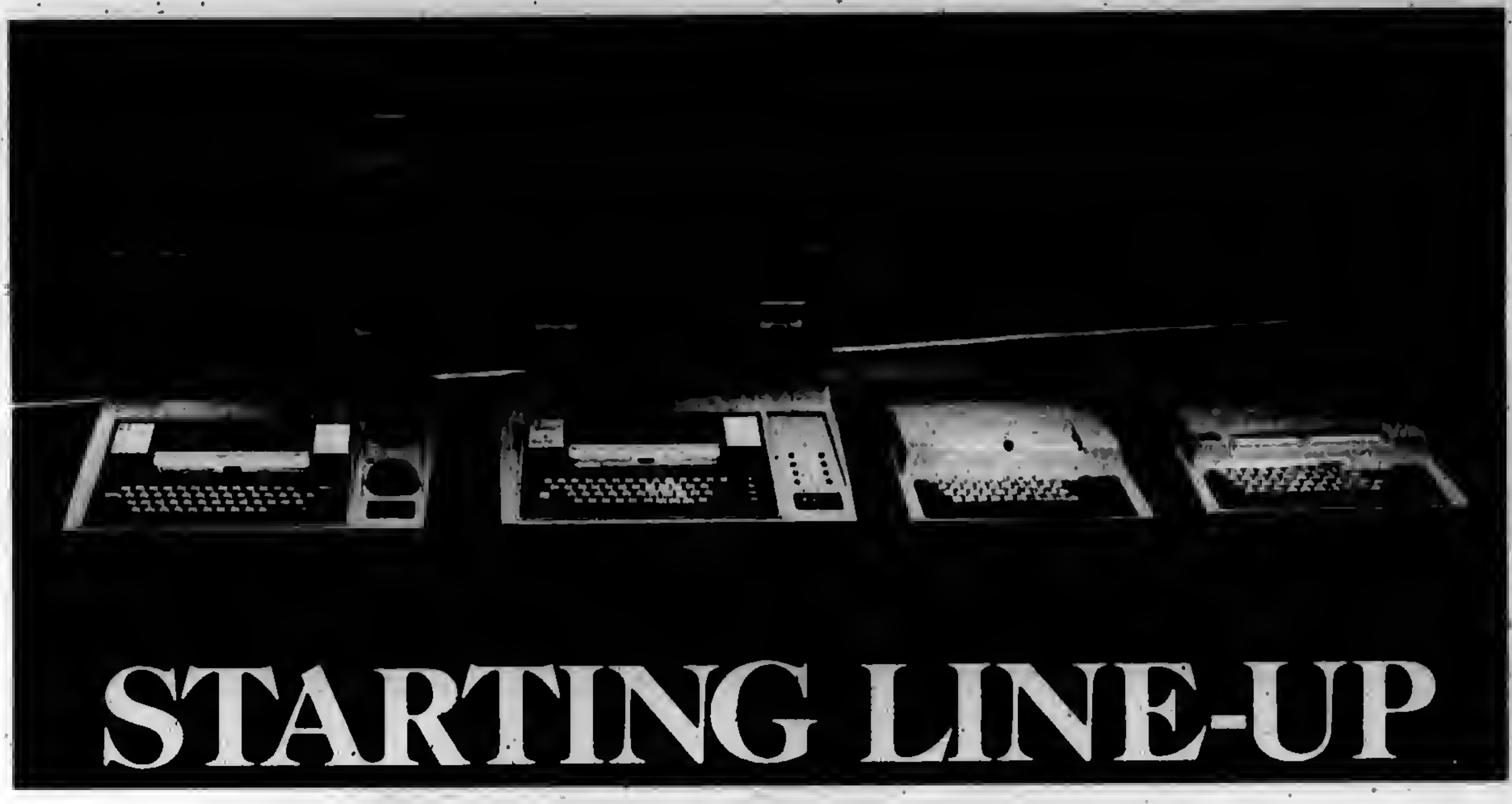
A basic 256K-byte B1865 with console, meanwhile, costs $140,090 or leases for $4,540/mo under a one-year contract.

The systems are also available under three-and five-year leases, and all prices include service, the spokesman noted.

Available Options

Options available with the B1825, B1835 and B1865 include a microprocessor-based data communications subsystem, which costs $3,000 or leases for $110/mo, and a multiline communications control system, which costs $7,000 or leases for $255/mo.

Deliveries of the B1825 begin immediately, and the first shipments of the B1835 and B1865 will start during third quarter 1978 and first quarter 1979, respectively.



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The 742 offers programmability; TICOL*, a powerful data entry language; automatic search; preprogrammed error recovery; preprocessing; and the ability to capture data independently of the host computer.

The 743 offers a compact keyboard send-receive terminal with field-proven thermal printing and low prices, so you can very easlly afford to become, or increase, a multiterminal operation.

And the 763 has built-in nonvolatile bubble memory so it can remember even when the power is off, while it waits to talk to your computer. It also has off-line editing, and a built-in numeric cluster.

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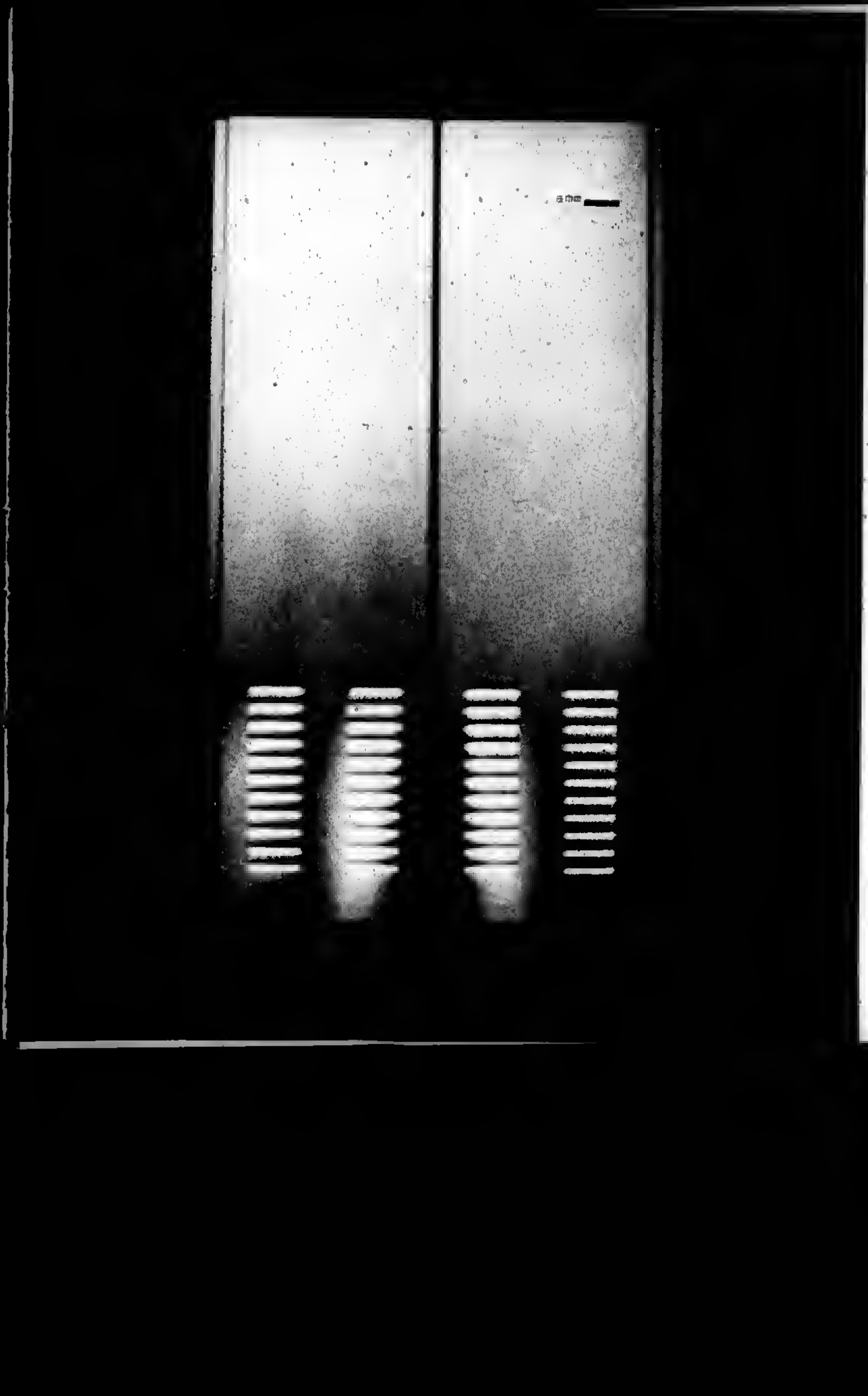

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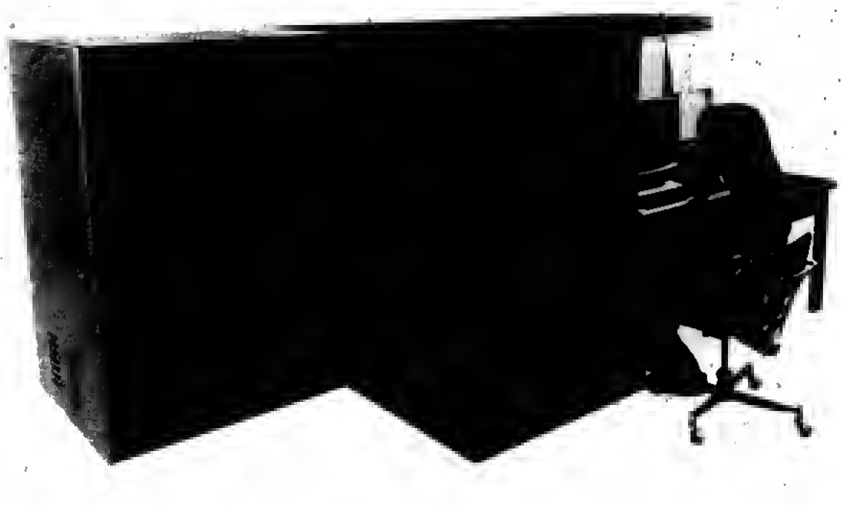
EMM gives you the memory and features that effectively extend the life, performance and capacity of your IBM CPU. We give you more memory than IBM says you can have. And, we give you more than any other plug compatible independent memory manufacturer. We design our memories to be *totally IBM compatible* and highly reliable. We build our own memories so you're assured of complete quality control. We support it now and continue to support our memories with a thoroughly trained and certified installation team, a responsive worldwide service organization, and a network of spare parts depots and regional service representatives. And, that's not all. Our memories have enhancements that you can only get from the world's largest independent add-on memory supplier—EMM. For example, our speed enhancement improves performance, giving you higher throughput. Our deferred maintenance feature lets you reconfigure any segment of memory that fails without unnecessary downtime. And, we offer standby memory and backup power supply features. We're even ready for your future memory needs. Since your memory needs will grow with time, we make it easy for you to expand. Our add-on memories are field expandable and/or convertible to other models. And, we also make it easy for you financially by including future upgrades in our lease agreement. So, when you're ready for more memory than IBM delivers, EMM add-on memories can make the difference.



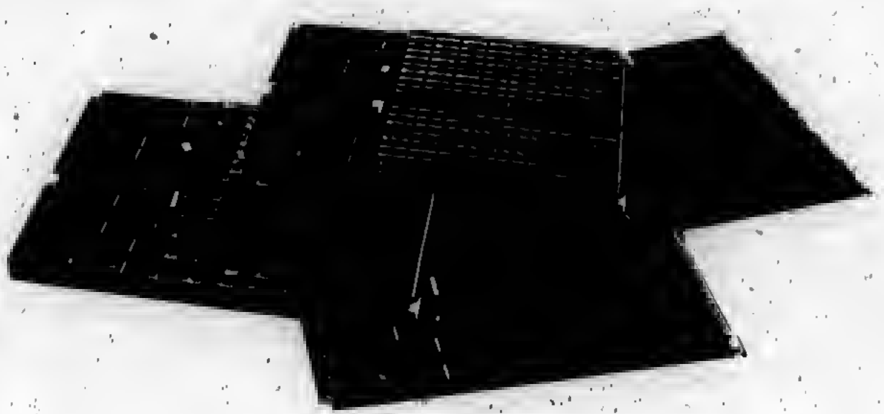
Leading the Way in a New Generation

EMM is among the first of the independent add-on memory manufacturers to deliver memory for IBM's new generation of computers, the 303X series. To expand and enhance the operating capacity of this new generation. With many of the same features and enhancements that have made our 360 and 370 memories the standard of the industry.

- EMM enhances up to 12 Megabytes of memory
- Uses same 4K static chip as EMM 370/158 and 370/168
- Deferred maintenance
- Convertible to other 303X models and 370/158 and 168

- EMM enhances up to 12 Megabytes of memory
- Uses same 4K static chip as EMM 370/158 and 370/168
- Deferred Maintenance
- Convertible to other 303X models and 370/158 and 168

- EMM enhances up to 16 Megabytes of memory
- Uses same 4K static chip as EMM 370/158 and 370/168
- Deferred maintenance
- Convertible to other 303X models and 370/158 and 168



The Megabyte Difference In Memory

EMM add-on memories significantly expand the operating capacity of your System 370. Our add-on memories are the most reliable around. Using proven 4K chips. With features designed to keep our memory up and running when you need it. Our memories require the fewest logic upgrade cards giving you fast installation with minimal attachments to your IBM CPU. Because we build our own memories, you're assured of on-time delivery when you select EMM memory.

- EMM enhances up to 2 Megabytes of memory
- Deferred maintenance
- Field upgradable in 256/512 increments
- Multiple floor plans

- EMM enhances up to 2 Megabytes of memory using 4K chips
- Deferred maintenance
- Upgrades to 370/148 without major installation changes
- ECCL
- Speed-up performance enhancement
- Multiple floor plans

- EMM enhances up to 4 Megabytes of memory
- Deferred Maintenance
- Field upgradable in 1 Megabyte increments
- Multiple floor plans
- Convertible to 145 or 138

- EMM enhances up to 4 Megabytes of memory
- Optional processor speed enhancement delivers 15–25% improvement over IBM
- Deferred maintenance
- EMM supplies port adapter (IBM J-K versions)

- EMM delivers 16 Megabytes of memory
- UP, AP, MP versions
- Upgrades to 370/168 without major installation changes
- Standby memory, bump store backup and backup power supply (RASI package)
- Field upgrades in 512K/1024K increments
- Multiple floor plans

- EMM delivers 16 Megabytes of memory
- UP, AP, MP versions
- Deferred maintenance
- Backup power supply (RASI package)
- Upgradable to 303X models
- Multiple floor plans

Superior Price/Performance

High speed, large capacity core storage power and floor space savings are the major benefits of EMM's 360 add-on memories. EMM continues to build 360 memories long after IBM has stopped. Giving you a superior price/performance ratio when compared with IBM. Extending the life and investment of your CPU well beyond the limits set by IBM. Now, instead of investing in a new, larger and more expensive system, you can simply add EMM memory. With enhancements for your 360 that IBM only offers on their 370's.

- Totally detachable from IBM
- EMM enhances up to 256K of memory
- Low power consumption
- Field upgradable/convertible to Model 40 or 50
- EMM supplies upgrade materials

- EMM enhances up to 512K of memory
- Low power consumption
- Field upgradable/convertible to Model 30 or 50
- EMM supplies upgrade materials

- EMM enhances up to 2 Megabytes of memory—*four times more than IBM*
- Low power consumption
- Field upgradable/convertible to Model 40 or 30
- Multiple floor plans

- EMM enhances up to 8192K of memory—*eight times more than IBM*
- Uses less than ⅛ floor space as IBM memory uses
- Deferred maintenance for any 1024K memory
- Power consumption ⅛ of IBM's
- Multiple floor plans

EMM has been building add-on memories longer and has more installed units than any other independent manufacturer—semiconductor or core. This has brought us into contact with many types of customers engaged in many types of businesses. The experience that we have during the course of both the 370 and 360 generations has provided us with a superior sensitivity and awareness of add-on memory customer needs. We have been responsive to translating these needs into reality in countless instances such as:

Offering speed enhancements for various 370 models

Providing our own materials for upgrade and model change

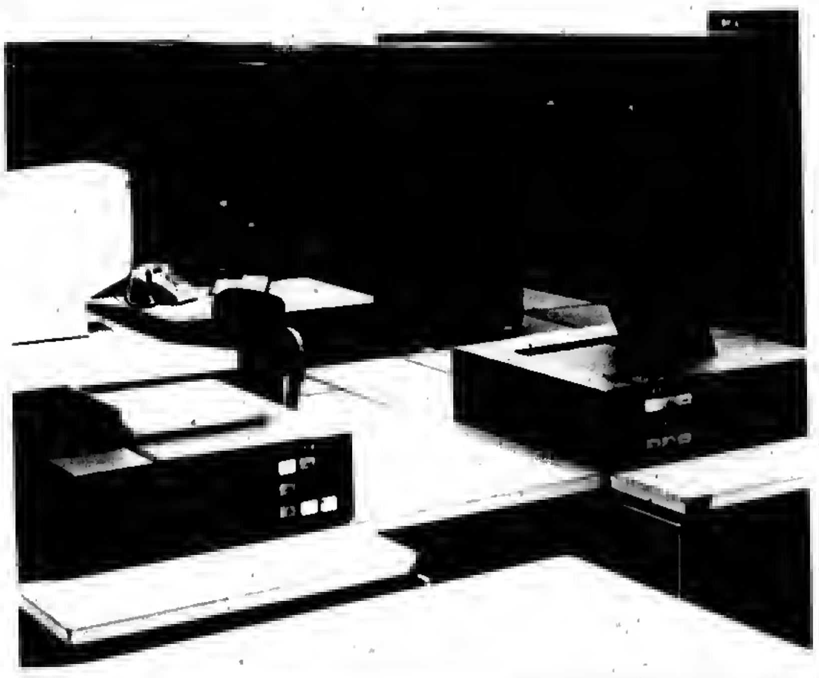
Offering more memory capacity than IBM for all 370 and 360 models

Building products totally design compatible with IBM

Manufacturing and supporting product lines that IBM gave up ten years ago

Maintaining localized depots for 360/370 7/303X units

Manufacturing quality products which command resale premiums



Over the years we have developed a special five point "what to look for in an add-on memory supplier" checklist. It includes:

Total IBM Compatibility When you add EMM memory to your system, your CPU won't be able to tell the difference between IBM and us. In fact, on our 370 and 7/303X memories, we use the same technology IBM uses. This means compatibility with future IBM enhancements.

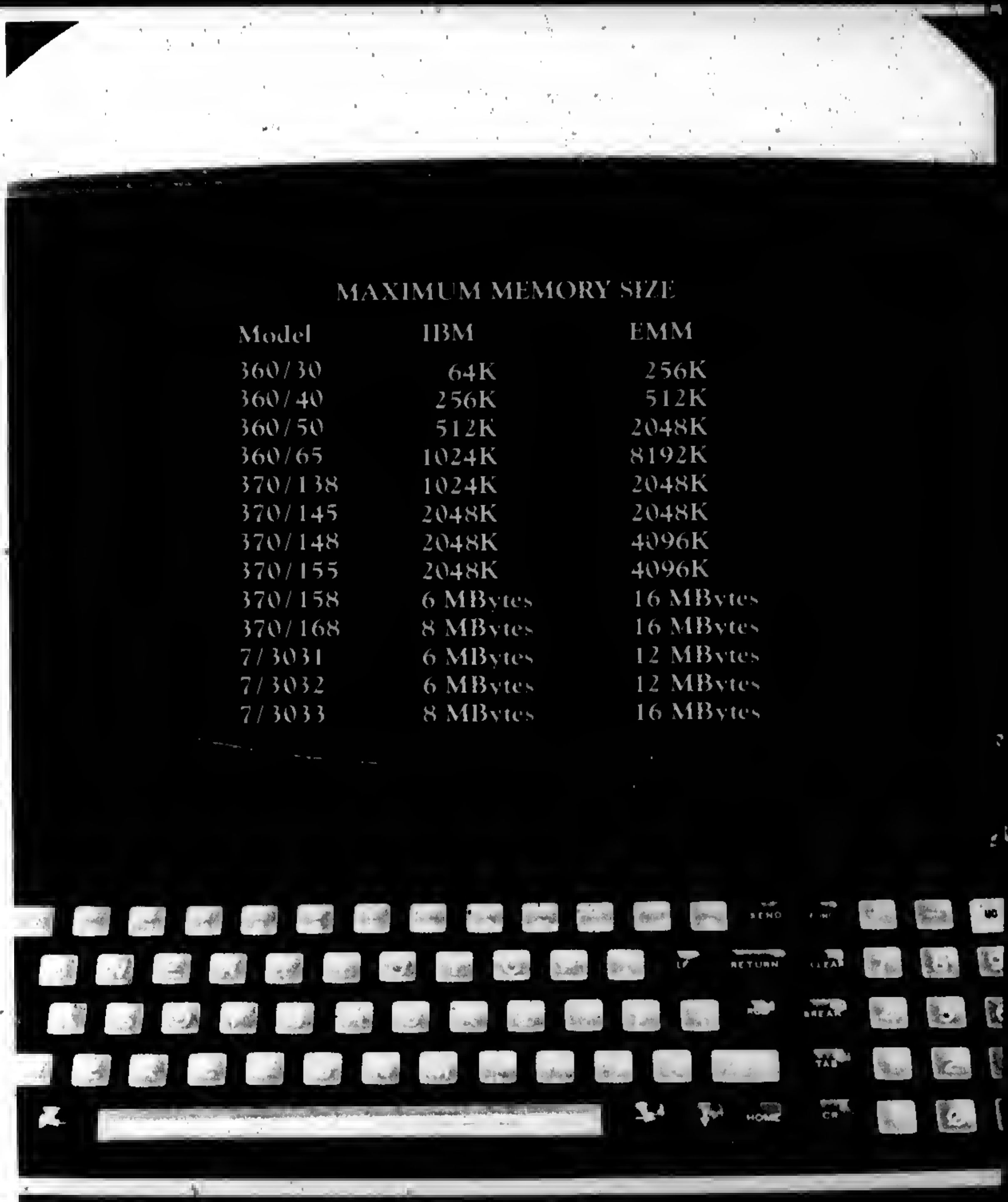
Reliability You Can Count On Our add-on memories are designed for reliable operation. We use fewer parts, less power and less CPU parts to enhance reliability. For our semiconductor memories, we use IBM technology which has proven to be the most reliable around. And, we build our own memories ensuring that you have the most reliable memory available.

Available When You Need It Even if your IBM main memory fails, your EMM memory keeps operating. Unnecessary downtime is eliminated with our deferred maintenance feature which lets you switch any troublesome 512K or 1024K memory off-line without interrupting operations. On some models, we offer standby memory, bump store backup and backup power supplies.

Superior Price/Performance Compare EMM's price/performance with IBM's and you'll see one reason why EMM is the world's largest independent add-on memory supplier. We deliver this memory in a flexible financial package tailored specifically to your capital and cash flow requirements.

We Grow With You As your memory needs grow, our add-on memories stay with you. In many cases, our memories are field expandable and convertible to other models. We can upgrade your memory using the existing installation. And, no matter what CPU you have, you'll find that EMM has the smallest access area requirement and uses less floor space than any other plug-compatible add-on memory system.

This checklist will enable you to better evaluate the factors that should and do make the difference in making your final selection. And, we are confident that when all is said and done you'll come to the same conclusion as thousands of others: That EMM is the difference in add-on memory.



MAXIMUM MEMORY SIZE

Model	IBM	EMM
360/30	64K	256K
360/40	256K	512K
360/50	512K	2048K
360/65	1024K	8192K
370/138	1024K	2048K
370/145	2048K	2048K
370/148	2048K	4096K
370/155	2048K	4096K
370/158	6 MBytes	16 MBytes
370/168	8 MBytes	16 MBytes
7/3031	6 MBytes	12 MBytes
7/3032	6 MBytes	12 MBytes
7/3033	8 MBytes	16 MBytes

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In-House CPU Cuts Wholesaler's DP Costs 20%

PORTLAND, Maine — Data processing costs have dropped 20% at W.H. Shurtleff Co. since the wholesale distributor of industrial chemicals switched from a local service bureau to its first in-house small business system.

Shurtleff's president William Poole credits the system with eliminating most of the delays the firm previously experienced in generating sales reports, performing standard business functions and accessing critical information about customers. Since its installation in January, the system has also allowed Shurtleff, whose annual revenues total $10 million, to diversify by becoming a systems house for other chemical distributors, Poole explained.

In the five years before it converted to in-house processing Shurtleff contracted most of its DP workload to a Boston-based service bureau. But when the time-sharing firm announced a hefty increase in its $2,000/mo service charge, Poole concluded "the cost curves of bureau service and minicomputer ownership were about to intersect for us."

Realizing they could not economically justify the proposed rate hike, the Shurtleff president and his colleagues abandoned their long-time service bureau and converted instead to a Data General Corp. CS/40 small business system, which they bought from The Computer Center, a combination service bureau/turnkey systems developer based in nearby Falmouth, Maine.

Poole and his staff evaluated several other systems, he said, and soon narrowed the field of competitors to two configurations before finally opting for the DG equipment. "In our opinion, the hardware of both [our current system and its nearest rival] was comparable, but DG's software was superior," the company president explained.

For four months after its installation, the system ran parallel with the Boston service bureau. Then, in April Shurtleff cut its last tie with the time-sharing firm and began relying solely on the in-house configuration for its DP services.

Built around a CS/40 Model 5 minicomputer with 20M bytes of disk storage, the system incorporates two DG dasher CRT terminals, a Dasher 70 char./sec keyboard-send-receive printer and a Dataproducts Corp. 300 line/min printer.

Besides allowing Shurtleff to avoid an imminent hike in the Boston time-sharing firm's service charges, the system provides "a list of reports and statements such as sales analyses by customer and/or product as we need them," Poole explained. With the service bureau, by contrast, the chemical distributor could obtain much-needed reports "only at certain times, and the reports would finally reach us by mail three to seven days later," he added.

Unexpected Benefit

The system has also yielded an unexpected benefit, Poole said. In the short time since it installed the hardware, Shurtleff has developed a Chemical Management Information System (Chemis) for which the company has already received several customer inquiries and which it expects to begin marketing soon to other chemical wholesalers.

Built around CS/40 hardware and a software package written in-house, Chemis is expected to yield profits that will equal or perhaps even exceed the costs of programming Shurtleff's own system, Poole predicted.

Applications are being added to the Shurtleff system in stages. So far, the company has computerized its aged trial balances, sales analyses, receivables, payables, inventory control and order entry.

Chassis Extender Fits PDP-11 Bus

ANAHEIM, Calif. — Two sets of four-board slots or one set of nine-board slots can reportedly be added to the Digital Equipment Corp. PDP-11 series bus with a chassis expansion unit from Western Peripherals, Inc.'s Wesperline Division.

Besides accommodating PDP-11 memory and peripherals controllers, the Model 919 accepts DEC's LSI-11 boards and modules, according to Wesperline.

Snap-Off Front

Almost identical in appearance to its DEC counterpart, the chassis expansion unit comes with a snap-off front panel and an inner module that permit front access, a spokesman noted. The inner module extends like a drawer and allows users to service their printed circuit boards without removing the chassis from its rack, he added.

Measuring 5.25 in. high by 19 in. wide by 20 in. deep, the unit costs $550 excluding integral power supply. Wesperline is located at 1100 Claudina Place, Anaheim, Calif. 92805.

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When you're ready to change your system, choosing the right package can be tricky business. Up the speed and you up the cost. Lower the cost and you reduce capability. Where is the happy medium between performance and expenditure? Find out! In our July 31st supplement: *Systems and Utility Software*, edited by Brad Schultz. Featuring tutorials and applications stories as well as late-breaking news, we'll be concentrating on finding the best ways to cut the hidden costs of using and maintaining systems and utility software, especially in the area of:

- Resource allocation
- Program sequencing
- Merging/Sorting of Data
- Control of access
- Compilation

If you're an MIS executive, DP Manager, Supervisor or Programmer, you'll find our July 31st report especially valuable. If you market systems or utility products — your ad should be there. Closing date is July 14th. Or, to reserve space, call Terry Williams at (617) 965-5800.

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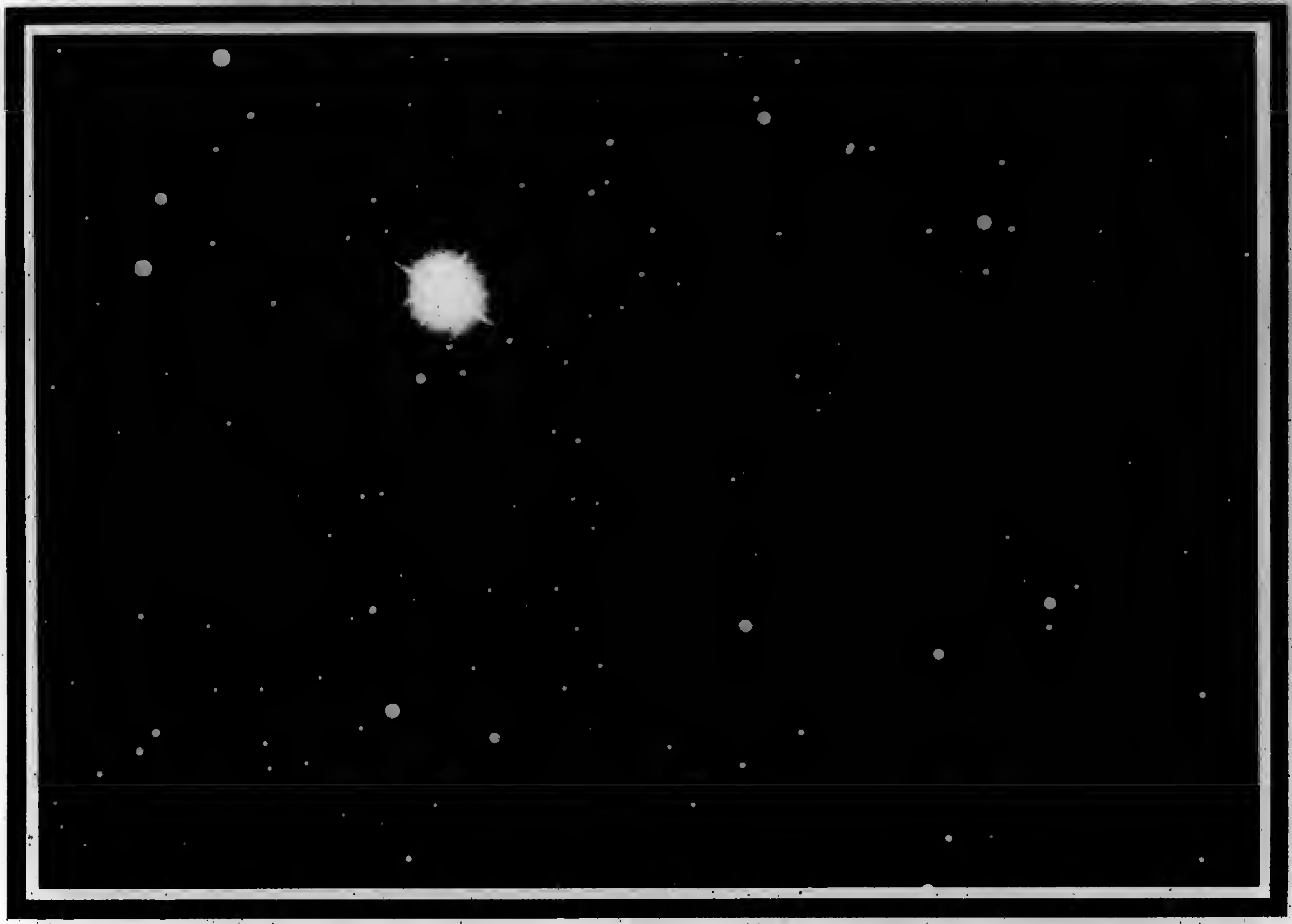

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Mini-Based System Speeds Firm's Inventory Process

(Continued from Page 47)

ventory levels for each of the firm's stock items. It also warns warehouse personnel when the supply of any houseware product part begins to run short.

Historical File

In addition, the system maintains an historical file that allows CGE officials to track the long-term usage patterns for each part in the company's warehouse, the spokesman said.

Among its other functions, Oscar generates assorted management reports including summaries of each day's transactions and weekly stock ledger files that serve as a hedge against system failure.

Under the Oscar system, CGE warehouse personnel manually write purchase orders and enter the information into the GE-115 system several times a week. For all open orders, the company then generates a magnetic tape, which it runs each evening on the HP 3000.

When the ordered parts begin arriving at the warehouse, the receiving office staff enters the purchase number of each item into the HP system's data base through an HP 2640 CRT terminal. Maintained in a 15M-byte disk system and duplicated in the GE-115 computer, CGE's data base consists of three files — a list of outstanding purchase orders, a list of parts in inventory including their warehouse locations and a master list of the parts needed to assemble each of the company's products.

Identification Tag

After warehouse personnel acknowledge the receipt of an order in the data base, a nearby GE Terminet printer produces a two-part identification tag describing the incoming item with information like engineering drawing number, the quantity received, application for the part and its prospective location in storage.

Receiving office personnel then attach one part of the tag to the arriving material and return the other part to the stores clerk with an indication of the part's warehouse location. The stores clerk in turn enters the location into the 3000 system, which revises the inventory count for that part accordingly, a CGE official explained.

When materials managers later need a quantity of the item for the assembly line, a storesman uses the on-line terminal to inquire about the part's availability. If the desired item is still in stock, CGE personnel manually write a line requisition form and tell the computer to produce a pick tag showing the part's identificaiton number, description, warehouse location and the quantity requested.

After being generated on a receive-only Terminet printer, the pick tag is used by a truck-lift driver to find and retrieve the requested item.

Floppy Disk Controller Bows

SANTA CLARA, Calif. — A floppy disk system controller from Cybernetic Micro Systems, Inc. (CMS) operates either as a stand-alone unit or with a host processor.

Using only a dumb terminal or teletypewriter, the Model IFC-8400 reportedly creates, deletes and edits files while operating off-line from a central computer. The intelligent unit also interfaces to any microprocessor- or minicomputer-based system through an RS-232 or 20 mA current loop serial channel, CMS spokesmen said.

Optional parallel, 8-bit TTL I/O channels are also available with the controller, they added.

The Model IFC-8400 is said to control up to eight SA400 or SA800 single-sided, single-density floppy disk units from Shugart Associates.

CMS officials partly attributed the controller's stand-alone capabilities to a diskette operating system stored in an on-board read-only memory (ROM). The operating system in turn controls the 8400's built-in microprocessor.

In its basic form, the operating system provides all the code required to execute board functions. With the addition of custom-coded programmable ROM, however, users can extend the software to gain performance features that otherwise would not be available.

The Model IFC-8400 costs $795 from CMS at 2378A Walsh Ave., Santa Clara, Calif. 95050.

165-II

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Finally, the macro maker of computer printers has gone micro. With a high-speed, desk-top, non-impact printer complete with parallel interface (Model P1) that's perfect for the home, hobby and small business user. A complete 80-column printer for less than [illegible]

The new Centronics microprinter is big on performance. It prints clean, clear dot matrix characters at a rate of 150 lines per minute. Yet it's quiet, compact, comes fully warranted and is backed by Centronics' worldwide service. It's even available in a serial interface version (Model S1) for remote applications.

Of course, buying your small systems printer from the industry's leading producer of printers is simply a better buy. You get the security, support and systems flexibility only Centronics can bring. Plus the targeted technology that brings out the best in any computer.

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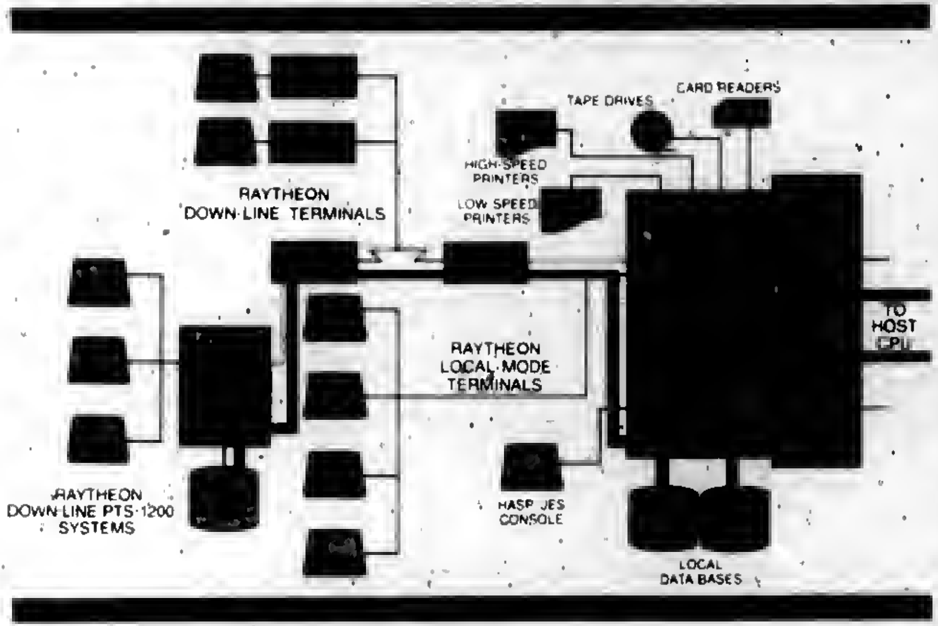
The Raytheon Checklist. A distributed processing user's best friend.

The term distributed processing is new enough that many people, both users and manufacturers, mean many different things when they talk about it.

Rather than try to add another definition to the many now existing, Raytheon Data Systems has prepared this comparative checklist of the major functions that might normally be considered attributes of any distributed processing system. Regardless of the distributed processing system you eventually select, there are a number of capabilities you will want that system to possess. Obviously, the more features the system has, the greater its capacity to do all the work you have planned now—or might need tomorrow.



Shown above is a typical schematic of a PTS/1200 distributed processing system with a hierarchy of local data bases, multiple terminals in multiple applications, all linked by one or more protocols to a central mainframe

Our checklist itemizes many of the most important features you should consider. They are not the only features, but we think they are the most important.

And—to make the point that Raytheon's PTS/1200 MARK·I and MARK·II systems are extraordinarily powerful distributed processing systems—we've taken the liberty of itemizing their capabilities in each of the columns shown. Do that with other vendors' equipment, and we think you'll choose Raytheon.

Then check prices. The MARK·I is lowest.

After you've looked at the variety of products on the market, you'll also want to see what each costs.

We can tell you about Raytheon's pricing. The PTS/1200 MARK·I is the lowest. By low, we mean up to 30 per cent below the most popular alternative models. The PTS/1200 MARK·II costs a little more, but is more than twice as powerful as the MARK·I. You won't be able to compare its cost directly with other equipment, because no other equipment can come close to matching its performance.

Solving the installation and productivity problems that these users encounter takes patience, skill and the commitment of an experienced vendor. It takes going beyond a standard product, and finding customized solutions, and often products, to meet a user's requirement.

Most of all, it takes doing it: Over and over and over again. Raytheon has done it over and over and over again.

Fast, easy installation and growth is vital.

Not shown in the checklist is another vital aspect of distributed processing systems—immediacy of installation and ease of expansion. The Raytheon PTS/1200 MARK·I can be installed in less than a day, with no change to host hardware, or systems or applications software. You become productive right away.

And when you want to grow, you simply add capacity—within a single system, or by adding additional systems or devices. Every PTS/1200 is compatible with every other—and with your host mainframe system and protocols in almost every case.

Look hard at experience too.

Beyond the hardware, the price and the easy compatibility, there is the experience factor. The vendor with experience can save the user without it a lot of grief.

Raytheon is the world's largest non-mainframe supplier of intelligent terminals and distributed processing systems. Some of our customers use more than 2,000 Raytheon terminals in data networks located at more than 300 locations either domestically or around the world. Many others have one or several PTS/1200 distributed processing systems at work in remote locations, linked on-line to a central mainframe.

A typical four-station MARK·I system with a 64K-byte controller, 10 MB disk, and one 165cps printer leases for $850 per month, including all software and maintenance.

The 54-Point Checklist

Feature	Typical Configuration	Importance of Feature	Product Capabilities			
			PTS/1200	Brand X	Brand Y	Brand Z
INTELLIGENCE	✓ Dependent totally on host processor ✓ Stand-alone (non-shareable) intelligence in each station ✓ Small-cluster (shared by 1-8 stations) ✓ Large-cluster (shared by 1-24 or more stations)	Intelligence is based upon the amount of available programmable memory a system possesses. Its purpose is to facilitate local application development and execution. The larger the available memory, the better the applications freedom.	N/A All resources shareable by all stations 64K to 128K bytes 64K to 128K bytes			
CONTROLLER	✓ Word size ✓ Number of operator stations per controller ✓ Number of peripheral attachments per controller ✓ Availability of high level languages ✓ Ability to perform multi-tasking	The controller is the central processor of a distributed system. Its power in terms of word size, attachment capacities, programmability and ability to perform multiple tasks concurrently is the key limiting factor in its ultimate performance	16-bit 1-8 stations or 1-24 stations 1-4 peripherals, or 1-20 peripherals Yes, MACROL, COBOL in the future Yes Up to 32 tasks concurrently on one controller			
TERMINALS	✓ Variety of screen sizes ✓ Variety of keyboard options ✓ Availability of user-definable function keys ✓ Ability to provide operator prompting ✓ Ability to attach remote terminals on phone line	The terminal is the point of operator interface and should be capable of being comfortable to use, easy to use, and easily matched to one or many different applications through customizing	960 or 1920 3270 typewriter, data entry 16 program function keys plus any key programmable Yes by screen, audio and light indicators Yes			
PERIPHERAL ATTACHMENTS	✓ Number of attachments per controller ✓ Low-speed printer devices ✓ High-speed printer devices ✓ Card reading devices ✓ Magnetic tape transports ✓ Printers word processing quality	The ability to attach a variety of peripheral equipment of various speeds and capacities is a measure of the range of work a system can do	1-4, or 1-20, any combination 45-165 CPS 3 models 300 LPM and 600 LPM [illegible] LPM 800 and 1600 BPI Yes			
COMMUNICATIONS PROTOCOLS	✓ Asynchronous ✓ Synchronous ✓ Binary Synchronous —Batch —Interactive ✓ Synchronous Data Link Control, SDLC	The ability to support more than one protocol —at the same time on the same system—adds immeasurably to the number of tasks and number of networks a system can work in without additional user development effort.	Yes, TTY RS-232 Yes Yes Yes Yes [illegible]			
INTELLIGENT 3270 OPERATIONS	✓ Local format storage ✓ Local printing ✓ Ability to access and update local data bases ✓ Transactions stored locally [illegible] ✓ Field verification at each terminal location ✓ Application program decides when to go to host	This feature assures that the system can work immediately and easily with the most popular terminal devices in use today, and extend the performance of those devices in a variety of ways.	Yes Yes Yes Yes Yes Yes			
EMULATION CAPABILITIES	✓ 3270 interactive (dumb) ✓ 3270 interactive intelligent ✓ 2780 batch ✓ 3780 batch ✓ SDLC batch/interactive ✓ HASP [illegible] ✓ Non-IBM protocols ✓ Specialized protocols	Emulators are software tools that permit a system to operate as a look-alike under other vendors protocols and procedures. Their advantage is to permit direct and immediate attachment to networks using a specific device protocol.	Yes Yes Yes Yes Yes, in 1979 Yes Yes Yes			
DATA BASE STORAGE	✓ Multiple disk storage capacities ✓ Memory management software ✓ Ability to expand to very large local storage	Local data base storage under sound memory management techniques assures powerful local filing, easy off-loading of large central files and elimination of unnecessary communications to and from host	Yes, from 10 to 320MB Yes Yes, to 320 MB per system			
SOFTWARE LANGUAGE	✓ Assembly language ✓ Strong macro command repertoire ✓ High-level compiler language ✓ Easy-to-learn and use ✓ Numerous [illegible] programming aids ✓ Parameter-driven aids where required	Language is the facility that makes it possible to tap the power of the basic system by allowing applications to be written easily. Simple but rich high-level language that can be learned easily by programmers or used by non-programmers extend a system's reach that much further	[illegible] by [illegible] personnel Yes, 150 instructions MACROL now, COBOL in 1979 Yes Yes Yes, for format creation and source data entry			
NETWORK ENHANCEMENTS	✓ Concurrent communications operation ✓ Downline control of multipoint networks ✓ Remote program development support for maintenance utility language ✓ Teleprinter network on terminal lines ✓ Downline program debugging ✓ Downline terminal loading ✓ High-speed data transmission rates		Yes, batch and interactive at same time Yes, up to 10 drops per controller Yes Yes, on same lines at same time Yes Yes To 9600 BPS			

Raytheon—50,000+ terminals in use now.

When you select Raytheon, you are selecting a total single-source supplier who has installed more than 50,000 intelligent terminals. A supplier with a worldwide field maintenance organization that is linked together by its own distributed processing network that keeps track of every equipment outage for every customer. A supplier that does not need to offer third-party leasing, because it maintains its own self-financed leasing company. And a supplier whose customer list includes a very high percentage of the world's largest industrial, commercial, financial, insurance and government data systems users.

Raytheon. The company to pick when you've completed your distributed processing checklist.

Tell me more about the Raytheon PTS/1200 distributed processing family: CW61978

☐ MARK-1
☐ MARK-11

Tell me more about some of the features shown on The Checklist. I'm especially interested in:

1. ______________________
2. ______________________
3. ______________________
4. ______________________

☐ Have a salesman call.
☐ Send me more information.

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Micro Chips

Interface Bus Fits 8080s, Z80s

NATICK, Mass. — Control Logic, Inc. has announced a general-purpose interface bus for 8080 and Z80-based microcomputers that is said to meet IEEE-488 requirements.

The MEE-888 bus works with microcomputers that have up to 64K of memory in any combination of random-access memory (1K and 4K boards) and electrically programmable read-only memory (2K, 2708 or 8K, 2716).

The function of "talker," "listener" and "controller" can be performed using the interface and the appropriate controlling software, the firm claimed.

The bus interface costs $495 from the firm at 9 Tech Circle, Natick, Mass. 01760.

Prom Board Unveiled

SAN DIEGO, Calif. — Electronic Solutions, Inc. has a 32K programmable read-only memory (Prom) board compatible with Intel Corp.'s SBC 80 Multibus.

The Prom-32 accepts as many as 16 2716-type erasable programmable read-only memories (Eprom) and has a maximum memory access time of approximately 475 nsec, the firm claimed. All of the integrated circuits on the board, including the Proms, are socketed and the jumper-selectable base addresses fall on 16K boundaries.

Any number of 2K memory address blocks can also be deselected by jumper removal.

The board uses 5V at .38A and is priced at $195 in unit quantities from the company at 7969 Engineer Road, San Diego, Calif. 92111.

TRS-80 Gets Interface

CHARLESTON, S.C. — Computerco, Inc. has unveiled an S-100 bus interface that is compatible with Radio Shack's TRS-80 microcomputer system.

The interface costs $250 and informational packages are available for $10 from the company at 5833 Dorchester Road, Charleston, S.C. 29405.

Professor Observes:

Personal DP's Path Uncertain

By Tim Scannell
CW Staff

ANAHEIM, Calif. — Microcomputer vendors and suppliers have geared their operations to accommodate the forthcoming "boom" in personal computing that has been predicted by industry observers, but no one is in fact "quite sure just what will occur," according to Jack Nilles, a professor at the University of Southern California.

Manufacturers should both identify and monitor three areas in order to get a complete picture of the future trends in the microcomputing industry, Nilles said here recently at the Personal Computing Festival. Those areas include the direction of technological growth, the impact this technology will have on the individual and the status of related public policy issues.

Many "experts," Nilles continued, do not know exactly what a personal computer is and therefore are unable to provide an accurate portrait of the machine's future. The first thing to be understood is that the microcomputer is a general-purpose, standalone computer containing one or two microprocessors and not "a lawn sprinkling system or automatically controlled oven," he stressed.

The microcomputer should be affordable by either an individual or group of individuals, it should be able to be operated by nonprofessional computer enthusiasts and it should also be applicable to a variety of uses, Nilles stated. These uses are generally in hobby, business, education and entertainment applications.

Vendors should also strive to identify both the "actors" and the "stakeholders" within the personal computing industry, Nilles said. The actors are the most important group because they are the users or the people "who do things with personal computers" while the stakeholders stand off to the side, watching the actors.

Government Regulation

Proposed government regulations also bear watching, Nilles noted. Although there are no explicit laws on the books right now and lawmakers are seemingly "ignoring" the growth of personal computing and its related machinery, it is inevitable that rules will eventually be mandated.

Hobbyists have already started to communicate with other hobbyists' computers via amateur and citizen's band radio, Nilles said. This type of operation could be classified as a form of telecommunications and therefore subject to related laws.

In the area of privacy, personal data bases or "lists of anything about people," could be subject to regulation under future laws, Nilles pointed out.

There are, however, numerous opportunities that have evolved because of the growth and continued use of the microcomputer. Computers have raised educational standards and allowed teachers to use "cheap computers to teach basic fundamentals to children in the classroom," Nilles noted. Computers have also increased employment in the industry, especially for the handicapped, and provided a new avenue for interpersonal communication, Nilles said, as in the development of communications via electronic mail systems.

Book Describes Cycles In Micro Logic Design

By Tim Scannell
CW Staff

BERKELEY, Calif. — Logic within a microcomputing system is broken up into two separate areas: the digital logic design cycle, or those actions which occur inside the microcomputer itself; and the microcomputer programming logic design cycle, consisting of those steps constructed outside of the system.

These two areas are discussed in detail in *Z80 Programming for Logic Design*, a book by Adam Osborne, Jerry Kane, Russell Rector and Susanna Jacobson. The paperback is intended for programmers, logic designers and hobbyists who have at least a basic knowledge of microcomputing theory, according to the publisher, Osborne & Associates, Inc.

Using the premise of the existence of two specific levels of logic, the authors attempt to explain the functions of a microcomputer system from "the sequence of instructions which, taken together, constitute an assembly language program" to what these individual instructions do within the microprocessor.

Cautioning the reader that "the specter of programming will haunt you only if you let it," the authors begin by defining just what is meant by the separation of logic within the basic microcomputer system.

First of all, the reader must strive to "develop some criterion for estimating what a microcomputer system can do and what it cannot do, based on the ability of assembly language to simulate digital logic." Then, the text continues, the reader should "create a program to implement the logic functions which have been assigned to the microcomputer" and, having mastered the concept of using instructions, "learn how to write efficient programs."

In its first three chapters, the book describes what takes place when instructions are given to the microcomputer. Event sequences and timing, determining data sources, I/O functions, time-outs and interrupts are discussed as well as programmable timers, flip-flops, memory utilization and real-time simulations.

'From Programmer's Viewpoint'

In the following chapters, programming and device configuration are covered from a "programmer's point of view." This particular section focuses on the specific differences between assembly language instructions and digital logic.

"The principle difference be-

(Continued on Page 64)

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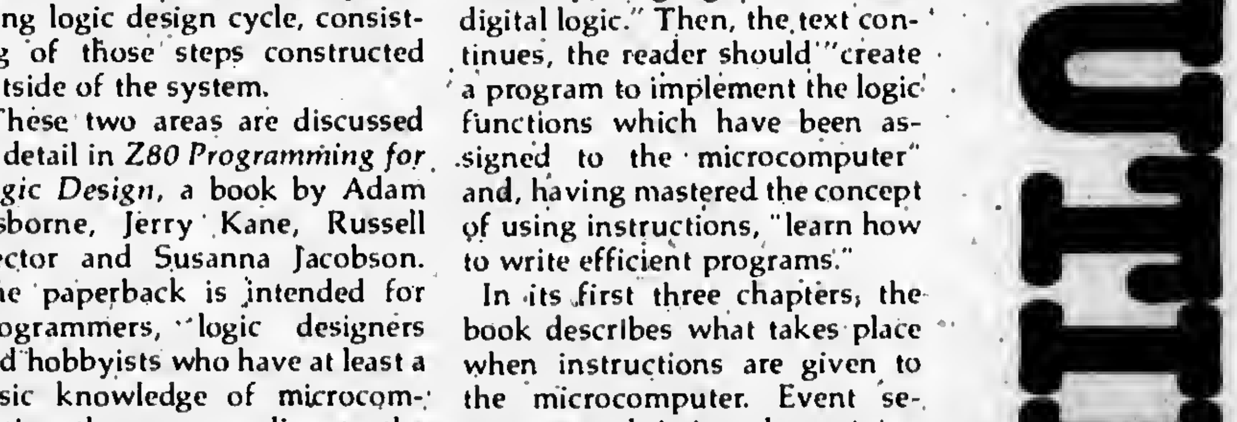
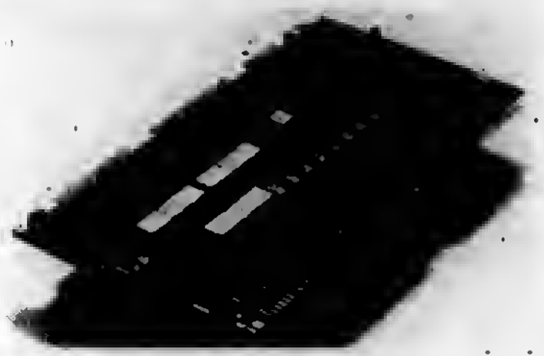


National Semi Adds Three Single-Board Micros

SANTA CLARA, Calif. — Three single-board microcomputers from National Semiconductor Corp. reportedly contain integral read/write and read-only memory (ROM) as well as 1K, 2K or 4K of static random-access memory (RAM).

The BLC 80/11, 80/12 and 80/14 each include a central processor, system clock, RAM and ROM, I/O lines, serial communications interface, bus logic and drivers, according to a spokesman. The boards incorporate the firm's INS8080A microprocessor, which provides six general-purpose 8-bit registers, an accumulator, a 16-bit program counter and a 16-bit stack-point register.



BLC Series 80 Board

The microprocessor's registers can be utilized singly or in pairs and the 16-bit program counter allows direct addressing of a full 64K bytes of memory, the firm added.

The stack pointer controls addressing of an external stack located within the read/write memory, the spokesman continued. The stack may be used to store the contents of the various registers while servicing interrupts and subroutines.

Parallel and serial I/O are fully programmable on the boards under MPU control and 10 available sockets allow users to install terminators or drivers to configure 48 parallel lines to their specific I/O configuration.

The serial port is programmable either for 20mA current loop or RS-232 interface with data rates from 110 bit/-sec to 38,000 bit/sec. RS-232 signals are jumper-selectable to board edge I/O connectors, the firm said.

The BLC 80/11, 80/12 and 80/14 are priced at $470, $485 and $570 each from National Semiconductor Corp., 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Book Covers Logic Design

(Continued from Page 63)

tween digital logic and assembly language," according to the book, "is that assembly language treats events chronologically, while digital logic segregates logic into functional nodes. Thus, one logic device may be responsible for a number of events occurring at different times during any logic cycle; when translated into an assembly language program, each event becomes an isolated instruction sequence."

Another difference between digital logic and aasembly language is the concept of timing, the book notes. "Within an assembly language program, timing results strictly from the sequence in which the instructions are executed," while digital logic timing is restricted to "clock signals and the need for clean signal interactions." The fact that users are unable to exactly duplicate digital logic using assembly langauge instrutions doesn't mean that assembly languge is in any way inferior but "that assembly language is [simply] going to do the job in a different way," according to the authors.

The fifth chapter deals with the programmer's perspective and efficiency in program construction. "One of the most confusing things about programing," the book continues, "is the trivial ease with which you can do the same thing in 10 different ways . . . To a great extent, writing efficient programs is a talent, just as creating efficient digital logic is a talent; but there are certain rules which, if followed, will at least help you avoid obvious mistakes."

These rules, according to the book, include having a thorough knowledge of multiple and conditional subroutines, macros and macro parameters, interrupts and interrupt hardware considerations.

Finally, the book reviews some commonly used subroutines that cover indirect and post-indexed memory addressing, data block movement, binary and decimal arithmetic and 8- and 16-bit binary multiplication and division.

Z80 Programming for Logic Design is priced at $7.50 from Osborne & Associates, Inc., P.O. Box 2036, Berkeley, Calif. 94702.

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Independents Eye Early Base

Series 30 Memory Seen Bonanza Market

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif.— Add-on memory makers agree that IBM's apparent shortage of memory for its Series 30 processors is creating a bonanza that will help the independents establish a customer base early in the products' life cycle.

The shortage is expected to last 12 to 18 months as IBM gears up hardware production to meet the higher than expected demand for the systems, they added.

Furthermore, an informal survey of 30 series add-on memory makers during the recent National Computer Conference here revealed some independents are considering raising prices for memory for the series because the near-term demand far outstrips the supply.

David P. Goldsmith, director of marketing development for National Semiconductor Corp., said IBM is totally production-limited. The decision IBM has to make is not how much memory to produce, but how many of each of the three CPUs in the series to build, Goldsmith said.

National Semi will now sell its memory directly to the end user, according to Goldsmith, who added the add-on memory market has always been good as long as the price is lower than IBM's.

STC to Enter Arena

Although Storage Technology Corp. (STC) has held off formally announcing its Series 30 add-on memory product, Don Vermeer, memory product manager, told *Computerworld* STC will definitely enter the market.

The delayed announcement is a result of National Semi's decision to market directly to the end user, Vermeer said. Until now, STC has purchased its memory from National Semi.

STC is currently looking for another source for its Series 30 memory, he pointed out, and the company expects to make a decision on a supplier within a month. It will continue to buy memory for the 370/158 and 370/168 from National Semi, however, Vermeer reported.

Vermeer agreed with National Semi's Goldsmith that IBM is production-limited on memory. "The usual configuration on the 3031 and 3032 models is 6M bytes of memory, with 8M bytes for the 3033," he explained, "but users who order systems with 6M bytes will probably only be able to get three from IBM." In fact, Vermeer said, in the near future customers will demand 3033s with 16M bytes.

"IBM is happy to have the independents around," quipped Kent Mueller, Intel Corp.'s director of field operations. Users are not waiting for IBM to gear up its memory production.

"Usually when a new product is announced, independents are not successful selling in the market during the introductory stage. In this instance, there is demand for the product from the independents in the initial stage," Mueller said.

He added that Series 30 memory will be in short supply for the next 12 to 18 months, allowing independents to sell all they can make.

Another problem causing the memory shortage, according to Paul J. Shapiro, man-

(Continued on Page 70)

Lack of NCC '79 Space Incites Boycott Threat From Exhibitors

By E. Drake Lundell Jr.
CW Staff

ANAHEIM, Calif. — Some exhibitors at the recent National Computer Conference here were up in arms about the arrangements for next year's show, and there was even talk of boycotting the 1979 conference in New York City.

But in many ways there is little the show organizer, the American Federation of Information Processing Societies (Afips), can do to head off the potential revolt.

The basic cause for complaint on the part of exhibitors — lead by Data General Corp. — is the lack of room for all who want to exhibit at the next NCC. While the New York Coliseum will probably house as many booth spaces as this year's show, many exhibitors are taking spaces larger than the ones they had this year, squeezing less favored companies.

All the space for the 1979 edition of NCC is already sold out, and there will be even less room for those exhibitors who have not been at an NCC before — in fact, these people may be totally closed out.

The situation has arisen from several factors. First, Afips has assigned a priority system for exhibitors; those who have supported the show for a long time receive priority treatment when booking booth space for the next show. Those who have taken larger booth spaces in the past also get extra credit.

This marks a reversion to the older system sponsored by Afips. For this year's show here, the organizaiton sponsored a "land rush" system for booth space in which exhibitors waited in line — some all night — to sign up for the prime spaces. However, exhibitors complained about this method of selling and assigning booth space, so the organizers went back to the older priority system.

However, with times good, more exhibitors want to be in the show and they want to book larger booths. Therefore some exhibitors — such as DG and Digital Equipment Corp. — received less than what can be called "good" booth space for the 1979 show.

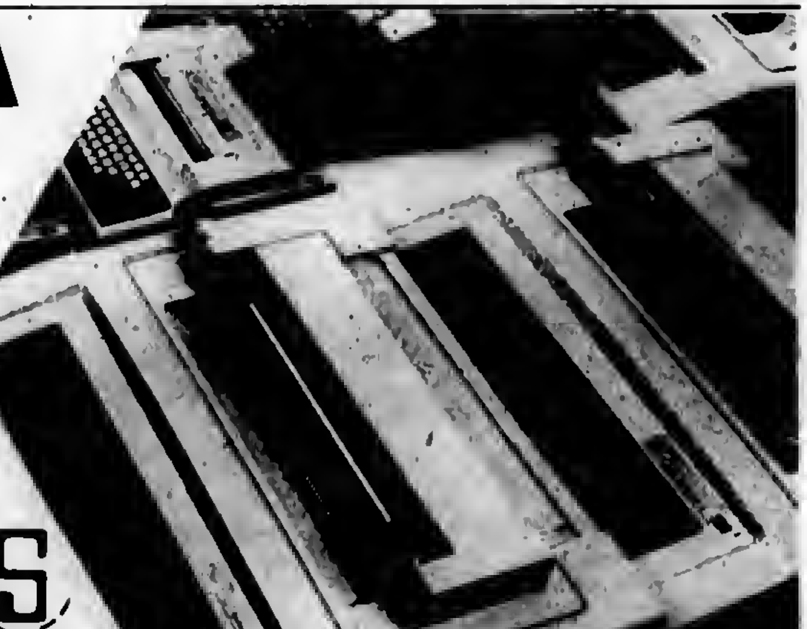
Analysis

Many of these firms — which will be stuck on the fourth floor of the New York Coliseum, the worst space in an overall rather shabby convention site — are upset and are indicating they may pull out of the show.

Such a pullout is probably unlikely, since show organizers may be able to rejuggle the schedule and get better exhibit space for some of the firms.

The situation is difficult and there will be no easy answers, although two shows a year — such as the previous Spring and Fall Joint Computer Conferences — have been suggested as a way to keep down the number of exhibitors at any one conference.

At 1,500 booths, the National Computer Conferences is clearly too big for most facilities in the U.S. Only Chicago's McCormick Place really has the room to house the show, and that site is sold out until sometime in the next century, with Afips booking it only in 1981 and 1991.



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Witness Stresses Risks

IBMer: Firm Put Itself on the Line With 360

By Catherine Arnst
CW Staff

NEW YORK — IBM "bet the company" on its System 360 line in the early 1960s and the payoff was the growth of both IBM and the computer market, Richard Case, director of IBM's Advanced Systems Development Group, testified recently at the U.S. vs. IBM antitrust trial here.

As IBM's second witness in its direct case at this trial, Case echoed the same theme that ran through the firm's pretrial brief and all the other antitrust cases for which it has mounted a defense — that is, IBM's extraordinary success in the DP industry is a result of the extraordinary risks it took to achieve that success.

Case spent 11 days on direct examination laying the groundwork for the testimony of the 95 defense witnesses scheduled to come after him. He concentrated on the risks IBM took with its 360 line of computers, which were designed with the goal of "growing that market." In other words, IBM wanted to push demand into new areas which were yet unexplored, he said.

Goals for 360

IBM's specific goals for the 360 line, according to Case, were to build a new circuitry, develop a "long-life architecture" with the broadest possible range built into its instruction set, have compatibility and modularity throughout the line, design a new operating system, offer a full line of peripheral devices, insure a great degree of reliability and serviceability and make educational resources available.

IBM achieved all these goals and also succeeded in "growing" the market, Case said. IBM's pretrial brief concurred, stating that "had IBM not introduced the System 360, 'the DP industry would be a much different universe, to the detriment of users of DP equipment throughout the world."

The government has charged that the 360 line was developed to ensure that IBM had the dominant position in the computer industry by locking users into IBM systems. The Justice Department has maintained IBM used the 360 systems as "fighting machines . . . introduced ahead of schedule, usually with low profit expectations, in those markets where IBM's monopoly position had eroded or threatened to erode."

The first six models of the 360 line were announced in 1964, but IBM had been planning the system since 1961, when it organized a task force of top executives, designated the Spread Committee, to develop IBM's product strategy. Out of that committee came a determination to develop a line of products which were interchangeable, allowing users to upgrade their systems without having to scrap all their previous components.

Combination of Capabilities

The committee also wanted IBM to design a system which was capable of handling both general-purpose commercial applications and scientific applications, Case said. Prior to the 360 announcement, a system was considered to be either scientific or general-purpose and lacked the capabilities needed to do the other applications, he said.

Case defined a scientific system prior to 1964 as one containing binary capabilities, a fixed word length, low dependence on an alphabet, lower input/output rate than a business computer, floating-point arithmetic and a binary address system for the main memory.

A business computer operated with the decimal system, had a variable word length, relied on the alphabet, had a high input/output rate, offered character string processing and had a decimal address system for the main memory, he said.

When the 360 line was announced, IBM provided users with a family of computers that had both binary and decimal arithmetic functions, fixed and variable word lengths, a good alphabet capability, high input/output rate, binary main memory addressing, floating-point arithmetic and character string processing. Consequently, the 360 systems were capable of doing both scientific and business applications, which eliminated to a certain extent a distinct market for scientific as opposed to general-purpose computer systems, Case said.

This portion of Case's testimony went directly to the heart of the government's case against IBM. The government has charged IBM with monopolizing the general-purpose business computer system market, which is a distinct and well-defined market that does not include scientific computers. The government must prove there is a sharply defined market before it can prove IBM exercised monopoly power over that market.

There was considerable risk in combining scientific and business computer capabilities and there was disagreement within IBM as to the potential results, Case said. Several members of the development team opposed combining those functions because "it was said . . . someone could make competitive hay by saying, 'Here's a scientific machine not burdened down by commercial applications features,' " Case said.

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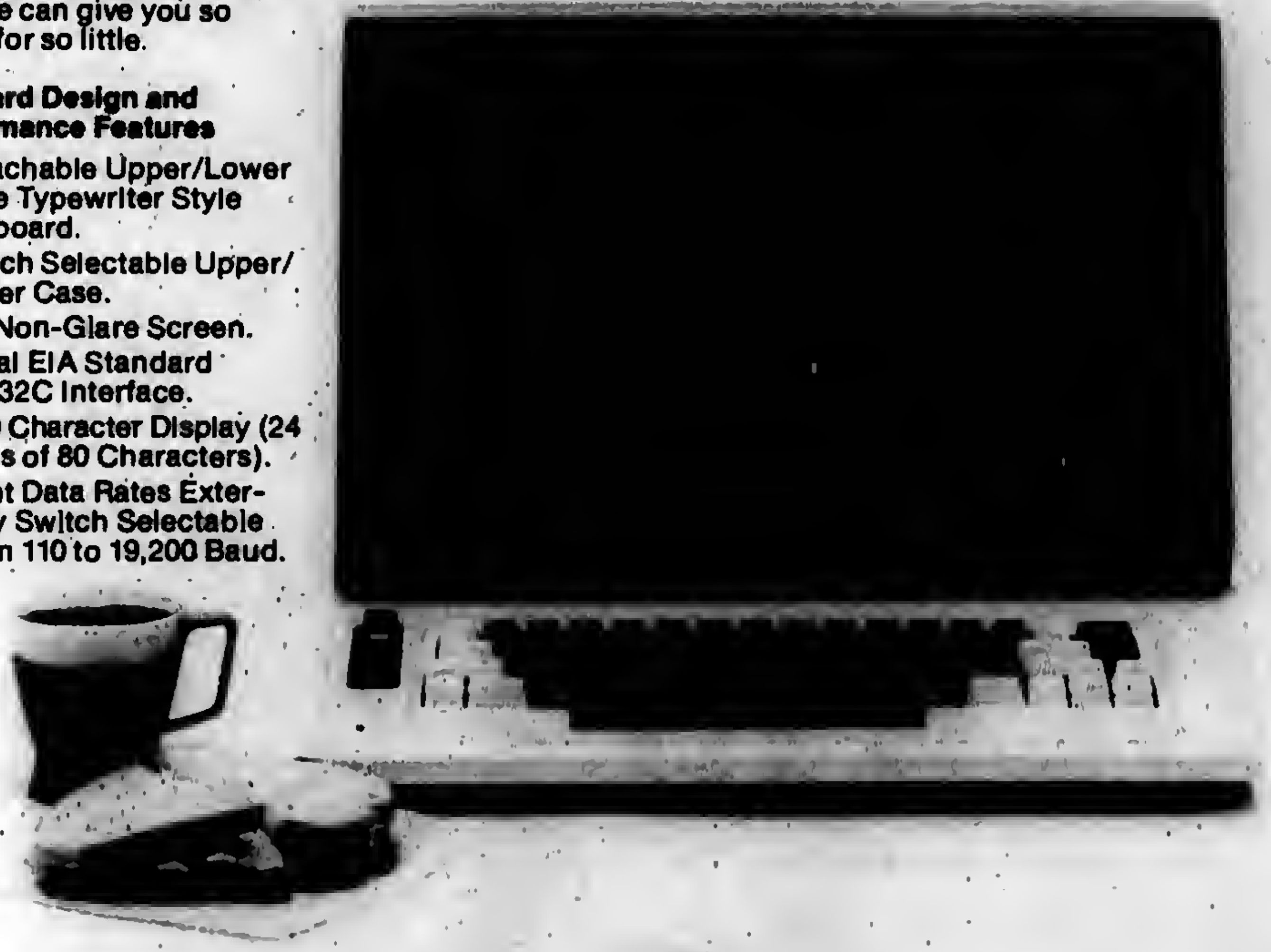

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Supershorts

Siemens Corp. and Three Phoenix Co. have entered into an agreement covering the manufacture and distribution of hard disk memory testers. Three Phoenix will manufacture testers for Siemens, and Siemens will serve as the distributor for the testers in the U.S. and certain overseas countries.

— — —

Hewlett-Packard Co. delivered its 25,000th CRT terminal recently. The milestone terminal, an HP 2645A, was purchased by the Canadian government's Department of Supply and Services to access data bases maintained on HP 3000 CPUs.

— — —

Electronic Memories and Magnetics Corp. has formed a subsidiary, Severe Environment Systems Co., which will be headed by Richard P. Shively. The company designs, develops and manufactures memories and systems for use in harsh environments.

— — —

Dometic, Inc., a subsidiary of AB Electrolux of Sweden, gained 36% ownership of Dataroyal, Inc. through a stock purchase with the option of acquiring up to a 50% interest. Facit AB, another division of Electrolux, will market Dataroyal's IPS 7000 matrix printer in Europe.

— — —

Prime Computer, Inc. has opened a research and development operation in Bedford, England, which will develop specific software products.

— — —

Data 100 Corp. has signed an exclusive distribution agreement with the Ransom Company, C.V., to market and maintain Data 100 multifunctional terminal systems in Mexico. This marks Data 100's entry into the Latin American market.

— — —

Data Electronics, Inc. of Pasadena, Calif., has appointed Facit AB Data Products of Stockholm, Sweden, as its exclusive Western European representative for Data Electronics' 1/4-in. Ansi digital cartridge tape drives and related products.

— — —

The British government has granted the Queen's Award to the computer peripherals manufacturing plant of Control Data, Ltd. in Brynmawr, South Wales, for increases in export earnings. During 1977, earnings amounted to $9.1 million, compared with $1.6 million in 1975.

— — —

Perkin-Elmer Corp.'s Terminals Division has signed a contract with Prime Computer, Inc. for delivery of 1,000 CRT terminals for use with Prime's product line.

— — —

Sycor, Inc. has extended its distribution agreements with CMC France S.A. and Computer Machinery (Deutschland) GmbH to include Sycor's 400 series of distributed data entry and processing systems.

— — —

The board of directors of the Computer & Communications Industry Association has elected Philip S. Nyborg the association's vice-president and general counsel. Nyborg has spent the last three years as director of the Washington office of the American Federation of Information Processing Societies.

— — —

Hewlett-Packard Co. has added the company's desktop computer manufacturing division in Fort Collins, Colo., to the company's Computer Systems Group.

— — —

Microdata Corp. has concluded a transaction to acquire the remaining 25% interest in Computer Machinery Company Ltd. (CMC/UK) of Hemel Hempstead near London.

— — —

Cullinane Corp. began marketing and technical support operations in Mexico and Central America. Alejandro Ramos is the general manager of the new affiliate, Cullinane Mexicana S.A. de D.V.

— — —

Dataproducts Corp. has established a facility in Ponce, Puerto Rico, that will manufacture its M-200 dot matrix and T-80 thermal matrix printers.

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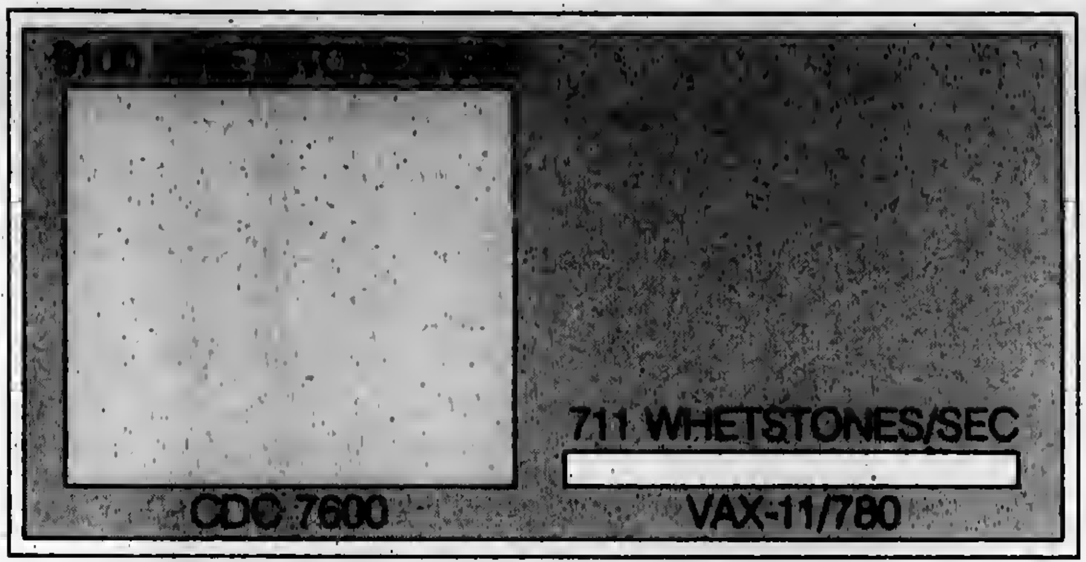
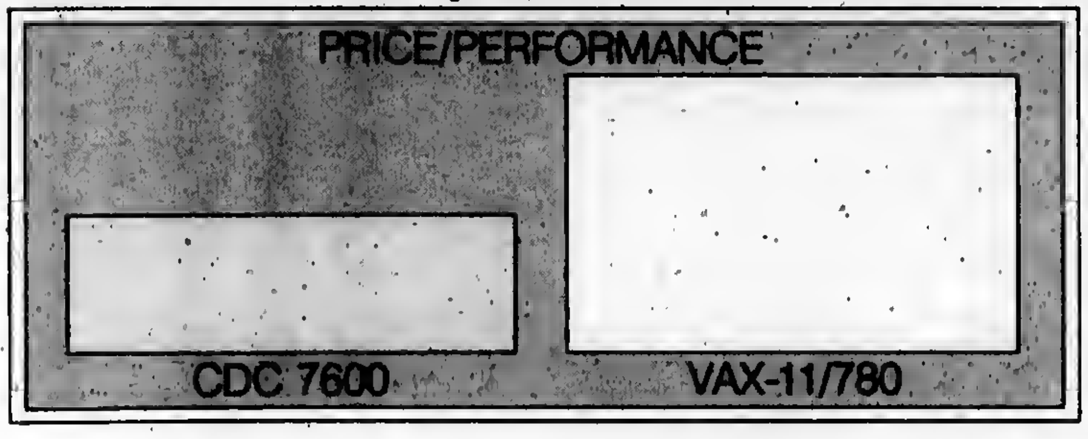
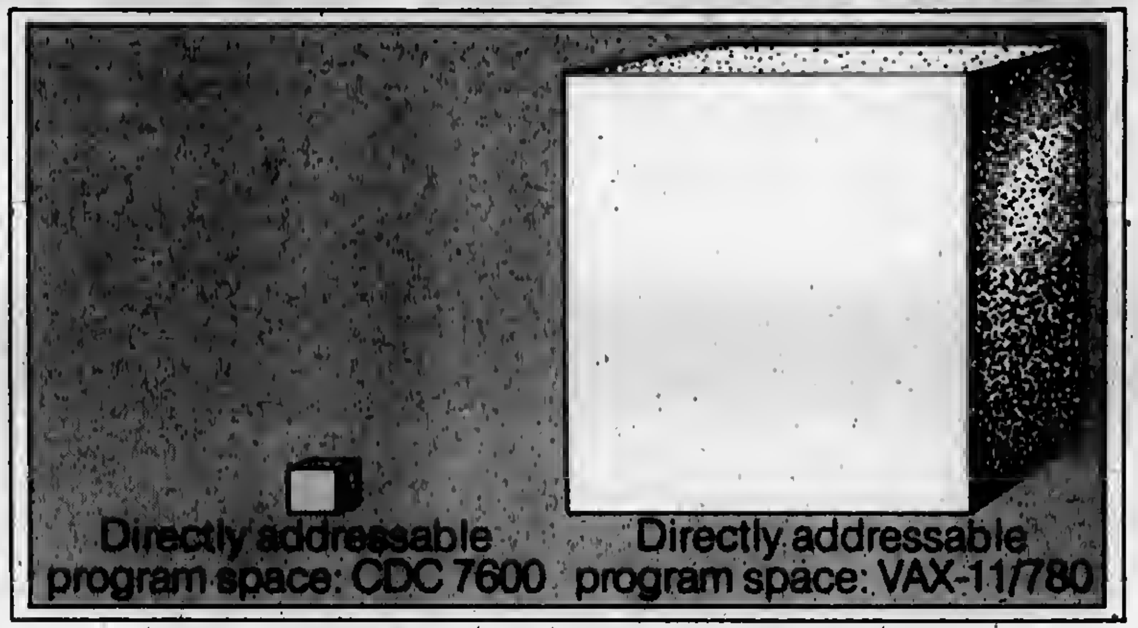


Round two to VAX: Price/Performance. The 32 bit VAX is the world's fastest mini. A $141,000 VAX system runs 711 double precision Whetstones. That's one twelfth the speed – at one twenty-fifth the cost. A dozen VAX systems could equal the throughput of one 7600 – and you'd still save literally millions of dollars.





Round three to VAX: Program size. Virtual addressing and a gigantic 32 bit address size, compared to the 18 bit address size of the CDC 7600, allows VAX a directly addressable program size that is – are you ready? – 1000 times larger than the CDC 7600.

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Believed to Be Model 138

IBM Confirms Sale of 370 System to China

By Marcia Blumenthal
CW Staff

ARMONK, N.Y. — IBM recently confirmed that its subsidiary IBM World Trade Americas/Far East Corp. sold a medium-scale 370 system to China National Technical Import Corp., a government agency that handles purchases from sources outside of China.

Rumored to be a Model 138, the system reportedly will be installed at an air compressor factory in Shenyang, in northeast China. However, IBM would neither confirm or deny the model or the purchase price of the computer.

"It is the company's usual practice to keep the details of business transactions confidential unless the customer authorizes the release of sales information," an IBM spokesman said.

The spokesman would not comment on how long IBM expects to wait for approval from the U.S. government or whether the firm anticipates any problems in gaining approval.

IBM Chairman Frank T. Cary visited China within the past year. When asked whether trade arrangements resulted from that trip, the spokesman said the purpose of Cary's visit was to "learn more about the People's Republic of China, its industrial development, its DP requirements and the opportunity to trade there."

No specific business proposals were discussed during the visit, he added.

Another rumor that has been circulating for the past five months is that IBM sold two IBM 3032 processors to the Bank of China for use by its branches in Hong Kong. The spokesman admitted there have been business discussions with the Bank of China, but said the nature of these discussions was confidential.

He would neither confirm nor deny whether sales to the Bank of China have been finalized.

China is said to be in the market for the best DP equipment that non-Soviet nations are willing to sell in order to improve its science and industry.

A U.S. Department of Defense official said, "We aren't opposed to selling the Chinese computers unless they have a military utility. We have balked at exporting to them anything that could have a military application that they don't already possess."

Independents See Bonanza In IBM Memory Shortage

(Continued from Page 65)

ager of product planning semiconductor memories at Memorex Corp., is IBM's recent reevaluation of its memory technology. Shapiro explained IBM was experimenting moving from static to dynamic random-access memories (RAM).

IBM finally realized, Shapiro said, that density — rather than static or dynamic RAM — is the crucial technological difference.

Memorex is using the highest density RAM — 8K — of any independent memory supplier, other than Itel Corp., Shapiro claimed. He believes this will give Memorex an edge in the market for about one and a half years. Memorex, like STC, purchases rather than manufactures its memory products.

Electronic Memories and Magnetics Corp.'s (EMM) introduction of Series 30-compatible memory marked "the fastest EMM has been able to come out with a new memory product. Usually we cannot ship add-on memory for a new IBM product until eight months after IBM's first delivery," according to Anthony F. Coppola, marketing director for EMM's Computer Products Division.

Summing up the shortage of Series 30 memory, T. Kendall Hunt, vice-president of marketing for Itel Corp.'s Computer Products Division, contended it was typical of IBM to announce a product and not be able to deliver it.

Billion-Dollar Market

The market for Series 30 memory may approach more than $5 billion over the next five ears, Intel's Mueller predicted. Most of the independents agreed IBM would sell or rent about 12,000 30s over the next five years. IBM's price for 1M byte of memory is $110,000, with no quantity discounts, the independents said.

Mueller estimated the independents could capture at least a billion dollars of that market. Right now, independent memory suppliers share an annual market of $100 million, the executives said.

All of the suppliers expect to ship Series 30 memory by the fourth quarter.

Although there was general agreement on the shortage of Series 30 memory, the independent memory marketers, for the most part, did not agree on pricing strategy or the share of the market each one would capture.

Hunt said that Itel's price per 1M byte is $80,000, and he reported the company does not anticipate raising the price.

Presently Intel's price is $70,000 for the first 1M byte and $60,000 for each additional 1M byte, Mueller reported. However, he indicated Intel may raise prices because of limited supply and high demand.

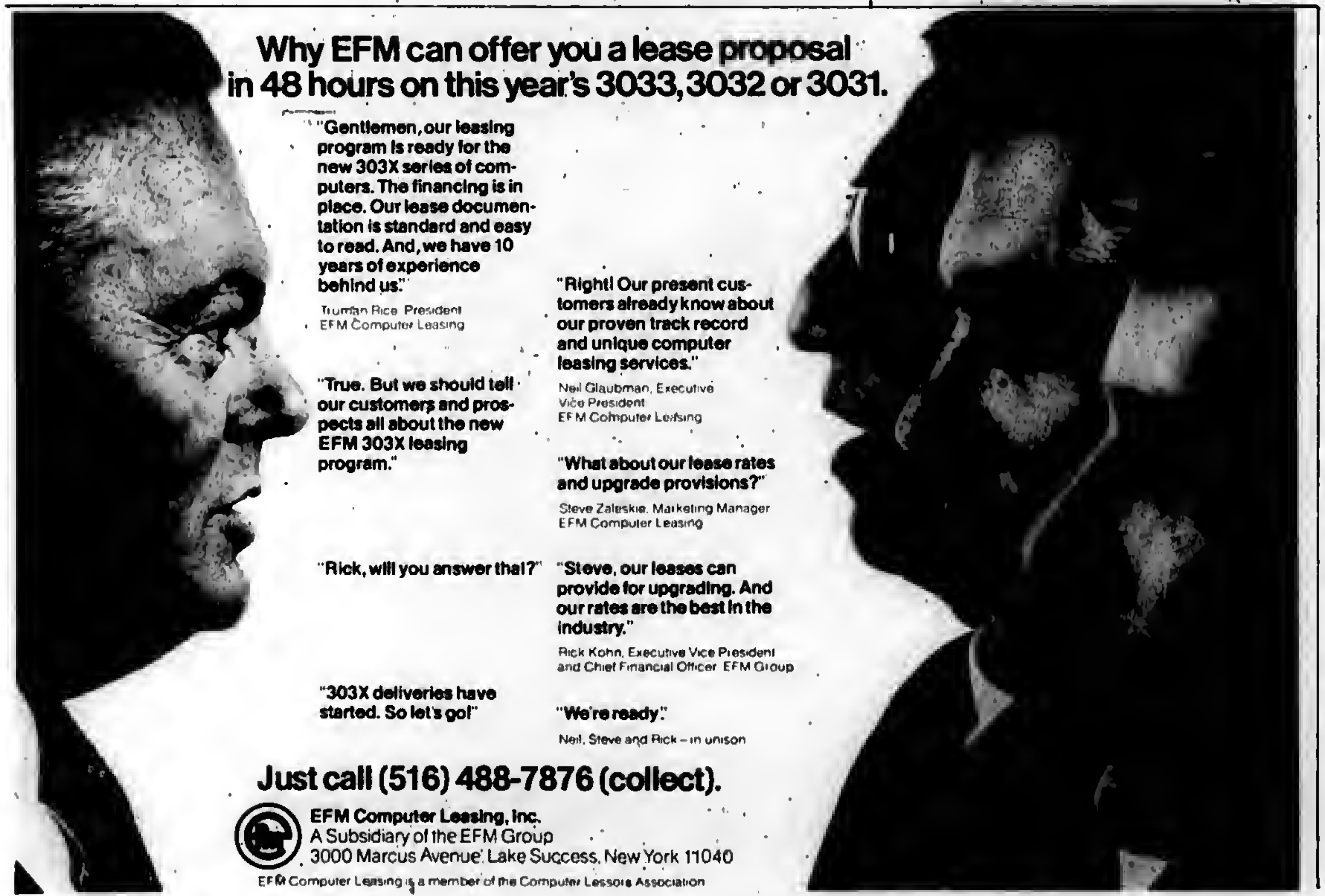
Intel hopes to grab 30% to 40% of the add-on Series 30 market, and Mueller pointed to the company's manufacturing capability and service as important marketing considerations.

Memorex is pricing its memory at $74,000 per 1M byte, Shapiro said. He didn't know whether the company planned a price increase.

Shapiro said the 3031 corresponds roughly to IBM's 370/135 to 370/148 models and claimed that because Memorex ships more memory than all the other independents combined for those models, it would be reasonable to assume Memorex will dominate the 3031 sector.

STC's price per 1M byte will be high — between $80,000 and $90,000 — to capitalize on the shortage, but Vermeer predicted that once the shortage is over — about a year from now — the price will drop to $50,000 to $70,000 per 1M byte.

Goldsmith said that National Semi would be delighted to scoop 35% to 40% of the markets.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Pertec Earnings for Year Outpace '77 Level by 54%

LOS ANGELES — Pertec Computer Corp. earnings for fiscal 1978 sprinted ahead of 1977 earnings by 54%. Pertec earned $7.1 million or $1.17 per share in fiscal 1978 compared with $4.6 million or 78 cents per share last year.

Revenues totaled $131.8 million during the year, a 31% increase over 1977 revenues of $100.6 million.

Financial News

For the fourth quarter ended March 31, Pertec earnings were $2.2 million or 36 cents per share compared with final quarter results last year of $1.5 million or 25 cents per share.

Fiscal 1977 results were restated during the year to reflect the acquisition of Mits, Inc. in a pooling-of-interest transaction and to apply provisions of the Financial Accounting Standards Board concerning lease accounting.

Ryal R. Poppa, Pertec chairman, president and chief executive officer, noted that approximately 80% of the firm's revenues are from the outright sale of data entry and distributed DP (DDP) systems and small business systems. The balance is from leasing and servicing activities.

Customer acceptance of the XL40 DDP system continued to grow, Poppa said. He also pointed out that the sale of small business systems through 50 Mits/Altair retail outlets recorded good progress and that Pertec plans to add 25 stores by the end of 1978.

New products that increase the density of tape systems as well as additions to the flexible disk drive family for both minis and micros were announced during the year, the firm said.

Poppa noted that while the outlook is favorable for fiscal 1979, a number of overseas markets are still flat, having not yet fully recovered from the recession three years ago.

Pertec plans to file a registration statement with the Securities and Exchange Commission to underwrite a sale of 1.25 million shares of authorized but unissued common stock. Poppa said the proceeds of the sale will be used for general business purposes and to retire bank debt.

. . . But Poppa Sees Flat Half Ushering in '79

LOS ANGELES — Pertec Computer Corp. anticipates earnings levels for the first half of fiscal 1979 to be "flat to slightly down when compared with a like period of a year earlier. However, an upturn is expected in the last half of the year," according to Chairman Ryal Poppa.

"Continued development efforts and expenditures associated with positioning the company to capitalize on the rapidly expanding small business systems market are the primary reasons for a potentially flat earnings performance the first half of the fiscal year," Poppa claimed.

"There is also some profit deterioration anticipated as Pertec's peripheral products operations are shipping proportionately higher quantities of lower margin disk drive products in relation to tape drive products. Other areas of business within the company are essentially meeting our expectations," he added.

Datapoint Reports Sales For Nine Months Up 56.6%

SAN ANTONIO, Texas — Datapoint Corp. reported nine-month revenues of $114.5 million, an increase of 56.6% over sales of $73.1 million reported for the comparable period in fiscal 1977.

Net earnings for the nine-month period ended April 30 were $10.4 million or $2.95 a share compared with earnings of $6 million or $1.84 per share for the same period a year ago.

Third-Quarter Earnings

Third-quarter unaudited earnings were $3.9 million or $1.08 a share on sales of $42.1 million compared with 1977 third-quarter earnings of $26.2 million or 60 cents per share.

The company reported that it changed the name of its Domestic Marketing Division to Data Processing Division to more accurately reflect the services it provides its customers.

Datapoint has also signed a letter of intent with General Dynamics Communications to establish a marketing relationship for Datapoint's Infoswitch product line. General Dynamics Communications will add Infoswitch to its current line of telecommunications products.

Data Terminal Sales Climb

MAYNARD, Mass. — First-quarter revenues for Data Terminal Systems, Inc. (DTS) bounded 69%, climbing to $13.6 million compared with revenues of $8.06 million a year ago.

Earnings for the first period were $2.5 million or 52 cents per share compared with $985,143 or 21 cents per share for the corresponding period a year ago.

Dr. Robert F. Collings, DTS president and founder, said that first-quarter performance reflected DTS' growing prominence as a manufacturer of stand-alone electronic cash registers and point-of-sale systems. "In the current fiscal year alone," he added, "we will release more than 10 new models."

Of particular interest is the Model 540 Scan-Alone, which the company claimed offers a 15,000-item price-look-up and UPC scanner without requiring a backroom computer.

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MSI Posts Records In Quarter and Year

COSTA MESA, Calif. — Donald F. Brosnan, president and chief operating officer of MSI Data Corp., said the company set records for the fourth quarter and the fiscal year ended March 25.

Fourth-quarter earnings rose to a new high of $988,649 or 48 cents a share, a 26% increase over the previous year's final quarter earnings of $753,704 or 38 cents a share.

Revenues in the quarter climbed to $10.4 million, up 21% from $8.6 million a year ago.

For the year, MSI posted earnings of $3.6 million or $1.80 a share, an increase of 29% over 1977 earnings of $2.7 million or $1.40 a share. Revenues for the year topped $38.8 million, up 13% from $34.2 million in the prior year.

As Earnings Rise 11%

HP Quarter Revenues Gain 22%

PALO ALTO, Calif. — Hewlett-Packard Co. reported a 22% increase in revenues and an 11% increase in earnings for the second quarter.

Revenues for the quarter ended April 30 totaled $415.2 million, with earnings reaching $35.7 million or $1.23 a share. Revenues for the corresponding period a year ago were $341.6 million, with earnings totalling $32.1 million or $1.13 a share.

Net income was affected by a higher tax rate, which rose to 49.1% from 46.1% last year, HP noted.

On the brighter side, incoming orders during the six months were up 27% from a year ago, topping $881 million. International orders showed a gain of 32% during the first half of the fiscal year.

"International orders were higher than anticipated, reflecting continuing strength in key overseas areas," HP President John A. Young said, "which should have a beneficial effect on the company's performance in the second half."

Computer and calculator products accounted for 41% of the company's sales, the firm reported.

Revenues for the six months amounted to $783.4 million, a 22% increase over the first half of 1977. Earnings increased 17% to $68.2 million, equal to $2.37 a share. This compared with earnings of $58.2 million, equal to $2.06 a share, during the corresponding period last year.

Financial News

Cognitronics in the Black

STAMFORD, Conn. — Cognitronics, Inc. reported unaudited earnings of $37,905 or 3 cents a share on sales of $1.3 million for the first quarter. Year-ago first-quarter revenues were $1.1 million with a loss of $62,434.

However, first-quarter earnings were boosted by a $15,000 carryforward for operating losses from prior years, the company noted.

David H. Shepard, president of Cognitronics, said the firm expects increased profitability, especially if anticipated deliveries to overseas markets can be made.

But, he observed, inflation and rising production costs pose a threat to earnings.

Inforex Results Steady in Quarter

BURLINGTON, Mass. — Inforex, Inc. has posted earnings for the first quarter of $474,000 or 14 cents a share on revenues of $15.5 million. Earnings for the corresponding period a year ago were $428,000 or 14 cents a share on revenues of $14.4 million.

The increased revenues were attributed primarily to higher third-party sales. Gross profit margins improved, rising to 51% of revenues from 47% because of the fuller amortization of systems rented or sold during the quarter, the company said.

Engineering and research and development expenses increased 41% over the same period a year ago, primarily for work on the System 7000, a spokesman noted.

Inforex Chairman T.C. Cronin said recent developments in two pending lawsuits have been favorable to Inforex. A treble damage suit for $12 million dollars instituted by a former employee was dismissed. A second suit involving a claim by the U.S. government that Inforex defaulted on a contract was remanded by the Court of Claims upon appeal to the Board of Contract Appeals of the General Services Administration for reconsideration.

Cronin also noted that orders in the aggregate were approximately 15% ahead of the first quarter of 1977, excluding a major order for an estimated 300 System 7000s that was received in February.

Dataproducts Hits Records

WOODLAND HILLS, Calif. — Dataproducts Corp.'s earnings and revenues for 1978 set records. At the end of the year March 25, the backlog stood at $70 million — 40% higher than a year ago.

Earnings of $15.5 million for the year were also 40% ahead of the previous year's results. Earnings per share reached $2.15 on sales of $138.6 million compared with $1.63 a share on revenues of $115.2 million a year ago.

Fourth-quarter earnings broke all previous quarter records, rising 40% to $4.3 million or 60 cents a share on revenues of $38.9 million. Fourth-quarter '77 results were $3.07 million or 43 cents a share on revenues of $30.3 million.

"During the year," Dataproducts President Graham Tyson noted, "the initial member of each of three new product families were introduced to expand the market sector Dataproducts serves."

The company recently declared a 50% increase in its semiannual dividend. The new amount, payable June 23, is 15 cents per share.

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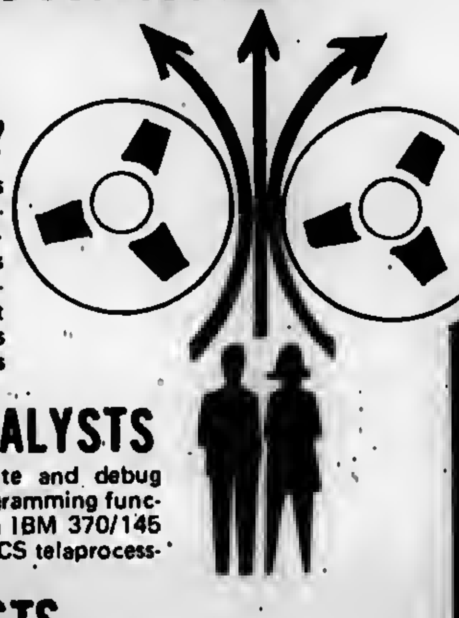

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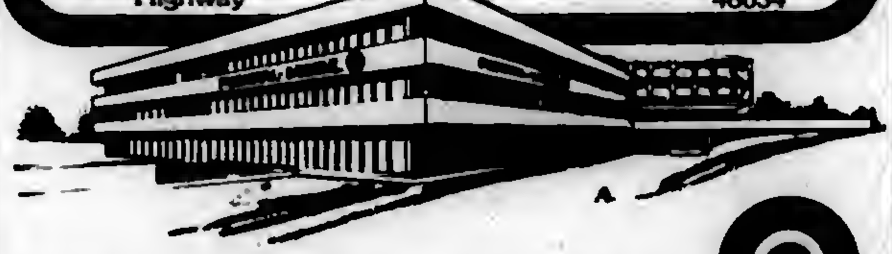

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If your background also includes COBOL, CICS, BAL, IIMS or other data base experience, Samsonite Corporation can offer you a rewarding career opportunity working in our teleprocessing environment. Your initial responsibilities will be in heavy applications programming, working into systems design and project leadership.

Systems analysis skills and project management experinece would be helpful.

We offer a competitive salary and benefits program which includes paid relocation. Please send your resume salary history and requirements to Patti Grinnell, SAMSONITE CORPORATION, 11200 E. 45th Ave., Denver, Colorado 80239. An Equal Opportunity Employer M/F.

COMPUTER PROGRAMMING PROFESSIONALS

Control Data Corporation has career growth opportunities in pre-sale, post-sale and consulting located throughout the United States.

APPLICATIONS

Applicants should have experience in one of the following areas:

- **Programmer/Design Analysts**

(Opportunities in Oetroit, San Francisco Bay Area and Washington, D.C.).
Various levels are now open to candidates with one or more of the following:

COBOL, FORTRAN, BASIC
Interactive Information Systems
Quantitative Analysis
CDC 6600/7600, CYBER 70 or 170 series
IBM 370/360 OS, VS

- **Data Base Analysts**

(Opportunities in Oetroit, Minneapolis, and Washington, D.C.)

COBOL, FORTRAN
Total System 2000 IMS SPSS

- **Software Develop,ent**

(Opportunities in Detroit, San Francisco Bay Area, and Washington, D.C.)

Requirements analysis
General and detailed design
Systems analysis
Project leadership
Information systems implementation
Knowledge of time sharing usage

OPERATING SYSTEMS

Applicants should have experience in maintaining, modifying or extending any one of the following operating systems:

- **CYBER 17X or 6000 with**

NOS, NOS/BE, SCOPE or KRONOS (Opportunities in Austin, Albuquerque, Boston, Chicago, Denver, Detroit, Fredericksburg, Livermore, New Jersey, Philadelphia, St. Louis, and San Francisco Bay Area).

- **System 370 or 360 with DOS**

(Opportunities in Albuquerque, Boston, Detroit, Milwaukee, Minneapolis, New York, Philadelphia, Pittsburgh, and Washington, OC)

- **CYBER 18 with 1700 MSOS, RCOS or ITOS**

(Opportunities in Oalias, Los Angeles, and Minneapolis)

- **PDP-11 with RSX-11M**

(These positions in the San Francisco Bay Area)

- **Intel 8080**

Or other microprocessors
(These positions in the Philadelphia Area):

or have extensive assembly language on any of the above computers.

For immediate consideration, please send resume, salary history and geographical preference to: John N. Powers at the address below

CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

60 Hickory Dr., Waltham, Mass. 02154
OR CALL COLLECT:
(617) 890-4600, ext.245

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Maximize your opportunities . . .

. . . take advantage of the most individualized job search available in the D.P. industry today. You pay absolutely NO fee for our service. We search out the best opportunities nationwide to fit your earnings & growth potential with respect to your location requirements. In confidence, send us your resume with present salary & geographic preference. Let us maximize your opportunities.

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OVERSEAS ADVENTURE $40K+

IRAN

Applications programmer, Systems Engineer, H-6000 or L/66, GCOS/COBOL/GMAP IOS TPE/MULTICS, US firm has 18-24 mo tours w/fam. Ex financial pkg in Tenran. Ski 1 hr fm office. Rusn resume: Cybermetrics Corp., P.O. Box 579, McLean, VA 22101. (703) 356-1997. Other positions avail. USA and Iran

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Public Service Company of New Mexico (PNM), located in mile-nigh Albuquerque at the foot of the Sandia Mountains, offers a comfortable year-round climate with easy access to skiing, hiking, camping and rich cultural activities.

PNM provides excellent benefit programs and salary structures for skilled professionals to participate in the analysis, design and installation of large State-of-the-Art business and engineering systems. Current software development projects include a materials management system, a customer service system, an employee information/payroll system and a project management information system.

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Top quality FORTRAN or COBOL Programmer/Analysts are required for new systems development and installation. On-line and data base experience a plus.

Systems Analysts

Experienced Analysts required for challenging assignments in the development of large business and engineering systems. Project management experience a plus.

Methods and Procedures Analysts

Excellent writing skills required for the design and documentation of manual systems which interface with automated systems.

PNM's IBM S-370, 3031 with 2 Megs, MVS, CICS, IMS and TSO will be delivered January, 1979. PNM's hardware also includes an HIS 66/40 with 384K words, GCOS, TDS, IDS, TSS and MOQS.

To find out more about how you can join our progressive utility in the beautiful, Rocky Mountain Southwest, send your resume with salary history to:

Personnel Department
Public Service Company of New Mexico
P.O. Box 2267
Albuquerque, NM 87103
We are an equal opportunity employer

LIVE IN OREGON

Immediate openings for programmers/analysts to develop new on-line systems. Experience desired in FORTRAN, Hewlett-Packard 21MX computers and RTE-III operating system. Opportunity to join growth-oriented company in beautiful small city. Profit sharing and all the other fringes.

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OPERATING SYSTEMS MANAGER

Supervises the generation of operating system's, job entry subsystem and conversational remote job entry subsystem of a major computer installation (360/370 Systems). Configures hardware and software including telecommunications services to assure continuous operations of computerized systems. Documents all operating system-related facilities. Supervises staff of professional programmers. Consults with customers and staff of Computer Network.

Qualifications: Bachelor's Degree, six years experience in data processing including a minimum of four years in systems programming. Experience with OS/VS, HASP, CICS/VS, and OS/MVT desirable. Resume should be sent to Beverly Mace, University of Nebraska, Computer Network, Box 688 Oowntown Station Omaha Nebraska 68101, Equal Opportunity/Affirmative Action Employer.

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Immediate opening for en experienced Systems Analyst/Programmer. This position carries mejor responsibilities in maintenence & upgrading of en information system, handling leboratory anelysis & other technically oriented dete.

Position requires:

- Six years of experience in Applications Programming
- College degree in Computer Science or Electricel Engineering
- Experience in Analysis & Design of Deta Processing Systems
- Experience with IBM/370 & MVS
- Fluency in COBOL & IBM based JCL

Send Resume with salary history to:

THE COCA-COLA COMPANY
Department (1)
P.O. Drawer 1734
Atlante, GA 30301
Equal Opportunity Employer

FLORIDA!

SYSTEMS RESEARCH & DEVELOPMENT
MANUFACTURING - FINANCIAL - ENGINEERING

Dynamic Systems Development div. of a major manufacturing co. is expanding its resources for the express purpose of future systems development. Selected individuals will possess a superior knowledge of one or more of the specified disciplines (Manufacturing, Financial, or Engineering Systems) plus a demonstrated ability in Systems Analysis & Design. Experience with large scale, data base oriented systems preferred. Knldg. of available software packages and ability to evaluate their usage is helpful.

MANUFACTURING *Sr. Systems Analysts (hi $20's+) & Systems Analysis (mid $20's+) Positions involve Analysis, Design, Development of Mfg. Systems, User Support, require no programming, and offer opportunity for light travel.*

FINANCIAL *Sr. Systems Analysts (hi $20's+) & Systems Analysts (mid $20's+) Positions involve Analysis, Design, Development of Financial Systems, User Support, require no programming, and offer opportunity for light travel. Experience with large CPA companies desirable.*

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Comprehensive benefit pkg. offered plus all expenses paid by client co.

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(813) 872-2631

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The dynamic and rapid acceptance of UNITED's CAD/CAM systems in the areas of 3D Mechanical Design/Drafting, Construction, Electrical, Circuit Layout and N/C tape Preparation has created a demand for immediate expansion of our sales team.

THE JOB

It's not an easy job. It takes a special type of Sales Engineer. The type of individual who knows the ins and outs of Engineering or Manufacturing methods as well as the whos, whys and wheres relating to "state-of-the-art" CAD/CAM systems and how they can be used advantageously.

THE PERSON

Our professional Sales Engineer will be systems oriented with a degree (technical degree preferred) or equivalent technical experience and have at least 3 years successful sales experience in any of the fields of Engineering, Manufacturing, N/C, CAD/CAM, Machine Tools/Supplies or Mini-computers.

THE REWARD

If you're the Sales Engineer that fits the description we are prepared to offer you one of the finest compensation packages. This includes an excellent salary plus generous commission and plenty of growth potential. We also have a complete benefits package including fully paid medical, dental and group insurance. We expect you to earn over $35,000 in your first year.

Openings exist in the following areas:

- **Chicago**
- **Milwaukee**
- **Minneapolis**
- **Cleveland**
- **Boston**

If you feel that you meet our qualifications and are interested in moving forward into a challenging career with a prominent organization, call COLLECT NOW or send your detailed resume including salary/earnings history so that we may arrange a personal local interview in your area soon.

Mr. Bob Schaal (213) 830-7720

22500 So. Avalon Blvd., Carson, California 90745

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A Subsidiary of McDonnell Douglas Automation Company
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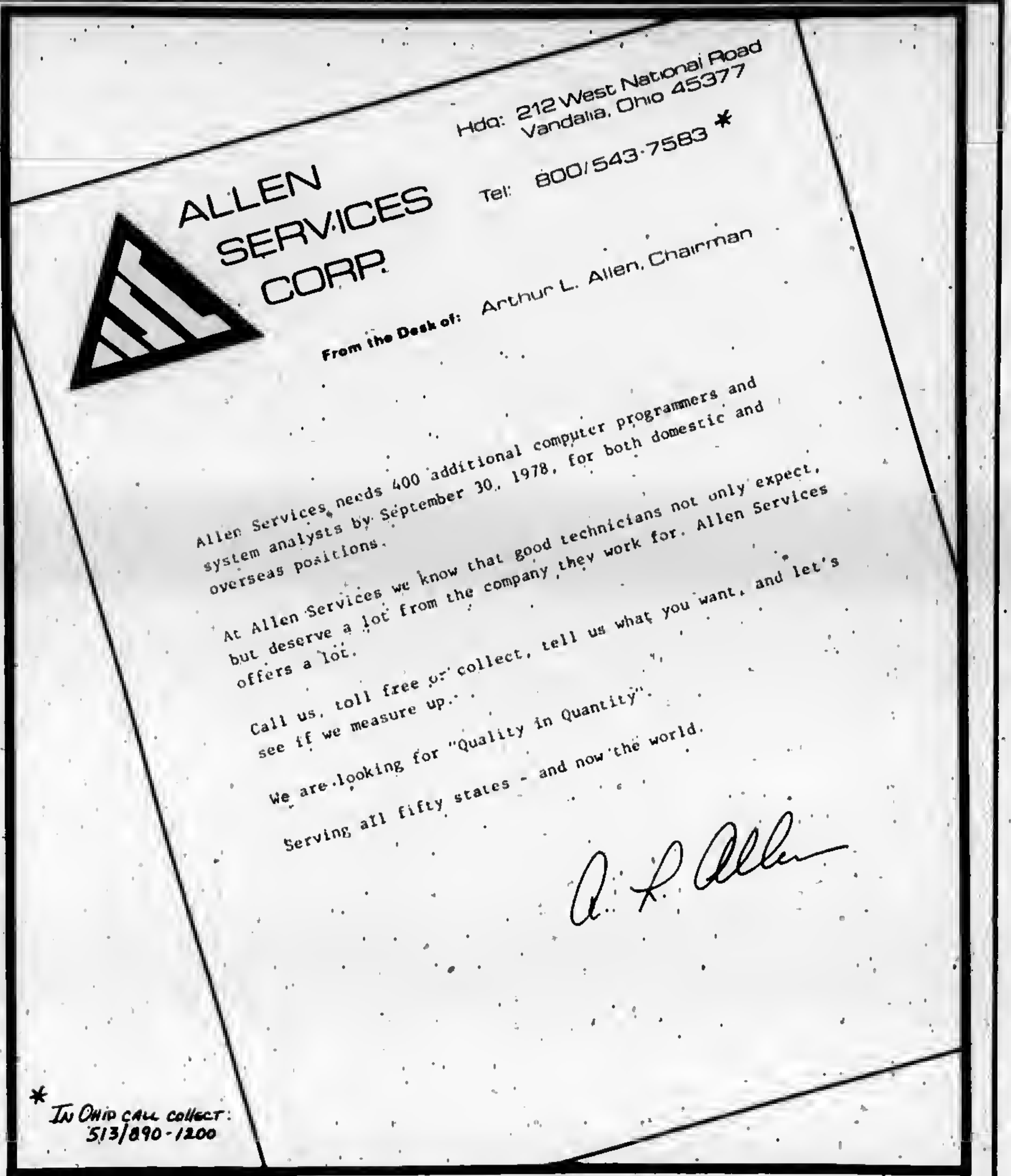
MCDONNELL DOUGLAS
CORPORATION



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From the Desk of: Arthur L. Allen, Chairman

Allen Services needs 400 additional computer programmers and system analysts by September 30, 1978, for both domestic and overseas positions.

At Allen Services we know that good technicians not only expect, but deserve a lot from the company they work for. Allen Services offers a lot.

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SYSTEMS PROJECT MANAGER & SYSTEMS ANALYST

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Hanes Hosiery Manufacturer of:

Hanes Hosiery, a division of Hanes Corporation — a Fortune 500 Company with Headquarters in Winston-Salem, N.C. — has openings for systems planning and development personnel.

These positions require significant experience in a large scale installation, utilizing on-line systems, transaction processing software, and data base management. You will have the opportunity to participate with a top staff of EDP professionals in the continued development of sophisticated systems. Our company is committed to maintaining a position of leadership in EDP utilization and these positions accordingly offer excellent opportunity for professional growth.

SYSTEM PROJECT MANAGER

Candidate should have a college degree and a minimum of 3 years experience as a systems analyst with overall responsibility on major projects. Will function as manager of systems development and maintenance activities for a group of functional areas.

SYSTEMS ANALYST

Candidate should have a minimum of 4 years total DP experience and at least 1 year as a systems analyst.

If you feel that you qualify, please send resume including salary data in confidence to:

MANAGEMENT RECRUITMENT COORDINATOR
HANES HOSIERY
P.O. Box 1413
Winston-Salem, N.C. 27102
Affirmative Action Employer

Faculty Position:

Physics and Computer Science, Murray State University

Qualifications: Ph.D. in Computer Science or related field. Teaching and industrial experience desirable. The successful candidate will be expected to teach courses in areas of programming language and operating systems. Rank and salary dependent upon qualifications and experience.

Send application, resume, three confidential letters of reference, undergraduate and graduate transcripts to: Dr. Robert C. Etherton, P.O. Box 2109, University Station, Murray, Kentucky 42071.

Applications received after July 15, 1978 may not be considered.

Murray State University is an Equal Opportunity Employer, M/F and encourages applications from all qualified persons.

ASSISTANT DIRECTOR TECHNICAL OPERATIONS

The successful applicant will be responsible for maintaining and enhancing the Commonwealth's automated merit rating system. This responsibility will include

- recruiting and supervising a small staff of analysts/programmers
- interacting on a frequent basis with Registry of Motor Vehicle Computer Center personnel
- supervising consultants and assisting in contract negotiations
- providing technical advice and assistance to the insurance industry

Candidates should have experience in COBOL programming, systems analysis, the implementation, operation, and management of a computerized system, and knowledge of key-to-tape data entry equipment.

Salary: $18,000 - $22,500. Hardware: The Registry of Motor Vehicles' CDC 3300 Computer.

Applicants must send a letter of application and a resume (including recent salary history) to Director, Merit Rating Board, 150 Causeway Street, Room 315, Boston, Ma. 02114.

The Merit Rating Board is an equal opportunity employer.

What price, Gloria?

If you and Gloria and Hal and Heather don't know the price for your services in today's active job market for computer professionals, you could all be at a serious disadvantage.

It's always important to know the job market and your own marketability . . . even if you're not actively looking now.

- You'll be in a position to assess and take advantage of an important career opportunity when it develops.
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You can find out IN COMPLETE CONFIDENCE how marketable you are. We operate with clients and candidates nationally. Call or mail your resume to:

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617/235-5663, 617/872-3577

Our client companies assume all fees and pay interview and relocation expenses.

EDP Professionals

As a major financial institution, located in New York City, we can offer opportunities for qualified individuals in our MIS area. We are seeking:

Internal Consultant
To $35,000

Responsible for planning and developing applications systems for the controllers department. Broad range responsibilities for all systems being planned in this area. Strong design and some programming experience is required as well as the ability to interface with senior management. This position can lead to a managers position in data processing or finance.

Hardware/Software Evaluator
To $33,000

Responsible for assisting management in planning, selecting and installing hardware/software. An excellent broad based background in large mainframes and mini computers is required. Additionally, strong consulting skills are a must.

Manager Teleprocessing
To $35,000

Responsible for the design and installation of a real time communications network. The ideal person will be able to move onto top level management within the MIS area. Knowledge of OS internals, communications monitors and some data base experience is required.

Data Security Administrator
To $36,000

Responsible for determining data security needs and for the implementation of data security plans. The person we seek will have background in data security, EDP audit and systems design. This position can lead to a senior staff level spot within the organization.

All of the above positions are at the officer level and offer excellent career potential. We welcome all sincere inquiries and will respect the confidentiality of communications with us. Please forward your resume or a brief description (including salary) detailing your background to Vice-President Data Processing.

CW Box 1595, 797 Washington St., Newton, MA 02160

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Our growing client base provides additional career opportunities for individuals with background in one or more of the following areas:

***IBM OS COBOL or BAL**	***CICS COBOL or BAL**
***IBM BAL, INTERNALS**	***IMS/OB/DC COBOL**
***UNIVAC 1100 COBOL**	***IMS/TSO/STRUCT/COBOL**
***UNIVAC 1100 FORTRAN**	***MARK IV**
***UNIVAC 1100 OMS, TIP**	***INTERCOMM**

***ASSEMBLER, MICROPROGRAMMERS**

Positions are available in San Francisco, Los Angelas, Austin, Seattle, Portland, Bloomington, Chicago and a few scattared sitas. If you are a bright, aggressive individual who enjoys client contact and want a career, not a job, we want to heer from you.

For individuals who meet our standards, we offer the opportunity to gain a large variety of experience in a short period of time, genarous compensation and a career with an organization where top quality results are our primary concern.

Please send resume to: Informatics PMI, 1121 San Antonio Rd., Palo Alto, CA 94303, Attn: Lois Flury; or telephone Lois Flury at (206) 385-0387 or (415) 964-9900 for additional information.

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Energy Management Systems Programmer Operator

Challenging new position open in sunny Albuquerque to project manage a dual EMS Computer System to be operational in 1979. Responsibilities include approval of manufacturer developed software and hardware documents consistent with contractual guidelines and project objectives.

Upon completion of system acceptanca testing and field integration, the Programmer will develop new power applications programs and other programming techniques, while being responsible for on-going softwara maintenance.

Applicant should possess e background in, or knowledge of, Electric Utility Power Operation and be experienced in Assembly, Fortran and other computer languages.

If interested, please send resume, salary history and referenca to: Plains Electric Generation and Transmission Cooparative, Inc. 2401 Aztac Rd., NE, Albuquerque, NM 87107.

Plains Electric Generation & Transmission Cooperative, Inc.

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COMPUTER CENTER POSITIONS

Operating Systems Analyst up to $20,000

Provides technical support in the effective utilization of the operating system on the CDC CYBER-71 time-sharing computer system. Diagnoses and isolates operating system problems in order to assist the operations staff of the Computer Center as well as the end users in the effective utilization of the computer system.

Bachelor's degree in Computer Science, Electrical Engineering, or related areas. Experience of 5 years with CDC large scale computer operating systems required. Experience in operating system design and programming required.

Administrative Data Prog/Analyst . . . . up to $18,000

Is responsible for Programming Administrative Data Processing Systems in COBOL-5 language for CDC CYBER-71 computer. Assists senior systems analysts in the design of data systems which may include budgetary control, accounts payable, personnel, payroll, accounts receivable, student registration and records, student admissions, Alumni Data, etc. Maintains and documents all production level programs and data systems.

Bachelor's level degree and an academic discipline. Minimum 3 years of experience in design and programming of large scale data systems; proven ability for independent development using COBOL language.

Academic Computing Applications Specialist . . . . . . up to $22,000

Procures and implements large scale program packages on the computer system for faculty use in teaching and research. Consults with faculty in order to provide assistance in the development of large scale programs for teacning and research. Offers professional level courses in computer technology as part of a "Faculty Training Program." Develops technical manuals for in-house use by the students and faculty.

M.S. degree or higher in an academic discipline. Minimum 10 years of academic programming applications development experience using sevaral of the commonly used languages such as: FORTRAN, BASIC COBOL, Assembler, APL, ALGOL, PL/1, etc. Experience in interfacing with faculty and students for solving their computer applications problems is essential. Please send resume along with your salary history to:

Dr. S.C. Mathur, Director, Computer Center
UNIVERSITY OF LOWELL
Lowell, MA 01854

THESE POSITIONS COMMENCING IN JULY, ARE SUBJECT TO STATE APPROPRIATION

The University of Lowell is an Equal Opportunity/Affirmative Action/Title IX University.

SYSTEMS ANALYST

A Fortune listed company, the biggest in its industry, is looking for a team leader for its Teleprocessing group. Should know IMS/DC or CICS, Structured Programming, Cobol and be prepared to learn and advance. IBM 370/168 MVS, 3300 on ordar. Salary commensurate with ability. Call or write: (305) 358-9280.

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Hvy equipment mfg. is seeking an exp. Sr. Programmer who will enjoy challenging work + cont. tech. & professional growth in e progressive NCR environment. Req. tech. school trg. in computer programming with 3 yrs. exp. Ability to read & comprehend tech. manuals as well as problem solving ability. 6 mo. COBOL & computer operations exp. with knowledge of NEAT/3 programming & NCR exp. desirable. 4 day work week. Please send resume & salary requirements to: RayGo, Inc., Box 1362, Mpls., Mn. 55440 EOE/MF

RSTS/E ADMINISTRATIVE PROGRAMMER

Opening for experienced (PDP 11) BASIC+ programmer to help maintain current administrativa software and to develop new financial system. Prefer accounting experience. Must interact well with users. Rose-Hulman is an all male college of science and angineering. Send resume with references including salary history and requirements to: Bruce Danner, Director, Computing Center, Rose-Hulman Institute of Technology, Terra Haute, IN 47803.

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DATA COMMUNICATIONS SPECIALIST

A major corporation in Pittsburgh seeks a qualified professional to fill a newly created position in the Telecommunications department. This position requires knowledge and understanding of a number of cross-disciplines - including Hardware, Software, and Data Communications. The successful candidate should be familiar with Voice-Transmission techniques and Digital Communications as well as have tha capability of developing a Micro-Processor. The incumbent should possess an analytical ability as well as be able to work well with people. A Bachelor's degree in engineering or related area is required unless the individual possesses sufficient experience directly related to this field. Mail your resume including salary requirements to:

Box 86053
Pittsburgh, PA 15221

ELECTRIC POWER CONTROL - SOFTWARE ENGINEER

Prominent West Coast utility has a vacancy for an Engineer with a background in power control center software applications. Assembly language and Fortran programming experiance for SCADA and AGC is required. Degree in engineering or related fiald is also required. Desire axperiance in advanced application programming such as Real Time Powar Flow, Unit Commitment and Transaction Evaluation. Send resume and salary requirement to:

Employment Office

SAN DIEGO GAS & ELECTRIC CO.

P.O. Box 1831
San Diego, CA 92112

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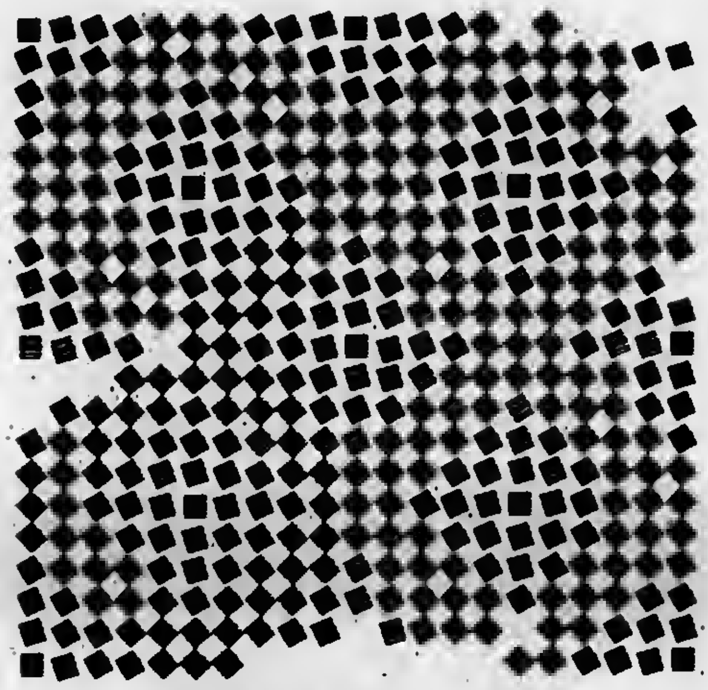

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Are you ready for a career change to greater opportunity?

Sperry Univac's expanding marketing effots have created a number of openings in our Applications Devalopment Centar in Blue Bell, Pa., for qualified computer systems specialists.

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Minimum of 3 years axperience in the design and implementation of manufacturing applications in the area of inventory and production control. Knowledge of COBOL is required. Data base concepts experience is desirabla. Responsibilities will include applications development work on Univac's UNIS package.

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Minimom 5 years experience, preferably on Univac 9000 serias computer systems or equivalent. Financial applications experience is required. Responsibilities will include applications development work on Univac's Savings and Loan package.

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Minimum 3 years experiance in the design and implementation of distribution applications. Knowladge of COBOL is raquired.

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Minimum 5 years experience on major computer systems. Background in systems generation and large scale operating systems support is required. Responsibilities will include troubleshooting and maintenance of our 1100 systems operating software.

A bachelor's degrea in computer science or related discipline, or equivalent experience is required for all of the above positions.

Send your resume and salary history, in confidance, to:

A.T. Barbato
Sperry Univac
P.O. Box 500
Blue Bell, PA 19424

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YOUR sales earn high commissions full or part-time.

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In-House programming instructors needed for the following areas: COBOL, OS-370, ALC, STRUCTURED PROGRAMMING, DESIGN and ANALYSIS. Salary commensurate with experience.

Department #3411-Staff Development, 1455 Market St., San Francisco, CA 94137. Equal Opportunity Employer.

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We are growing at over 20 percent a year and our business is virtually all commercial; extremely stable. (HONEST!)

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We are located in an urban area; convenient to Philadelphia, but without its high taxes, housing costs and congestion.

If you are a scientifically oriented programmer, or a technical leader with task or project level software responsibility, we would like to talk to you.

To investigate your opportunities with a leader in the industry, call anytime, 24 hours a day, including Saturday and Sunday, at (215) 643-2000, Ext. 8762, or send your resume to my attention, Jim Henderson, Manager of Systems Professional Employment:

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Equal Opportunity Employer, M/F/H

Conference Planner

We have an excellent opportunity for someone to be involved in the planning and execution of a series of computer-related conferences across the United States. These conferences are held in conjunction with trade shows managed by our company, and involve hundreds of speakers and thousands of attendees.

The job of our conference planner is to plan the format and content of each program based on attendee and industry feedback from previous conferences; prepare informational literature on the programs; and recruit speakers. You'll be dealing with industry leaders around the country, and spend a lot of time on the phone. You'll also be travelling about 25% of the time, as you attend each conference you've organized.

To qualify, you should have experience in conference planning and some familiarity with the computer industry or data-processing. We offer excellent benefits, including profit sharing and bonus plans, and the chance to be part of a small, but successful and growing company.

To apply, send your resume or a detailed letter to Kim Wichert, Conference Company, 60 Austin Street, Newton, MA 02160.

The Conference Company

EDITOR

CUSTOMER PUBLICATION

Hewlett-Packard's Calculator Products Division, leading manufacturers of desktop computers, is seeking an experienced editor for its bi-monthly customer publication, KEYBOARD. The magazine is not a sales tool, but a support medium written chiefly by customers and company technicians.

The editor should have one of the following education/experience mixes:

Bachelor's degree in journalism, experience with a newspaper or magazine, and considerable exposure to computer technology; or Bachelor's degree in computer science or related engineering discipline, with experience in journalism or promotional writing.

The editor will be responsible for planning each issue, "recruiting" material from HP customers, reviewing articles for style and referring them to appropriate experts for technical accuracy. The editor will work closely with product marketing managers in planning articles, but will have a high degree of independence in exercising final judgment.

Hewlett-Packard offers a progressive salary and liberal fringe benefits including profit sharing, insurance, stock purchase, flexible hours and more. For consideration, both immediate and confidential, forward your resume to Kathi Kline, Hewlett-Packard, CPD Personnel, P.O. Box 301B, Loveland, Colorado 80537. We are an equal opportunity employer dedicated to affirmative action.

EDP PROFESSIONALS

Metropolitan Life, possessing the world's largest array of IBM development capacity, is opening its doors to you through a get-together for all levels of hardware and software professionals at our

CAREER CONVENTION

Saturday, June 24th, between 10am-4pm and Monday, June 26, between 4-7pm at 11 Madison Avenue (24th Street), New York City

Your talents deserve the special advantages you'll have with us: learning more, acquiring management skills, advancing faster — in an environment that leaves nothing to be desired. You'll advance through opportunities for recognition and growth that come of working with small, interactive groups, and benefit technically as well from a large on-going educational program that includes computer assisted instruction.

Our hardware presently encompasses 8 IBM 370/168's; large and medium-scale Honeywell mainframes; DEC, GTE, Honeywell minis; with a number of IBM 3033's on order.

Our software includes MVS, VM, CMS, CICS, DM IV, GCOS, IMS, IDS, TOTAL, RAMIS, MARK-IV.

No waiting. Interviews with technical managers and senior officers for positions in

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All positions require 1-2 years of BAL and/or COBOL experience in a medium to large-scale environment.

Be sure to attend our Career Convention and see what your future can be with us.

For more information and/or to arrange a specific interview appointment time, call Robin Seligson collect at **(212) 686-2069, 8am-3pm**

We'd like you to come to our Career Convention, but if you can't — call Robin Seligson anyway.

Come to Metropolitan. Simplify your life.

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COMPUTER CAREERS

Control Data CYBERSEARCH is an employment service of Control Data Corporation. To augment the individualized effectiveness of our experienced counselors and to speed and simplify the search process, CYBERSEARCH utilizes the CDC nationwide computer network for job match. If you do not find the position of your choice listed below, please call with your specific requirements.

IBM DOS Programmer/Analysts	
Cobol, CICS, Sr. O.E. fin.	2tK
Cobol, BAL, some CICS, fin.	23K
Cobol, CICS, OL-t, ord. proc.	22K
Cobol, BAL, OBOMP mfg.	22K
Cobol, CICS, OBOMP, mfg.	22K
Cobol, Sr. fin.	20K
Cobol, BAL, Sr. Anel	24K
BAL, batch, banking	20K
BAL, on-line, benking	teK
PL-t, CICS, mfg	teK
PL-t, CICS, OL-1, mfg	25K
IBM OS Programmer/Analysts	
Cobol, CICS, new conversion	22K
Cobol, Sr. hvy JCL	2tK
Cobol, CICS, IOMS, enel.	21K
Cobol, fin.	2tK
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EDP

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A nationwide firm active in retailing, manufacturing, wholesaling, finance and agriculture, The Wickes Corporation, located in suburban Wheeling, currently has a unique position available for a person who has computer operations experience, preferably with on-line systems.

You could be the person we are seeking if you have an EDP background, are personable and can communicate effectively. This a liaison position in our Corporate MIS Group and involves troubleshooting in supporting our divisions and subsidiaries. Light travel is required. quired.

Wickes offers an excellent company paid benefits program including deferred profit sharing, thrift and pension plans. For further information, please call:

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(312) 541-0100 Ext. 2256

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Additional opportunities exist for product support marketing in our Los Angeles office.

Programs include add-on memory, memory enhancement, CPU enhancement and new products aimed at the IBM add-on marketplace. Send resume in confidence to:

Personnel Department

EMM COMPUTER PRODUCTS
A Division of Electronic Memories & Magnetics Corporation
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(213) 777-4070

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Midwest manufacturing concern seeks an effective manager of data processing and operations research. Responsibilities include data processing operations (IBM 370/138 online and database), systems development and operations research functions. Requires data processing management experience, ability to effectively manage department through supervisors at two locations, commitment to high performance of the PD function, and experience in the use of operations research for business management and planning. This is a senior level position, requiring an above average individual.

Please send your resume in confidence to:

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SYSTEMS to $29,000. Leading growth corp seeks indv. capable of early project mgmt resp. Req's BS w/4-6 yrs in mfg., financial &/or marketing systems analysis & design. Refer LB.

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SYSTEMS DESIGNER to $27,000. Heavy equip mfgr seeks degreed data processing pro w/strengths in mktg applications w/min 3+yrs. IBM/DL1, batch/TP. Data base req'd. Refer JB.

PROJECT LEADER to $26,000. Sunbelt "Fortune 500" co needs EDP pros w/mfg systems design & analysis exp. Prefer OS/VS, IMS exp. Refer JS.

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CHARLOTTE, NC 28202 — J. Schwab, 1742 South Nat'l Ctr., 704/375-0600
CLEVELAND, OH 44131 — A. Thomas, 5755 Granger Rd., 216/749-6029
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- **IBM 360/370 systems and plug compatible disc, tape, memory and printer sub-systems or related experience with Memorex, Telex or Calcomp.**

To explore these outstanding opportunities, qualified candidates should call or forward resume stating salary history and geographic availability to:

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One Gateway Center, Newark, N.J. 07102

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For further information, call collect Jerry Speno (415) 786-5089.

Or rush your resume including salary requirements to:
Jerry Speno, Supervisor,
Professional Employment, Dept. IM, Diablo Systems, Inc., 26460 Corporate Avenue, Mail Station D-101, Hayward, California 94545.

If you do not have a resume handy, please fill out the coupon and mail it to Mr. Speno's attention.

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Requires BSEE or Computer Science degree plus 4-8 years of recently related work experience.

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Interested candidates are invited to send resume or call collect: Mr. Robert W. Donoven, Personnel Resources, NCR Corporation, Engineering & Manufacturing, Cambridge, P.O. Box 728, Cambridge, Ohio 43725. (614) 439-0291

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DIRECTOR OF MANAGEMENT SYSTEMS

Indiana University invites applications and nominations for the newly created position of Director of Management Systems. The Director will report to the University Director of Information and Computer Services.

Responsibilities:

The Director of Management Systems is responsible for the design, development, implementation, maintenance, and evaluation of new, or significantly revised, management information systems throughout Indiana University. Related management responsibilities include customer and internal training plans and programs and the development of internal management systems and procedures. The Director will supervise 38 full-time positions. The primary computer supporting these systems is an IBM 370/158-3AP with 5 megabytes of memory. Software includes MVS, CICS, MARK IV, and SYSTEM 2000.

Qualifications:

MS/MBA in applicable area, training and experience in information systems design, management of computing applications, data base technology, ten years of progressively successful management experience in a large scale organizational and/or project management situation, preferably within a university environment. Five years of successful management experience in a position directly responsible for the development and implementation of management information systems, within a university environment. Superior written and verbal communication skills. Management and financial expertise.

Desirable Characteristics:

Manager or associate in such university functions as registrar, admissions, financial aids, student services, university planning, budget management, faculty records, personnel, accounting.

Appointment:

Twelve month, liberal fringe benefits, this position is open and available.

Salary: Open, depending upon background and experience.

Effective Date:

Mutually agreed to, but wish to appoint effective September 1, 1978, or earlier if possible.

Closing Date for Receipt of Application: July 7, 1978

Contact:
Richard E. Slocum, Selection Advisory Committee
Bryan Hall, Room 7, Indiana University, Bloomington, Indiana 47401. Phone (812) 337-1053

INFORMATION SYSTEMS MANAGER

Information Systems Manager reporting to Dean's Office, School of Medicine. Advise regarding data base systems, software requirements, and hardware evaluation. Develop and maintain systems including faculty and student records, admissions, financial systems interfacing with university file.

B.S. degree required in appropriate discipline including: business, management, computer sciences. Experience as programmer and systems analyst in educational setting preferred.

Submit resume with named references to Daniel P. Banlord, Assistant Dean for Administration, I.U. School of Medicine, 1100 West Michigan Street, Indianapolis, Indiana 46202.

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Client Companies pay all costs. Please send resume giving present salary and relocation preferences to Eva Campbell.

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We are not an Employment Agency by an Independent Consulting Firm with Clients that trust our judgment. If you would like to explore the opportunities with a professional who understands your career needs, Please call or send a resume to:

S.A. Mortall
312 Governor Pl.
Allison Park, PA 15101
(412) 487-6654

Analyst/Programmer

Gilbarco, a dynamic manufacturing company and a growing subsidiary of Exxon Enterprises Inc. has an immediate opportunity available for a Systems Analyst/programmer. You will be responsible Systems Analysis, and Design through implementation including conducting feasibility studies, programming and testing, debugging, documentation and procedure writing.

You should have a BA, BBA or BS in Computer Sciences with in-depth experience in Systems Design and Programming (preferably in a manufacturing environment) and a working knowledge of MRP, Inventory and Shop Floor Control. Competency in ANS COBOL programming on Disk oriented IBM 360/370 computer a MUST. Experience with DBOMP Software and CRT Systems desirable.

We offer excellent growth potential. Salary commensurate with experience and qualications plus liberal fringe benefits. Greensboro is ideally situated in the Piedmont area of North Carolina and affords excellent educational and recreational facilities. For consideration, please send a complete resume, in confidence to: Ms. Sharon Everhart, Employee Relations Department, Gilbarco, P.O. Box 22087, Greensboro, N.C. 27420.

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Will design, code, test, document and maintain computer programs. Degree is preferred, but not essential. Minimum 2 years experience required plus knowledge of OS, JCL and COBOL.

SENIOR PROGRAMMER ANALYSTS

Will evaluate software package, provide internal education and prepare programming and systems standards and procedures. Design, code, test document and maintain computer programs. Degree preferred plus minimum 3 years experience. Must know OS, JCL, and COBOL.

SYSTEMS ANALYSTS

Research, analyze, design and prepare system and program specifications. Implement and document systems and provide user education and assistance. Degree preferred plus minimum 3 years experience. Knowledgable in OS, JCL, and COBOL. Inventory control background a plus.

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You will be involved with communications, daily production, vendor interface and operations documentation. Minimum 3 years supervisory experience is required with at least 4 years exposure to EDP. Knowledge of OS, JCL and previous experience with an RJE environment preferred.

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Software/Systems Analyst for prestige Financial District group. Prefer IBM 370/OS Assembly lgr. Some supervisory. Install on-line package.

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senior education instructor

The Information Services Department of Baxter Travenol Laboratories, headquartered in Deerfield, Ill., is seeking a professional trainer for its systems and programming staff.

Applicant must have experience with and a fairly extensive knowledge of data processing using large scale computers and operating systems as well as current or prior college level teaching experience in business and computer science.

The position will involve responsibility for developing and presenting classes and/or seminars on a wide variety of business topics, developing improved techniques for the training of data processing professionals (using multi-media facilities) and assisting in the career development activities of data processing professionals.

In addition to an excellent salary and generous fringe benefits program, Travenol offers outstanding potential for career growth. For consideration, send a detailed resume with salary history, in confidence, to:

Paul Jensen

TRAVENOL

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Anheuser-Busch has an immediate opening for a Management Research Analyst that involves applying operations research techniques and concepts to specific business situations which will lead to the development of computer base management systems.

We require an MBA with 1-2 years' experience and a knowledge of systems analysis and quantitative approaches for problem solving. This position offers an excellent opportunity for exposure and advancement based upon the strength of your accomplishments.

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Manager, Salaried Employment
Department G-1
721 Pestalozzi
St. Louis, MO 63118

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You'll have at least four years' experience backed by a BSEE or equal and the ability to design and spec multi-tasking, multi-programming operating systems. Areas of heavy concentration should include: Primitives, table layouts, queueing, calling sequences, I/O drivers and handlers and file access methods. In addition, you'll have a well-developed working knowledge of communication protocols, high level language intervals and organization techniques.

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The highly-skilled Systems Engineers needed to help us grow will have critical responsibilities in our aggressive sales/marketing program. Each should have at least five years or more experience and an education in Engineering, Math, Computer Sciences or equal. You shoul have communications computer sstems and field sales experience with end users and know communications protocols, facilities, modems, systems design; computer operation, applications system design and programming. In addition, you'll be better able to carry out your substantial duties if you're familiar with micro-processing programming of user applications and have experience in IBM as well as other types of software.

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Call or write Conference Coordinator
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215-667-2400

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DIRECTOR AND DEPUTY DIRECTOR OF DATA PROCESSING

Department of Human Services

State of New Jersey

The Department of Human Services is a social services umbrella agency with approximately 22,000 employees comprised of seven divisions with an annual administrative budget of 400 million dollars.

The Department Data Center has recently acquired a large-scale dual mainframe installation with extensive random access storage and a telecommunications configuration (both hardware and software) which will support up to 400 on-line terminals.

To manage this sophisticated installation, we are looking for the following people:

DIRECTOR OF DATA PROCESSING

Salary Range: high twenties to high thirties. Educational Requirement: Bachelor's degree in Accounting, business administration, engineering or basic science areas required. Master's degree desirable. Experience: Minimum of ten years experience in a data processing installation which shall have included the planning, installation, operation and revision of data processing programs, systems and equipment. Must have a broad management background including data processing management experience, understand current issues and future trends of this technical field, have a service philosophy and be able to instill it in others.

DEPUTY DIRECTOR OF DATA PROCESSING

Salary Range: Mid-twenties to mid-thirties. Educational Requirement: Bachelor's degree in financial, business administration, engineering or science areas required. Master's degree desirable. Experience: Minimum of eight years experience in a data processing installation which shall have included the planning, installation, operation and revision of data processing programs, systems and equipment. The person in this position will act as the Director's alter ego in the running of the Data Center. This person shall have had management responsibility in data processing administration as well as a knowledge of teleprocessing and data base techniques.

Please include in response over and above your resume the size of your current installation, current salary and number of data processing professionals supervised.

The Department of Human Services Data Center is located in a suburb of Trenton, New Jersey called Hamilton Township.

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MANAGEMENT SYSTEMS AND PROCEDURES UNIT
135 W. Hanover Street
Trenton, N.J. 08625
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Minimum requirements include:

- **Degree in Business Administration plus 2 years programming experience is desired.**
- **Working knowledge in two of the following programming languages - FORTRAN, COBOL, APL, or PL1.**
- **Must be articulate and personable.**
- **Must be a self-starter who requires little or no direct supervision.**

Benefits:

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- **An opportunity to develop your managerial skills.**
- **An excellent starting salary plus monthly bonus based on performance contribution.**

If you are interested in applying your talents in a truly dynamic industry, please call or send resume to:

National CSS, Inc.

542 Westport Avenue
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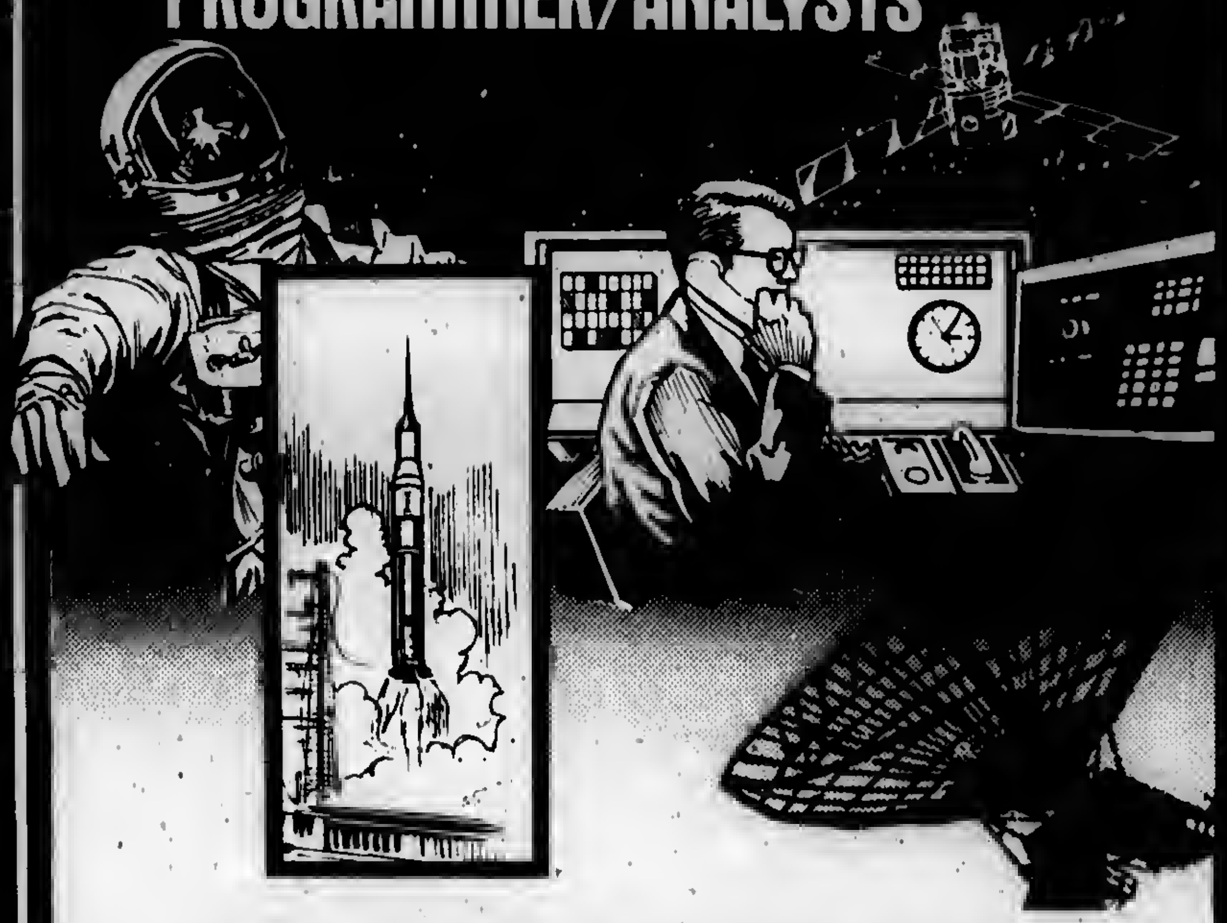
CSC

PROGRAMMER/ANALYSTS



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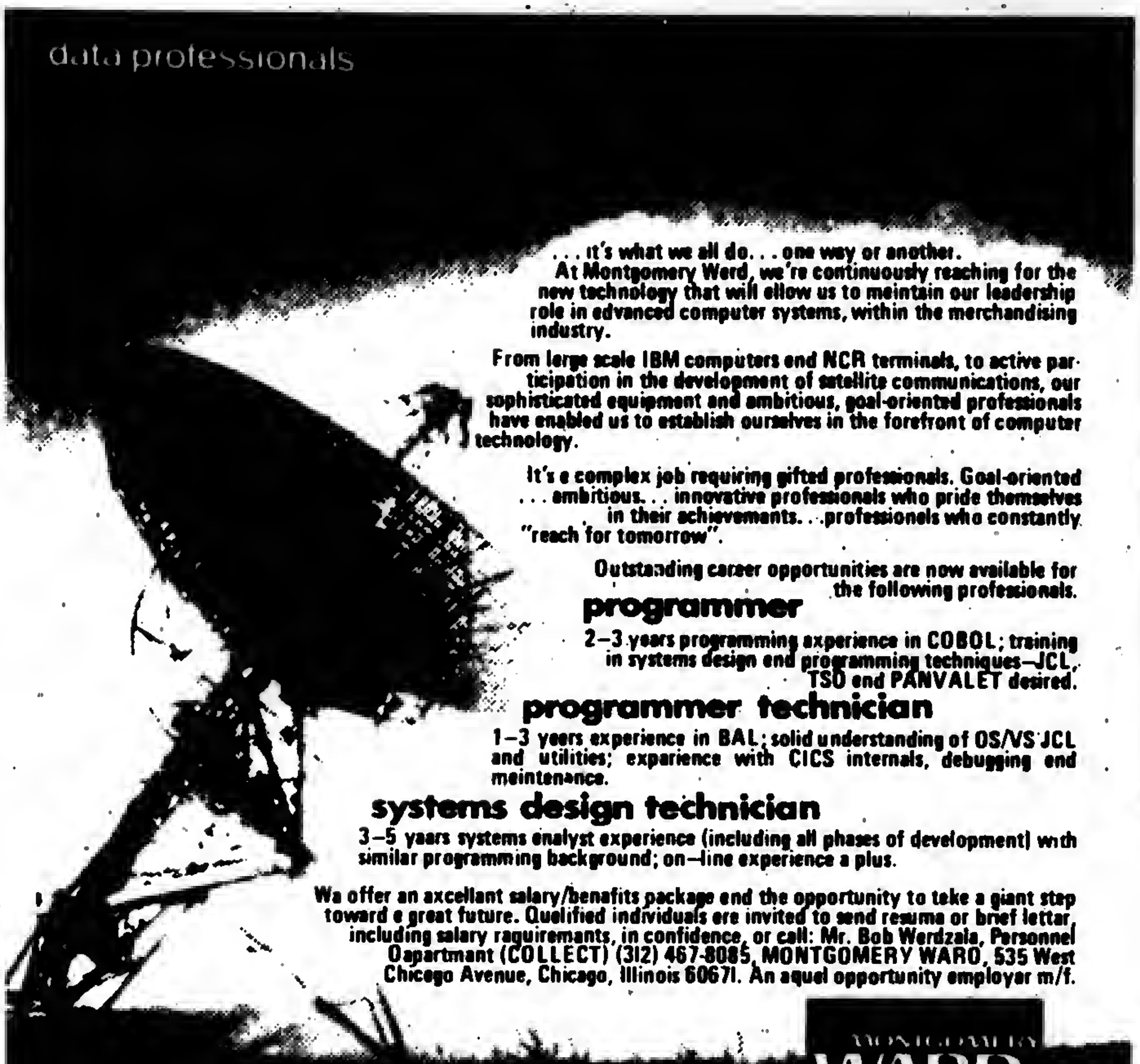

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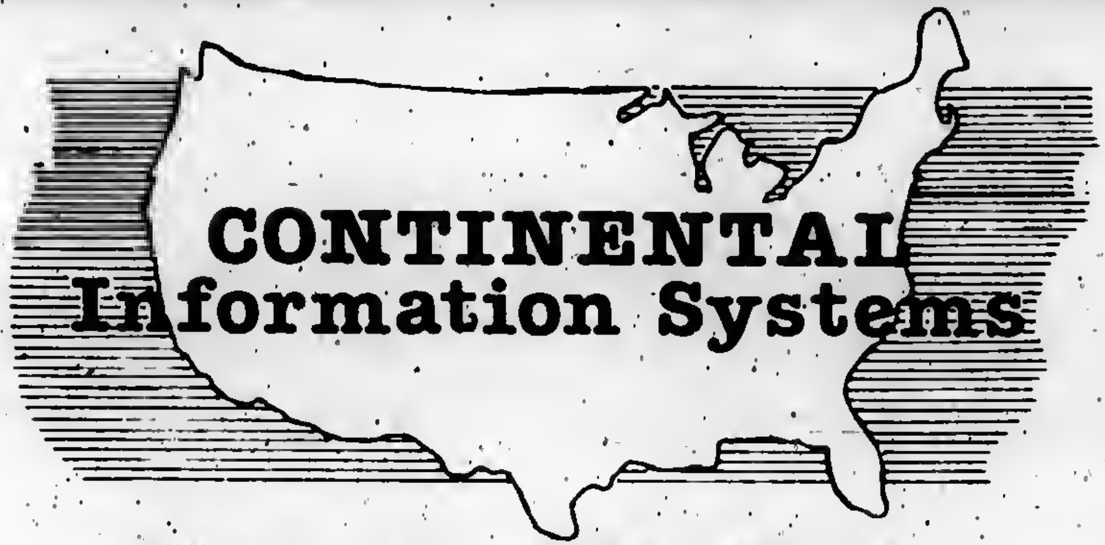

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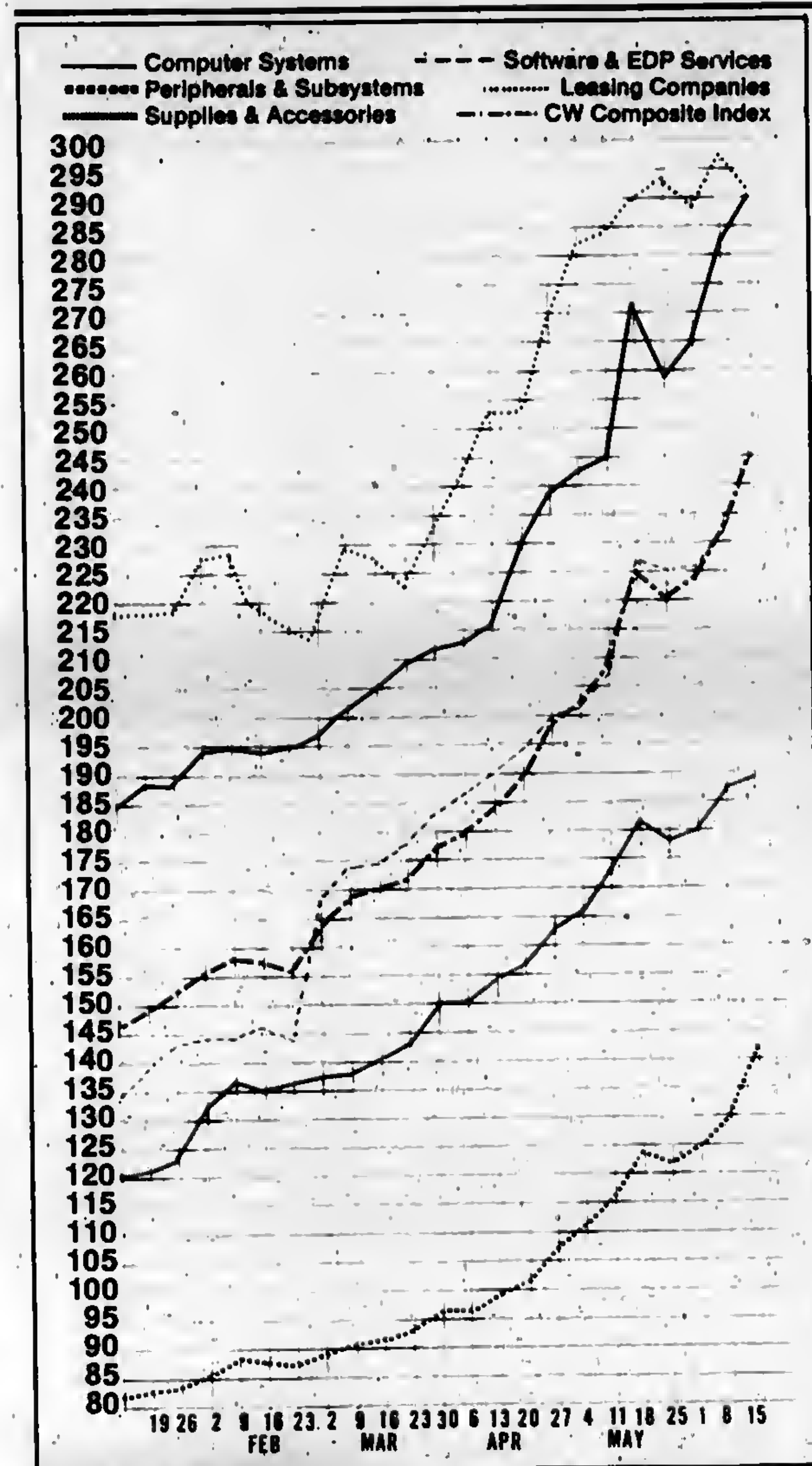

Earnings Reports

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Year Ended Feb. 28

	1978	1977
Shr Ernd	$.52	$.17
Revenue	5,008,000	3,817,000
Tax Cred	153,000	68,000
Earnings	495,000	160,000

TEC

Three Months Ended March 31

	1978	1977
Shr Ernd	$.30	$.27
Revenue	3,893,043	2,853,370
Earnings	245,236	220,217
6 Mo Shr	.67	.87
Revenue	8,488,148	8,586,858
Earnings	550,202	710,547

TELERENT LEASING

Three Months Ended March 31

	1978	1977
Shr Ernd	$.25	a$.24
Revenue	2,662,000	2,371,000
Earnings	361,824	342,327
6 Mo Shr	.52	a.42
Revenue	5,098,000	4,750,000
Earnings	759,384	815,038

a-Adjusted for a 5% stock dividend paid in March 1978.

TYMSHARE

Three Months Ended March 31

	1978	1977
Shr Ernd	$.75	$.60
Revenue	38,075,985	28,235,333
Earnings	3,381,245	2,821,282

COMMODORE

Three Months Ended March 31

	1978	1977
Shr Ernd	$.02	$.04
Revenue	8,888,000	4,957,000
Tax Cred	125,000	.....
Earnings	250,000	88,000
6 Mo Shr	.10	1.18
Revenue	20,143,000	15,428,000
Tax Cred	486,000	.....
aSpec Cred	.....	3,075,000
Earnings	938,000	2,810,000

a-Gain from settlement of creditor liabilities under Chapter 11 bankruptcy proceedings.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 14, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE JUN 14 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	22- 39	38 3/4	+2 1/2	+6.8
N	BURROUGHS CORP	55- 91	77	+ 7/8	+1.1
C	COMPUTER AUTOMATION	18- 38	37 1/2	+1 1/4	+3.4
N	CONTROL DATA CORP	20- 36	35 1/2	+ 1/8	+0.3
C	CRAY RESEARCH INC	15- 46	38 1/2	0	0.0
N	DATA GENERAL CORP	35- 61	60 1/4	+ 1/2	+0.8
N	DATAPOINT CORP	18- 64	64 1/4	+3 3/8	+5.5
N	DIGITAL EQUIPMENT	37- 53	52 1/4	+ 5/8	+1.2
N	ELECTRONIC ASSOC.	2- 8	7 3/8	-1	-11.9
A	ELECTRONIC ENGINEER.	8- 19	19 1/8	+2 1/8	+12.5
O	FOUR-PHASE SYSTEMS	13- 32	31 7/8	+ 1/4	+0.7
N	FOXBORO	28- 54	38 5/8	- 1/8	-0.3
C	GENERAL AUTOMATION	6- 19	18 1/2	+1 3/8	+8.0
O	GRI COMPUTER CORP	1- 1	1 5/8	+ 1/4	+18.1
N	HEWLETT-PACKARD CO	62- 87	83 3/4	- 1/8	-0.1
N	HONEYWELL INC	43- 59	57 3/4	- 7/8	-1.4
N	IBM	236-286	271 1/8	+5 7/8	+2.2
C	MANAGEMENT ASSIST	5- 18	16 1/8	-1 1/4	-7.1
O	MICRODATA CORP	7- 18	16 3/4	+ 5/8	+3.8
C	MINI-COMPUTER SYST	5- 12	5 3/4	-1 1/4	-17.8
C	MODULAR COMPUTER SYS	5- 15	14 1/8	- 1/4	-1.7
N	NCR	32- 58	56 5/8	- 1/2	-0.8
C	PRIME COMPUTER,INC	12- 31	31 1/4	+7 3/4	+32.9
N	PERKIN-ELMER	17- 26	25	- 1/4	-0.9
N	RAYTHEON CO.	16- 50	49 3/8	- 1/2	-1.0
N	SPERRY RAND	30- 45	43 5/8	0	0.0
C	SYCOR INC	8- 24	23 5/8	- 3/8	-1.5
A	SYSTEMS ENG. LABS	5- 21	20 1/4	+1 3/8	+7.2
A	WANG LABS.	10- 26	26 1/8	+2 7/8	+12.3

LEASING COMPANIES

EXCH		1977-78 RANGE (1)	CLOSE JUN 14 1978	WEEK NET CHNGE	WEEK PCT CHNGE
C	ALANTHUS CORP	3- 6	5 1/8	- 1/2	-8.8
C	BOOTHE COURIER CORP	8- 18	16 1/2	- 3/8	-2.2
C	COMDISCO INC	9- 20	18 1/2	-1	-5.1
A	COMMERCE GROUP CORP	1- 3	5/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	+ 1/8	+12.5
M	DATRONIC RENTAL	0- 2	1 5/8	0	0.0
A	DCL INC	1- 4	3 1/2	- 1/8	-3.4
N	DPF INC	6- 13	12 3/8	- 1/4	-1.9
N	ITEL	13- 27	26	+ 3/8	+1.4
N	LEASCO CORP	19- 35	31	-2 5/8	-7.8
C	LEASPAC CORP	1- 2	1 3/4	0	0.0
A	PIONEER TEX CORP	5- 11	6 5/8	- 1/4	-3.6
N	U.S. LEASING	10- 16	15	- 1/4	-1.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH.
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(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERVICES

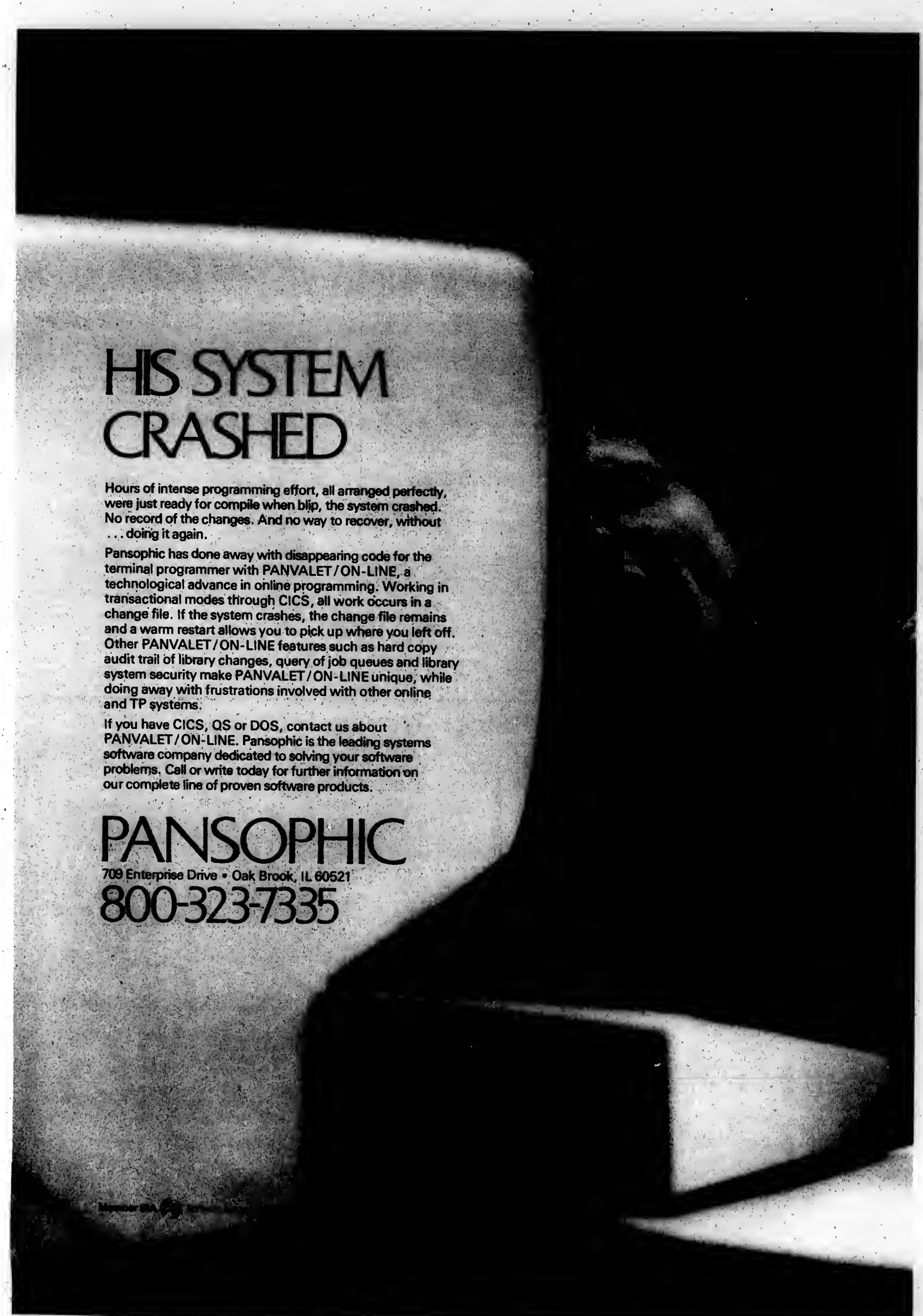
EXCH		1977-78 RANGE (1)	CLOSE JUN 14 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1 3/8	+ 1/8	+10.0
O	ANACOMP INC	7- 16	16	+2	+14.2
A	APPLIED DATA RES.	5- 16	15 7/8	+2 3/8	+17.5
N	AUTOMATIC DATA PROC	23- 34	33	- 1/8	-0.3
O	COLEMAN AMERICAN COS	1- 2	1 3/4	+ 1/4	+16.6
C	COMPU-SERV NETWORK	7- 15	9	- 1/2	-5.2
O	COMP ELECTION SYSTMS	6- 10	9	0	0.0
C	COMPUTER HORIZONS	1- 4	4	+ 1/4	+6.6
O	COMPUTER NETWORK	6- 12	11 5/8	+ 7/8	+8.1
N	COMPUTER SCIENCES	7- 13	12 1/2	+ 1/2	+4.1
C	COMPUTER TASK GROUP	1- 4	3 1/4	+ 1/4	+8.3
O	COMPUTER USAGE	1- 4	2 7/8	- 3/8	-11.5
C	COMSHARE	5- 17	16	+ 3/4	+4.9
C	DATA DIMENSIONS INC	3- 7	6 1/2	+ 7/8	+15.5
O	DATATAB	1- 2	1	0	0.0
N	ELECTRONIC DATA SYS.	14- 23	20 1/2	- 1/4	-1.2
O	INSYTE CORP	2- 3	1 3/8	+ 3/8	+37.5
C	IPS COMPUTER MARKET.	1- 2	2 3/8	+ 1/8	+5.5
O	KEANE ASSOCIATES	3- 6	6	+ 1/8	+2.1
C	KEYDATA CORP	1- 3	2 1/4	+ 3/8	+20.0
A	LOGICON	7- 17	12 3/4	+1	+8.5
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 28	28	+ 3/4	+2.7
C	NATIONAL DATA CORP	4- 12	11 3/8	- 1/8	-1.0
A	ON LINE SYSTEMS INC	16- 26	24 3/8	- 5/8	-2.5
N	PLANNING RESEARCH	3- 8	8	+1 1/4	+18.5
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	2- 6	5 7/8	+ 3/8	+6.8
C	REYNOLDS & REYNOLDS	17- 27	27 1/4	+ 3/4	+2.8
C	SCIENTIFIC COMPUTERS	1- 6	5 3/8	+ 1/4	+4.8
O	TYMSHARE INC	14- 27	25 3/4	-1 5/8	-5.9
A	URS SYSTEMS	4- 7	6 3/4	+ 5/8	+10.2
N	WYLY CORP	1- 5	4 1/8	- 5/8	-13.1

PERIPHERALS & SUBSYSTEMS

EXCH		1977-78 RANGE (1)	CLOSE JUN 14 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 25	24 1/4	0	0.0
C	ADVANCED MEMORY SYS	7- 14	13 5/8	+ 1/2	+3.8
N	AMPEX CORP	8- 17	15 7/8	- 7/8	-5.2
C	ANDERSON JACOBSON	3- 9	7 3/4	- 3/4	-8.8
N	APPLIED DIG DATA SYS	10- 20	17 1/2	+1 1/8	+6.8
O	BEEHIVE INT'L	5- 12	6 3/4	+ 5/8	+10.2
A	BOLT,BERANEK & NEW	6- 11	10	+1	+11.1
N	BUNKER-RAMO	8- 18	18 1/8	+ 1/4	+1.3
A	CALCOMP	3- 9	8	- 1/2	-5.8
C	CAMBRIDGE MEMORIES	1- 8	6 5/8	-1	-13.1
N	CENTRONICS DATA COMP	16- 30	28 1/4	+1 5/8	+6.1
C	COGNITRONICS	1- 4	4 3/8	+2 1/4	+105.8
O	COMPUTER COMMUN.	5- 10	9 3/8	+ 3/8	+4.1
C	COMPUTER CONSOLES	4- 9	8 3/4	+1	+12.9
A	COMPUTER EQUIPMENT	2- 6	5	- 1/8	-2.4
O	COMPUTER TRANSCEIVER	1- 1	1 5/8	+ 1/4	+18.1
C	COMTEN	9- 28	27	- 1/2	-1.8
N	CONRAC CORP	19- 28	23 3/8	0	0.0
C	DATA ACCESS SYSTEMS	4- 5	5 1/4	+ 3/4	+16.6
O	DATA 100	6- 17	15 1/4	- 3/8	-2.3
A	DATA PRODUCTS CORP	9- 24	23 1/4	+2 1/2	+12.0
O	DATA TECHNOLOGY	3- 4	4	0	0.0
O	DATUM INC	1- 4	4	0	0.0
C	DECISION DATA COMPUT	2- 4	4 1/4	+1 3/8	+47.8
O	DELTA DATA SYSTEMS	1- 1	5/8	+ 1/8	+25.0
A	DOCUMATION INC	6- 22	22 1/4	+3	+15.5
C	DATARAM CORP	2- 24	21 3/4	+ 1/2	+2.3
N	ELECTRONIC M & M	4- 7	6 7/8	- 1/8	-1.7
O	FABRI-TEK	1- 2	1 5/8	+ 1/4	+18.1
O	GENERAL COMPUTER SYS	0- 2	1 3/4	+ 3/8	+27.2
N	HAZELTINE CORP	8- 16	15 1/2	+1 1/4	+8.7
N	HARRIS CORP	28- 61	59 1/4	- 1/2	-0.8
C	INFOREX INC	4- 10	9 5/8	0	0.0
O	INFORMATION INTL INC	8- 14	9 1/4	+ 1/2	+5.7
O	INTEL CORP	38- 62	60	-1	-1.6
A	LUNDY ELECTRONICS	3- 6	3	0	0.0
O	MSI DATA CORP	6- 19	18	+ 1/8	+0.6
N	MEMOREX	23- 49	45 3/4	-1 1/2	-3.1
N	MOHAWK DATA SCI	5- 12	11 1/8	- 1/8	-1.1
C	PENRIL CORP	7- 9	12 1/4	+2 3/8	+24.0
N	PERTEC CORP	7- 14	11 7/8	+ 1/4	+2.1
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
C	PRECISION INST.	2- 2	2	0	0.0
C	QUANTOR CORP	3- 5	2 7/8	- 1/8	-4.1
L	RECOGNITION EQUIP	6- 12	12 1/8	+3	+32.8
C	SCAN DATA	1- 4	3 1/4	0	0.0
N	STORAGE TECHNOLOGY	10- 46	46 1/4	+7 3/4	+20.1
O	T BAR INC	7- 19	17 1/2	+1 1/2	+9.3
O	TALLY CORP.	4- 9	8 1/2	+1	+13.3
A	TEC INC	6- 10	10 1/8	+2 3/4	+37.2
N	TEKTRONIX INC	29- 45	43 3/4	- 7/8	-1.9
N	TELEX	2- 7	6 1/4	+ 3/8	+6.3
C	TESDATA SYSTEMS CP	13- 20	18 3/4	- 3/4	-3.8
O	WILTEK INC.	1- 1	1 3/8	+ 1/4	+22.2

SUPPLIES & ACCESSORIES

EXCH		1977-78 RANGE (1)	CLOSE JUN 14 1978	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 9	9	+ 5/8	+7.4
C	BALTIMORE BUS FORMS	1- 5	4 1/2	0	0.0
A	BARRY WRIGHT	10- 28	26 1/8	0	0.0
C	CYBERMATICS INC	1- 1	1 1/4	+ 1/8	+11.1
C	DUPLEX PRODUCTS INC	14- 27	26 1/8	+2 3/8	+10.0
N	ENNIS BUS. FORMS	6- 17	15 7/8	- 1/2	-3.0
N	3M COMPANY	43- 57	56 3/8	- 3/8	-0.6
O	MOORE CORP LTD	24- 37	32 3/4	- 3/4	-2.2
N	NASHUA CORP	16- 31	29	-1 3/4	-5.6
C	STANDARD REGISTER	18- 26	22 1/4	-2 1/4	-9.1
A	TAB PRODUCTS CO	5- 13	11 3/8	+ 3/8	+3.4
A	UARCO	19- 27	25	+ 5/8	+2.5
A	WABASH MAGNETICS	10- 15	13 7/8	- 3/8	-2.6
N	WALLACE BUS FORMS	17- 25	24 3/4	+ 1/8	+0.5



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Amdahl 'Assist' Package Makes MVS/SE Work on 470

By Don Leavitt
CW Staff

SUNNYVALE, Calif. — Amdahl Corp. last week introduced a software package that allows the MVS/SE operating system selectable unit (SU) — offered by IBM for its Series 30 processors — to run on Amdahl 470 systems.

Known as MVS/SE Assist, the package is the first program product for which Amdahl will charge its customers. Assist simulates many of the IBM 370 extended hardware instructions by providing software routines that perform functions identical to the machine language/microcode combination utilized by MVS/SE itself, an Amdahl spokesman explained.

Expected to be available in mid-October, Assist will run on any of the Amdahl CPUs as long as they have the operating system, the MVS/SE and other appropriate IBM-provided SUs in place, he said.

Although it appears to be the first attempt to bridge a gap between the two large-scale — and otherwise

(Continued on Page 8)

DP Crime Bill Revision Urged to Accommodate Changes in Technology

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — The computer crime bill now before Congress must be revised if it is to plug loopholes in the laws applied to computer crimes today, witnesses told the Senate Judiciary Committee's Subcommittee on Criminal Law and Procedures here last week.

Senate Bill 1776 — which would make computer-related felonies punishable by fines and jail terms — was introduced last July by Sen. Abraham Ribicoff (D-Conn.) and co-sponsored by Republicans as well as Democrats.

Despite the generally expressed need for such a law, the subcommittee, chaired by Sen. Joseph R. Biden Jr. (D-Del.), was urged to move slowly and cautiously in revising the proposed statute in order to make it less vulnerable to the rapid pace of technological change. In particular, the bill's present definitions of such terms as "computer," "computer system" and "computer network" are largely dependent on current technology and therefore tend to be unduly restrictive.

That advice came from Donn B. Parker, a senior information management consultant at SRI International, and Susan Hubbell Nycum, a member of the San Francisco law firm of

(Continued on Page 4)

Upkeep Charges Seesaw at IBM

WHITE PLAINS, N.Y. — Some users of IBM 360-age equipment had their Minimum Monthly Maintenance Charges (MMMC) raised last week while users of some 370 equipment got a reduction.

IBM announced both those increases and decreases as it juggled by 10% or less the maintenance prices on equipment that is out of production.

The 360 users got the increases: The MMMC for a 32K-byte 360/30 is now $179, up from $171; a 65K-byte 360/44 went from $332 to $365; a 512K-byte 360/65 rose from $699 to $768; and a 1M-byte 360/95, already high at $20,700, got hit with a $2,070 boost.

Also included in the increases is some peripheral equipment, such as the 2314 disk drive (from $79 to $82.50) and the 3767 Model 1 communications terminal, which increased to $45.50 from $41.50.

For 370-generation equipment, the story was the opposite. For example, the MMMC on a 512K-byte 370/135 was reduced from $971 to $874; a 512K-byte 370/145 went to $1,215, down from $1,350; a 1M-byte 370/155 was reduced to $1,690 from $1,875; and a 1M-byte 370/165 dropped from $3,110 to $2,800.

On the peripherals side, the 3330 Model 1 disk was reduced from $178 to $170 MMMC, the Model 2 went from $105 down to $100 and the 2305 Model 1 disk from $533 to $480.

U.S. Considering Funding

Global Net May Serve Third World

Special to CW

WASHINGTON, D.C. — Less developed countries (LDC) would have access to U.S. data banks with the costs of the terminal facilities and global communications links underwritten by the U.S. government under network proposals being studied by State Department officials here.

Such a move, however, would probably spark a strong response from the European and communist bloc nations, and opposition to the tentative U.S. plans may arise at the Intergovernmental Conference on Strategy and Policies for Informatics (Spin) to be held in Torremolinos, Spain, from Aug. 28 through Sept. 6.

In addition, several LDCs are also likely to oppose the program under consideration, both on privacy grounds and because the program is seen by some as a "new colonialism for the information age."

Political Issue

Furthermore, such a proposal by the U.S. would place information policy and access squarely in the political arena for the first time, European sources indicated, and make it a political football not only between the communist bloc and the West, but also between the developed and less developed nations.

While some sources expect the U.S. to make such a proposal at this summer's Spin meeting, State Department officials admitted last week that they were still "groping" with the idea and that a concrete proposal would not be ready until the United Nations Conference on Science and Technology for Development in Vienna, Austria, in the fall of 1979.

However, they did indicate that there is a "broad-based" effort under way to prepare for such proposals and admitted that LDCs are also involved in the planning for such a network so that it

(Continued on Page 6)

Downhill All the Way

By Tim Scannell
CW Staff

CHINA LAKE, Calif. — Aided by a computer-produced contour map and a pair of touring bicycles, two scientists at the Naval Weapons Center (NWC) here succeeded in traveling from the highest point in the contiguous U.S. to the lowest — in less than one day.

Edmund Schramko, a mathematician with the NWC, and Tom Kratzke, a graduate student in statistics who worked at the center last summer, began their trip last year at the 14,495-foot-high peak of nearby Mt. Whitney. The journey ended 144 miles later at Badwater in Death Valley, 278 feet below sea level.

Although the two men knew the general route they wanted to follow, they utilized a computer and a computer output microfilm (COM) recorder with plotting capability to translate statistical data into visual representations such as maps, charts and graphs. These helped them determine where to establish their "pit stops" or watering sites.

The idea of planning the bicycle trip became an actual part of the research into contour analysis mapping now under way for the military. The mapping technique, known as graphic terrain analysis, involves applying

(Continued on Page 8)

Ed Schramko pauses for refreshment on his one-day journey from the highest point in the U.S. to the lowest. The trip was mapped with the aid of a mainframe, a COM recorder and a specialized graphics software package. A CW Special Report on Computer Output Equipment follows Page 48.

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Law Expected by Summer's End

House Unit OKs $50 EFT Liability

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The House Banking Committee has unanimously approved a bill limiting customer liability in banks' electronic funds transfer (EFT) systems to $50, except in cases of fraud or negligence. The Senate Banking Committee approved a similar measure in late April.

At present, there is no federal limit on an individual's liability for unauthorized use of electronic banking facilities, although some states and some banks have set limits.

House Banking Committee Chairman Henry Reuss (D-Wis.) attributed consumers' slowness in accepting EFT to the fact that "there weren't federal laws protecting consumers from losing their life savings through fraud or some foul-up in the electronic systems." Reuss predicted the bill would become law by the end of the summer.

In addition to EFT, the legislation covers such electronic banking services as telephone bill paying, preauthorized bill payments and the direct deposit of salaries into accounts. It applies to commercial banks, mutual savings banks, savings and loan associations and credit unions.

Under the bill, the consumer would not be protected if the loss were part of a fraudulent scheme in which he participated or if he failed to notify the bank "within a reasonable time" after his EFT access card was lost or stolen.

The consumer also would not be protected if he disclosed his personal identifying number (PIN), kept it with the card or wrote it on the card.

The bill would require financial institutions to correct all bank errors within 10 days of notification under most circumstances. It would bar banks from sending unsolicited access cards to individuals unless the card required an individual's written approval in order to work.

Financial institutions would be required to disclose terms and provide transactions receipt.

Further, the bill would make an institution liable for damages to an individual that resulted from the institution's failure to make a requested electronic transaction, such as paying a bill. The institution would not be held to this provision, however, if the transaction did not occur because of "technical malfunction caused by circumstances beyond its control."

Access to Account Data

The bill would assure that information about a customer's electronic transactions could be disclosed only:

- To the account holder.
- To another person who is a party to the transfer of funds when the information is necessary to effect or correct the transfer.
- To communicate the terms and history of a credit transaction as defined in the Truth-In-Lending Act for a consumer reporting agency.
- To a person authorized by law to have access to the records of financial institutions in the course of his duties.
- Pursuant to a court order.
- Pursuant to the express written authorization of the accountholder for a particular purpose.

The bill's chief sponsor, Rep. Frank Annunzio (D.-Ill.), hailed it as "charting new waters." However, some of the bill's most controversial provisions — allowing individuals to reverse a cash transfer — was deleted in committee.

A spokesman for the American Bankers Association (ABA) said that from its point of view, only one minor problem remains with the legislation. The ABA disappoves of a provision stating that no seller may charge more for goods and services paid for by check than by EFT.

"When a financial institution charges less for an EFT transaction, it is simply a case of the financial institution passing on its savings to the consumer," the spokesman said.

Jury Still Debating Fate Of Memorex vs. IBM Case

By Catherine Arnst
CW Staff

SAN FRANCISCO — After two weeks of deliberations, the jury charged with deciding IBM's guilt or innocence in Memorex Corp.'s billion-dollar antitrust lawsuit against the firm still has not reached a verdict.

The six women and five men have been sitting from 9 a.m. to 5:30 p.m. with a 15-minute break each day since June 8 [CW, June 19], and apparently they have spent most of that time going over the 20,000-page transcript accumulated in the five months of trial.

At the start of the deliberations, the jury made a request for a blackboard, which was granted, and a dictionary, which was denied.

Early last week the jury asked its first question, which concerned Judge Samuel Conti's instruction about determining the intent of a firm to monopolize an industry. Intent is at the heart of the second hurdle the jury must cross to reach a decision, according to Conti's instructions, and the question could signify that jury members are halfway to making a decision.

However, the jury foreman did say members of the jury had reached very few agreements so far when Conti asked for a progress report June 19. He added that they are moving "very slowly," implying it would be a minimum of another five days before any verdict could be expected.

Memorex is suing IBM for $306,580,000 on grounds it monopolized the computer industry. If Memorex wins, any damages the jury awards it will be tripled.

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—Kenneth J. Panzarella, Vice President
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Students' Conviction for Theft Held Unlikely

By Brad Schultz
CW Staff

TORONTO — The three former University of Alberta (UA) students who stand accused of "stealing" telecommunications services for allegedly setting up unauthorized computer accounts on a university computer system will probably not be convicted, according to Canadian computer law expert Daniel Cooper.

Section 287 of the Canadian federal criminal code, under which they have been charged, is addressed to the "theft of telecommunications services" and has never before been used to prosecute cases of alleged computer abuse, Cooper indicated.

The "mischief" charge, brought under Section 387 of the code, is a vaguely defined term which can only apply in this matter if computer time can be considered "property," Cooper explained.

Section 287 defines telecommunications as "any transmission, emission or reception of signs, signals, writing, images, sounds or intelligence of any nature by radio, visual, electronic or other electromagnetic system."

Theft of telecommunications occurs, according to 287, when anyone "fraudulently, maliciously or without color of right abstracts, consumes or uses electricity or gas, or causes it to be wasted or diverted, or uses any telecommunications facility or obtains any telecommunications service."

'Stealing' Telecommunications

If the defendants used CRTs linked via phone lines to the Amdahl 470 in the course of their alleged access, then under 287 they have "stolen" telecommunications, according to the Toronto attorney.

"But that is hardly the relevant part of what they did," Cooper said, adding "the value of the transmission facility [or telephone medium] would have been less than $200, which makes them punishable only by summary conviction.

"I don't think that 'stealing time' is really caught by this section . . . The intent [of 287] is to help Bell Canada and the other telecommunications carriers with 'blue box' setups," he said. "Blue boxes" are devices used to operate telephones in a clandestine manner to avoid billing.

"I think there is only a very remote possibility that they will be convicted under that section," Cooper said.

Under Section 387, anyone commits "mischief" who "willfully destroys or damages property; renders property dangerous, useless, inoperative or ineffective; obstructs, interrupts or interferes with the lawful use, enjoyment or operation of property; or obstructs, interrupts or interferes with any persons in the lawful use, enjoyment or operation of property."

"Our jurisprudence is not terribly clear on what 'property' means, but it would probably have to be something fairly tangible," Cooper said, adding "computer time per se would probably not be property unless the judge were awfully creative."

Cooper indicated that other criminal code sections might have been applied in this case — such as 338, the fraud section, or 361, which addresses impersonation.

However, these alternatives may have been rejected by the prosecution since the UA abuse did not involve embezzlement or misuse of an account under the name of some innocent party, he speculated.

"My personal opinion has been that the theft of computer time alone is not a crime, unfortunately," Cooper said.

The trial will apparently focus not on what the students allegedly did but on what to *call* what they did, Cooper indicated, adding their intent — purportedly "playing" rather than making money — seems of little import in view of the law cited by the prosecution.

Intent has in the past been a critical factor in deciding some Canadian computer abuse cases involving unauthorized disclosure of confidential data [CW, May 29].

Computer law experts agree the trial of the three ex-students, slated to begin in Edmonton, Alberta, this December, will set a precedent in Canadian law. The trial may also show that the law as it now stands cannot handle most kinds of computer abuse in Canada and may suggest similar inadequacies in U.S. jurisprudence as well.

Senate Urged to Revise DP Crime Bill

(Continued from Page 1)

Chickering & Gregory.

S. 1766 also needs much exposure in order to give those in the computer field time to alter many of their current practices and to give the judicial system the opportunity to prepare for enforcement and prosecution of cases under a computer crime law, Parker said.

If S. 1766 were passed by Congress in the near future, it would make criminals of many honest and dedicated computer personnel, he stated. Anyone in the field who follows the common practice of making unauthorized use of computers for such activities as playing games, printing Snoopy calendars, calculating bowling scores and maintaining church mailing lists could be charged with a felony under the law as it is currently drafted, Parker warned.

These acts would no longer be ethical issues, winked at by management, but federal crimes punishable by up to 15 years in prison and $50,000 in fines, the consultant said.

Another time-honored practice that will be unacceptable should this bill become law, he added, is the belief of many programmers that as the authors of their programs, they have the right to trade, give away or make personal use of those programs even though their employers' resources were used in their development.

"These concepts and practices ingrained in the computer field will have to be drastically and quickly changed to ensure that the proposed law will start its life with respect and in an absence of gross and pervasive violation," Parker stated. "This will require a period of time for intensive exposure of the concepts in this bill in trade literature, professional society and trade association meetings, discussions and debates to swing practice in line with proposed law."

Licensing Opposed

Both Parker and Nycum, his co-investigator in a now eight-year-old National Science Foundation effort to study computer crime, expressed their hope that the proposed law will not lead too rapidly to the development of licensing and certification for computer systems or practitioners.

"I am totally opposed to [licensing and certification] at this tme due to the lack of standards in this new and radically changing industry and discipline," Nycum told the subcommittee.

From a strictly academic analysis of existing federal laws used in the past to prosecute computer crimes, Nycum believes most unauthorized acts against or involving computers are already illegal. But what is theoretically possible isn't always practical for a prosecuting or defense attorney faced with applying federal laws against wire and mail fraud to a case filled with new and complex technological facts, she said.

While legislation that would make certain actions involving computers a crime is "very desirable" at the federal level, such laws are "very necessary" in the states, particularly in cases involving the theft of computer programs or the misappropriation of computer time — cases in which it is difficult to prove that something "tangible" has been stolen or misused, Nycum added.

The attorney identified a number of cases that the bill, as it is presently worded, would not cover. Among these are civil rights and discrimination cases in which, for example, a computer program is used to screen out minorities and those instances where information, data or programs are taken but not used.

Law Enforcement Fear

For its part, the law enforcement community, represented at the hearings by the Department of Justice and the Federal Bureau of Investigation, supports the Ribicoff legislation as a powerful investigation tool that will see much use in efforts to combat sophisticated white-collar crime, but fears that the proposed law would cover violations of nearly every computer system in the country.

"It would be impossible for the FBI, armed with this legislation, to enter the field of computer fraud in a wholesale fashion with our current investigative resources," according to special agent Joseph F. Henehan, chief of the FBI's white-collar crime section in its Criminal Investigative Division. Even with an increase in resources to go after computer-related crimes, close cooperation with and help from state and local authorities would be required to guard against duplication of effort and failure to investigate a case.

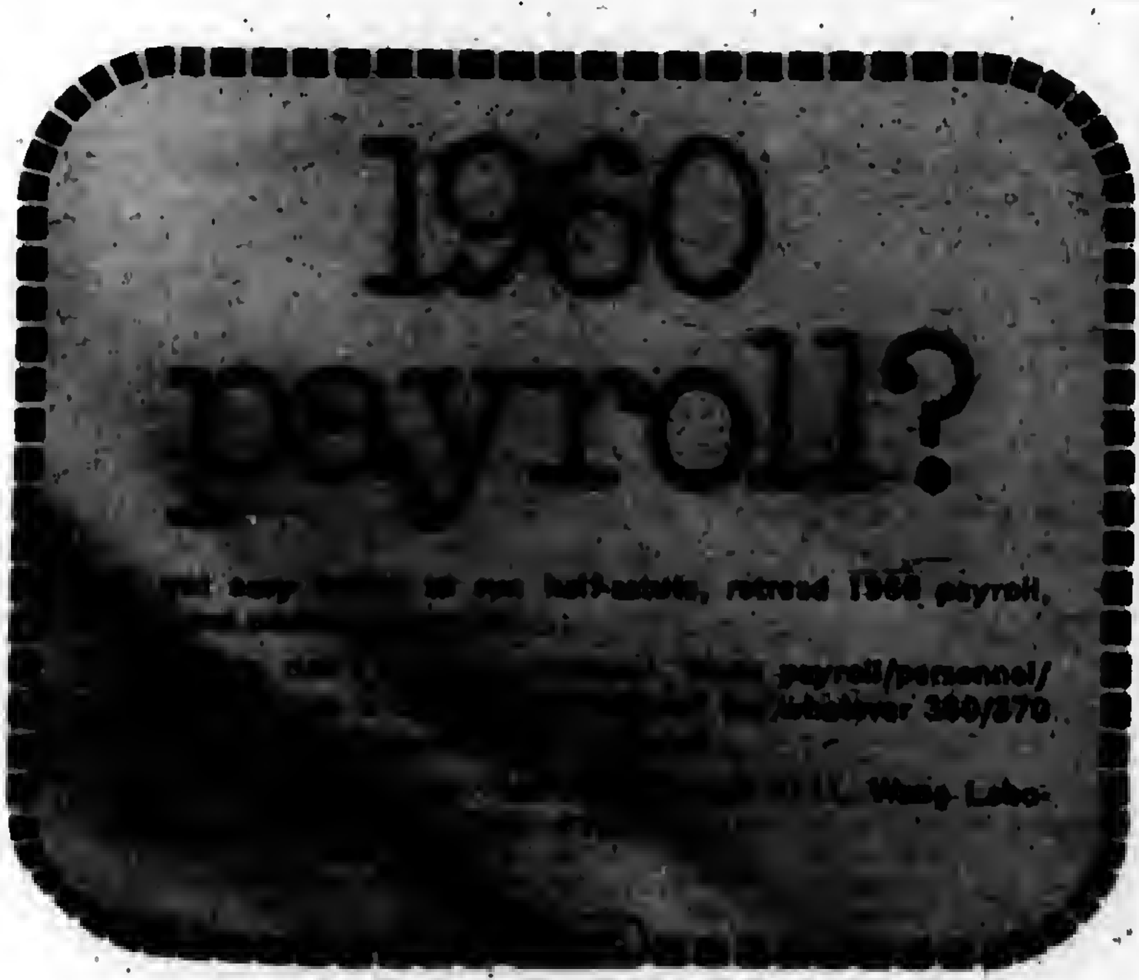
Training Problem

The FBI would also be faced with a serious training challenge, given the need for technical expertise in handling computer fraud matters, Henehan added.

Similarly, John C. Keeney, acting assistant attorney general for the Justice Department's Criminal Division, said the department "has no interest in prosecuting every computer fraud and abuse case occurring in the U.S."

But the Justice Department does believe federal jurisdiction in computer crime matters should be 'broad' and concurrent with state authority, Keeney said. Without "a compelling federal interest," the department would defer most investigations and prosecutions of computer crimes to the states and localities, he suggested.

While no less than 40 federal statutes can be applied to such crimes — not one of which was designed with computer-related fraud and abuse in mind — their success in a courtroom is particularly uncertain, Keeney stated. "In our view, a specific statute would achieve a greater deterrent effect than existing criminal statutes which may, through strained interpretations, be available for prosecution purposes," he said.



May Not Cover Computer Abuse

DP Service Theft Case to Test Canadian Code

By Brad Schultz
CW Staff

EDMONTON, Alta. — Canadians may discover their criminal code does not apply to most computer abuse cases when three former University of Alberta (UA) students stand trial here in December for allegedly issuing themselves unauthorized accounts on the main UA computer system.

The three have been charged with stealing "telecommunications services" — a federal offense — for allegedly accessing UA's Amdahl Corp. 470V/6 mainframe through CRT terminals linked over telephone lines.

Canada's criminal code has no section devoted to computer abuse, except in the area of privacy law. In handling most computer-abuse cases, Crown prosecutors must therefore apply such broadly stated sections as those that pertain to "theft" of telecommunications services, fraud and even misuse of energy resources.

So, while the three face possible 10-year prison terms, a number of legal experts consider conviction unlikely, largely because they doubt current Canadian law applies to the case — at least in the way it is being interpreted by the Canadian Attorney General's office. But none doubt the case will set a precedent in that nation's jurisprudence, whatever the outcome.

The defendants are charged with theft of telecommunications services under a criminal code section written, in the opinion of informed sources, to deter use of a telephone in a way that precludes billing. They are also charged, under another section, with "mischief," which is defined as interference with "the lawful use, enjoyment or operation of property."

Early last year, the three "bypassed the normal protection mechanisms" on the university's 470 in order to "play with it," according to UA computing service professor, Anthony Marsland, who knows all three individuals.

"They weren't selling their time or their knowledge on the side, or anything like that, but they were, in the last stages [of their activity], interfering with the operation of the computer," Marsland said.

The level of security on the 470-driven Michigan Terminal System (MTS) at UA — the "workhorse of the campus" with about 200 terminals connected — was especially low at the time.

Techniques Well-Known

Intrusion techniques were common knowledge among a number of UA students, having been developed by undergraduate and graduate computing science majors as faculty-approved projects, Marsland continued.

The three individuals who are now defendants — one a full-time engineering major, since graduated, and the other two part-time "fringe" students — derived a rough sense of these techniques from conversations with computing science students and succeeded in applying them through a process of experimentation, he said.

They logged on in a normal way, gave themselves a privileged status on the system and reserved portions of memory for their own use, Marsland said, adding they were able to give themselves unissued accounts on the system by altering its accounting records.

Since UA grade transcripts are stored on a separate computer system, the possibility of changing such records could not even have been considered by the students, he indicated.

A number of security breaches have been detected at UA's MTS since 1976, and at the time of this particular alleged abuse a "loop protection mechanism" was already on order. It was installed last January, Marsland said.

Considered similar to an installation at Rensselaer Polytechnic Institute in Troy, N.Y., UA's MTS features about 5M bytes of memory, IBM 3350 disk units, a high-speed paging drum and a "large number" of magnetic tape drives, he noted.

Attempted Violations

Ironically enough, some of Marsland's "most promising" students have been trying to violate the new protection in order to better understand it. Although setting up unauthorized accounts is forbidden, UA's computing science faculty views student attempts at simply penetrating system security as an expedient in trying to understand the nature of data base software.

"Really, I am concerned with ensuring that computer systems are as secure as possible. And one way to do that is to determine what [their] weaknesses and deficiencies are," Marsland said.

The matter at hand is not properly a judicial concern and it is not clear whether the facilities involved may truly be called "telecommunications," Marsland observed.

The defendants "would certainly deserve having the book thrown at them" if they had been motivated by monetary profit in their alleged activities, he declared, but said that since this was not the case, any punitive action against the individuals should only be decided by university officials.

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International Data at Issue

Informatics Meet Promises Hot Political Debate

TORREMOLINOS, Spain — The 10-day Intergovernmental Conference on Strategy and Policies for Informatics (Spin) promises to be one of the most political computer-related meetings of this year when it gets underway Aug. 28 [CW, April 17].

Jointly organized by the Intergovernmental Bureau for Informatics (IBI), based in Rome, the United Nations Educational, Scientific and Cultural Organization (Unesco) and the Spanish government, the meeting is expected to draw delegations from more than 80 countries both to the sunny beaches and to the hot political debates.

Less developed countires (LDC) will be heavily represented. More than 100 of these nations banded together at the UN Committee for Technical Assistance and Development (Unctad) meeting in Nairobi 18 months ago to demand more access to information held by the industrialized nations and they are sure to press those demands here.

The major Western power in the IBI organization that is putting the conference together is France, and other members include Algeria, Argentina, Bolivia, Brazil, Cameroon, Chile, Cuba, Equator (formerly French Equatorial Africa), Spain, Gabon, Ghana, Iraq, Iran, Israel, Italy, Jordan, the Malagasy Republic, Morocco, Mexico, Nigeria, Senegal, Swaziland, Tunisia and Zaire.

The U.S. is not a member — because "we don't support the pretensions of the organization," according to the State Department — but will send a "small" delegation to the conference and will present a paper on how three U.S. states have implemented computers and information systems.

Because of the heavy LDC orientation of the conference, there is expected to be a hot debate over the access to information in Western data banks, sources indicate, and conflicts between the less and more developed countries over information policy are expected to dominate the meeting.

A preview of such debates will take place within IBI itself in July when the contract of the present director-general, Fermin A. Bernasconi, comes up for renewal. While he is backed by the French — who contribute 30% of the IBI budget — there will be two other candidates for the job, one backed by the South American members and another backed by the Middle Eastern countries, led by Marxist-oriented Iraq.

Either of these candidates would be expected to take the organization into an anti-American stance, sources indicated, adding, however, that France can probably round up the votes for its candidate.

For the conference, the IBI General Assembly has set the following topics for consideration:

- Accelerating the transfer and application of computer/communications technology to developing countries.
- Initiating programs in all countries for indigenous capabilities in information resources.
- Encouraging developing countries to take a more active role in formulating international data transmission policies.
- Integrating informatics with major national educational, industrial, communications and social policies.
- Recognizing the power of informatics in affecting national sovereignty and democratic control over the destinies of nations.

The conference may come out with an agenda for the establishment of a new world information order, and at least one U.S. executive has predicted that "if there is an information war coming, some of the first volleys may be fired" at the meeting here.

U.S.-Funded Net Would Serve LDCs

(Continued from Page 1)

might be a hot topic of conversation at this summer's LDC-dominated Spin meetings.

Satellite Network

Under the proposal, a worldwide satellite network might be established to provide high-volume, low-cost information links between the LDCs and the U.S., State Department officials said. A variation of this proposal would include regional networks, possibly in Latin America or Africa, linked separately to the U.S.

Either plan would be subsidized by the U.S.

In the LDCs themselves, the U.S. would also subsidize terminal facilities, probably located either in the U.S. Information Agency offices in those countries or in the government agencies making the most use of the services, according to proposals under consideration.

Furthermore, the government would subsidize access to the publicly available data bases in the U.S. and would maintain catalogs of data base material available from U.S. private sources.

However, the government would not subsidize the use of these private files by LDCs, instead leaving it to the country in question to work out a contract with the private firms involved.

Barriers to Effective Use

The U.S. government is "very much interested" in helping LDCs gain access to information in U.S. data bases, one official said, but he noted several problems that need to be overcome before that information can be used effectively.

This story was developed by Rex Malik, a British freelance journalist in London, and E. Drake Lundell Jr. of the CW staff in the U.S.

Along with this, there is a great need for training of personnel in the LDCs, he added.

To date, the U.S. has been working to help fill these needs primarily through UN organizations, he said.

On the UN Secretariat level, for example, the U.S. has sponsored a proposal for a technical information exchange network.

Furthermore, there is an Industry, Technology and Information Bureau in the UN Industrial Development Organization (Unido) which is sponsoring a four-pronged, 18-month to two-year project in training LDCs to use existing data bases and exploring ways to tailor those data bases more to the needs of the LDCs.

Controversy Likely

However, when and if the U.S. makes its formal offer to underwrite the communications and terminal costs for such a system, the sparks are sure to fly.

Europeans are increasingly concerned about data that is flowing out of their countries and into U.S. data banks and many countries are currently studying ways to slow this transborder data flow, particularly in the area of information about private citizens.

Most European governments would not sit idly by and watch the U.S. in turn spread this information around the world, some Western European sources indicated.

In addition, the European governments would oppose such an idea on the grounds that it would lock the users in the developing countries into U.S. data bases and technology, thereby foreclosing that opportunity to Western European computer firms and data base suppliers, which are largely government supported.

Communist Bloc Reaction

Furthermore, the reaction from the communist bloc countries could also be expected to be negative, sources said, since they might see the move as an attempt to politically influence the LDCs in favor of the West.

In particular, some Third World countries, LDCs themselves, may charge that the U.S. proposal is a new form of economic imperialism designed to overwhelm the LDCs and their cultures.

Other LDCs that might favor the proposal in general might oppose some of its specifics, a U.S. source said. For example, the U.S. has developed large data bases on the resources of developing nations based on information gathered via remote sensing satellites, he said.

Already some of these countries have demanded that the U.S. turn such data over to them and that its dissemination to others be restricted, a State Department official said.

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Picks Promising Land Parcels

Service Lowers Odds in Federal Oil Lottery

By Tim Scannell
CW Staff

BEDFORD, Mass. — Each month, thousands of Americans, enticed by visions of financial independence, pay $10 for a ticket in a government-operated lottery whose prizes could eventually net the winner more than $100,000.

The raffle is conducted by the Department of Interior's Bureau of Land Managmeent (BLM) and the prizes consist of oil and gas lease rights to federally owned land in the Rocky Mountain states. The BLM offers about 600 to 700 parcels of land every month and sells an average of approximately 2,400,000 tickets to hopeful participants each year.

Initiated in 1960, the lottery has given birth to several firms which, for a fee, will file a client's application and provide various services that might theoretically lower the odds against a participant. These services include obtaining the government's parcel list and procuring accurate geological reports.

One such company, Petrodata, Inc., uses two Digital Equipment Corp. PDP-11s to process and correlate the reams of data to isolate desirable parcels. The object of entering the lottery, according to Charles Adams, president of the firm, is not only to win a tract of land, but to win one containing a deposit of either gas or oil.

Petrodata was founded by Adams in 1974 and has been used principally by him and his family for personal speculation and parcel selection. "We started with the idea of looking for some clients, but we didn't actually begin actively soliciting them until a few months ago," he said.

"We're primarily interested in people who want to file a fair number of applications," Adams continued. "Somebody who wants to file a few cards a month has to think of it as strictly a lottery in which the chances of winning are not very high. However, people who are able to file 30, 50 or 100 or more per month can expect to win a drawing more often and can consider it more of an investment than a lottery-type gamble," he stated.

Winners in the federal contest are issued leases for each of the plots of land. The person pays the government a fee, usually $1 an acre per year, and can hold the land for up to 10 years without starting any production or drilling activity, Adams said. After that time, the land reverts back to the lottery and the system repeats itself.

If, however, a speculator decides to drill on the winner's land, that person can retain the lease as long as there is commercial production going on.

Oil companies are usually interested in about one-fourth of the raffled parcels and, depending on their proximity to producing wells, will offer the lottery winners anywhere from $3,000 to $100,000 to obtain the drilling rights.

In addition to receiving payment from the oil or gas companies for the right to drill on a particular parcel of land, the winner is also entitled to royalties on any oil produced during exploration. Adams himself has been getting $1,500 a month in payments from an oil company that has been leasing one of his plots since 1975.

The popularity of the government lotteries has increased over the years, Adams claimed, especially since the oil and gas companies have exhibited more interest in exploratory drilling. "Some of the parcels are so unpromising that they draw none or very, very few applicants," he pointed out, "while a few of them are so popular that they draw as many as 8,600 applicants."

That is why Adams, a former adviser on DP for Exxon Corp.'s Creole Petroleum Corp., believes it is important to consider such things as geological surveys and the number of drillings that have produced oil or gas. Without such information, which is public record, the odds against winning a desirable parcel are increased, Adams noted.

PDP-11s After Hours

The system is composed of two PDP-11s made available after hours by the Data Syntecks Corp., of which Adams is president. The configuration is used to compile all of the available information on each parcel offered by the BLM as well as the drilling and geological data, Adams explained.

The systems are also used by Adams to predict how many cards will be bought on each tract and how much the oil companies might be willing to pay the winner for the drilling rights.

Although the PDP-11s' assistance helps to considerably lower the odds against the participant, Adams admitted that "you still tend to fly somewhat blind" in making selections. "There's no way of exactly knowing how much each parcel sold for or how many applicants each one drew," he noted. "Therefore, you can't see if you've picked the best ones" from the total number listed by the BLM.

There is, however, no guarantee that an oil company will buy the rights to a winner's tract of land. Drilling for oil is "a highly speculative, entrepreneurial area in general," Adams noted. "It costs anywhere from $100,000 to $1 million for someone just to drill the hole."

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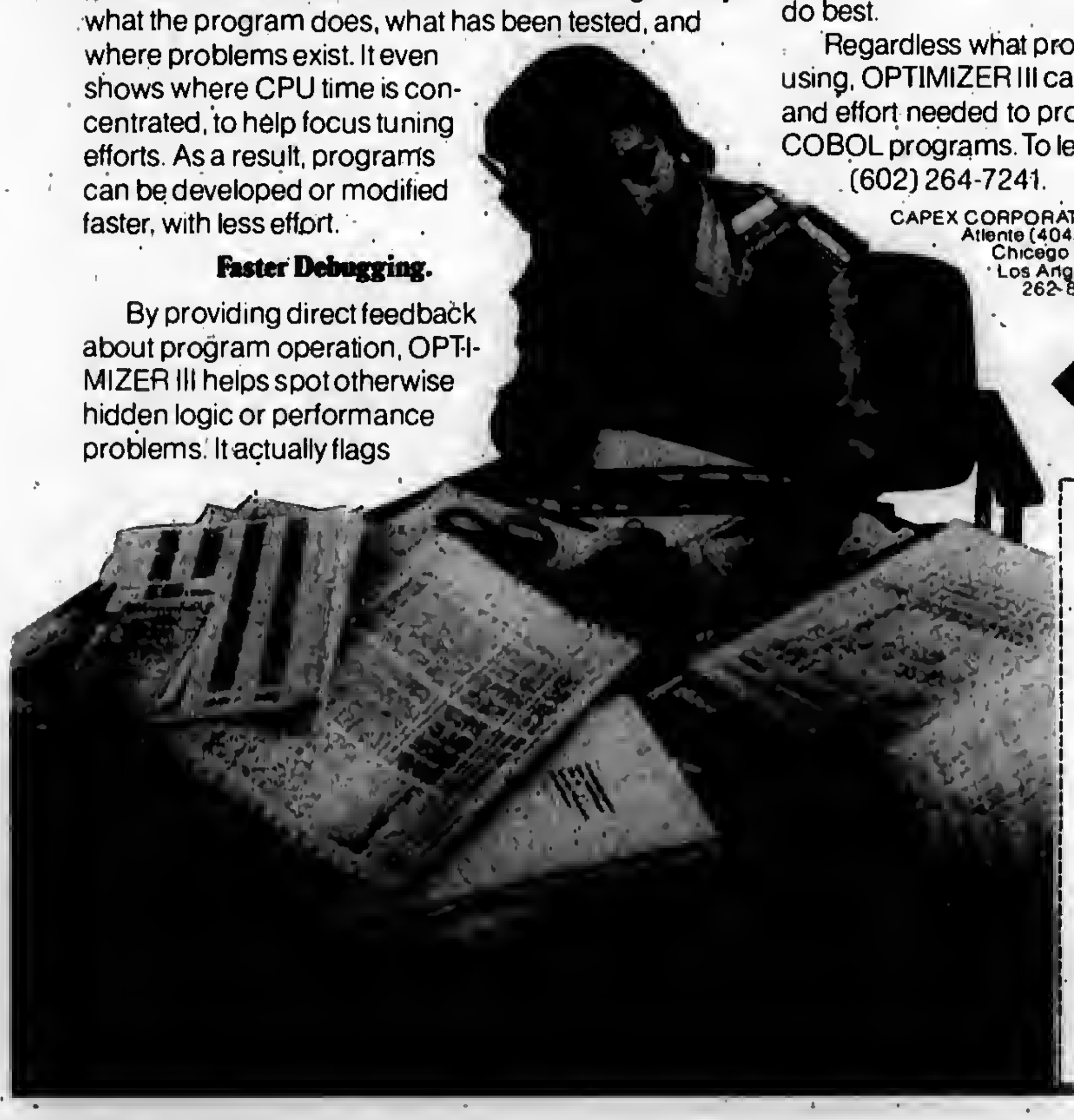


More Americans Fearing Loss of Privacy

NEW YORK — Seventy-one percent of Americans believe they "begin surrendering their privacy the day they open their first charge account, take out a loan, buy something on the installment plan or apply for a credit card," a recent Harris Survey found.

Sixty-seven percent felt that way last year [CW, May 2, 1977] and 48% in 1974.

A 61% majority said it believes "the Internal Revenue Service is not keeping individual tax returns confidential," and 62% called this practice a "very serious" invasion of privacy.

"Credit businesses are selling information about an individual's credit standing," 79% believe, and 60% see this as a "very serious" invasion of privacy.

Wiretapping and electronic surveillance were of even greater concern, according to the Harris Survey of 1,458 U.S. adults. Of those surveyed, 85% believe "illegal wiretapping and other forms of electronic surveillance" are "probably" or "surely" going on in America today, and 82% see this as "very serious."

Other "invasions of privacy" American believe are now quite common include unsolicited phone calls selling products or services, unsolicited mail advertising products or services, personal questions by banks and loan companies in connection with loan applications and the use of the Social Security number as an identifier on various records.

Amdahl 'Assist' Package Puts MVS/SE Work on 470

(Continued from Page 1)

compatible — processor series, Amdahl's Assist is comparable in function to packages available from several IBM 360 leasing companies that allow those older machines to accept and work with standard IBM 370 instructions.

Introduced by IBM when the 3033 was announced in April 1977, MVS/-SE — the "SE" stands for "System Extension" — has been described as providing significant enhancements to MVS systems by implementing several frequently used system routines in firmware. Without this SU, the MVS operating system cannot take advantage of the enhancement features built into the 30 series processors, according to one industry source.

In one test situation, the throughput of an Amdahl 470 running with IBM's MVS/SE and Amdahl's Assist was substantially better than the throughput of a 470 using IBM's "standard" OS/MVS, but not quite up to the performance of MVS/SE running on an IBM Series 30 CPU, the IBM competitor acknowledged.

In the same test, supervisor state execution was similarly reduced on the Amdahl setting with Assist, but not to the extent it dropped when MVS/SE was used in its native Series 30 environment, the Amdahl spokesman said.

MVS/SE Assist is activated when an IBM 370 extended instruction is executed on a 470. An operation exception program check is intercepted by an MVS/SE Assist routine in front of the program check first-level interrupt handler and the Program Status Word (PSW) is analyzed to determine what operation has been requested.

MVS/SE normally replaces the interrupted instruction with a branch to an appropriate simulation routine, leaving the branch in place to avoid further program check interruption overhead, Amdahl said.

No Changes Needed

No changes in 470 hardware, in existing MVS/SE instructions or in any uther programming are required to enable users to make a smooth transition to the MVS/SE environment on the Amdahl equipment, the spokesman said.

The Assist software is added to an MVS/SE system by performing a linkage edit of the system control program nucleus; no external operating considerations, turning parameters or linkage interfaces are involved, he noted.

MVS/SE Assist routines nccupy about 1,500 bytes in the MVS nucleus, he added.

In a benchmark reported by Amdahl, the measured environment was a commercial batch jobstream running concurrently with 48 simulated, active users of IBM's Time Sharing Option (TSO); OS/MVS Release 3.7 was on an 470V/6-II with 8M bytes of real memory. All required MVS SUs were installed, including MVS/SE and RMF-11, the spokesman continued.

With IBM's Trace routine on, MVS/-SE Assist provided a 13% reduction in supervisor state execution. System throughput capacity increased by 12%.

With Trace off, MVS/SE Assist provided an 11% reduction in supervisor state execution and a system throughput increase of 10%, he claimed.

Actual performance will vary with customer environment and system workload, the spokesman noted, adding that the performance improvements provided were meant simply as a "reasonable reference point."

IBM has released performance information on MVS/SE stating that the addition of the SU reduced supervisor state execution time by 20% to 27%, and improved uniprocessor throughput by 14% to 17%, apparently on a 3033 processor.

Amdahl's MVS/SE Assist will carry a monthly license fee of $250. The basic MVS/SE SU costs another $1,250/mo from IBM.

Amdahl is at 1250 E. Arques Ave., Sunnyvale, Calif.

Map Helps Cyclists Make Milestone Trip

(Continued from Page 1)

mathematics to a specific area when the altitudes of the terrain within that area are known, Schramko explained.

Cross-Section Produced

The computer uses this information to produce a cross-section of the ground contour in terms of altitude and distance. This data is then used to select impact and measuring-point locations for missile test firings so any point in the area, regardless of the altitude, is observable from at least one of the monitoring locations.

The computer and COM unit basically solve the problem of "where you put the explosion based on the fact that you only have a limited number of observation sites," Schramko said. Theoretically, if a straight line can be connected to two points along a plotted line without intersecting the contour line between the two points on the graph, the two points should be visible to each other by line-of-sight, he added.

Schramko used a Univac 1110 mainframe at NWC, and an Information International, Inc. Comp-80 COM recorder to produce the maps for his cycling expedition. The Comp-80 was under the control of a specialized graphics package Disspla, developed by Integrated Software Systems Corp. The software enabled the scientists to transform statistical data from a series of numbers into readable charts and graphs.

Input Modified

In order to be processed by the CPU, the data that was input had to be modified to include some known cycling parameters. For instance, Schramko established through experimentation in earlier trips that approximately one pint of water is required for a cyclist to travel about 28 miles along gently rolling desert terrain. If the terrain has an uphill grade of 8%, for example, the distance the cyclist can travel using one pint of water drops significantly, to about three miles.

With this information, the computer was able to schedule water stops for the trip according to the grades which would be encountered along the route. Since many of the stops did not coincide with water sources, water had to be left at the computer-selected stops in advance of the riders.

'Nnthing Arbitrary'

"There is nothing really arbitrary that goes into the computer," Schramko pointed out. "It's digitized map information and that's all. Everything on the map is calculated and based on the digitized distance from starting point and elevation, and those are the only input to the program."

Besides mapping distance and contours, Schramko pointed to other uses for the COM unit and specialized software. "For instance, we are presently drilling for geothermal steam here at the NWC to be used as a source of energy. We've taken a lot of readings and would like to plot those readings against such variables as distance and area.

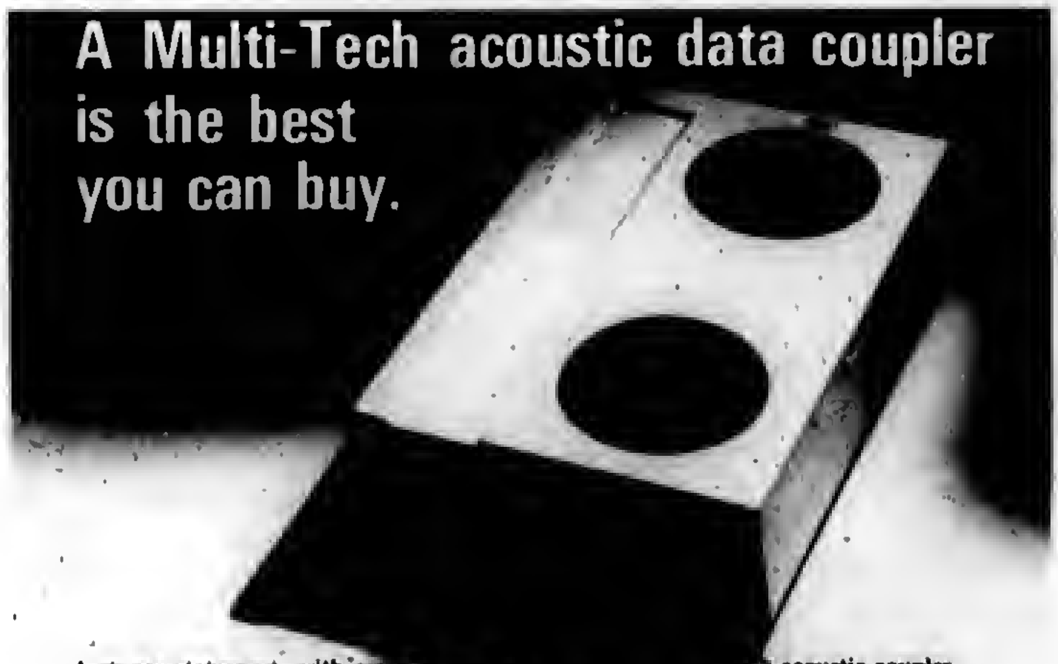
"Eventually, we'd like to get a graphic contour of the earth's temperature, 100 feet below the surface level," he said.

Map Available

The map produced by the computer for Schramko's expedition was made available to cyclists who last month participated in a two-day, 99-mile race sanctioned by the U.S. Cycling Federation. The event, which involved traveling over part of the route traversed by Schramko and Kratzke, covered approximately 100 miles from the northern boundary of Death Valley to a campground at the Mt. Whitney Portal.

Although Schramko's cycling trip did have a scientific purpose — to debug and verify the accuracy of the computer output — the primary motivation was a personal desire for accomplishment. "The trip was undertaken just to see if it could be done," Schramko remarked.

If anyone else wants to see if it can be done, the map is available from the Lone Pine Chamber of Commerce, P.O. Box 552, Lone Pine, Calif. 93545.



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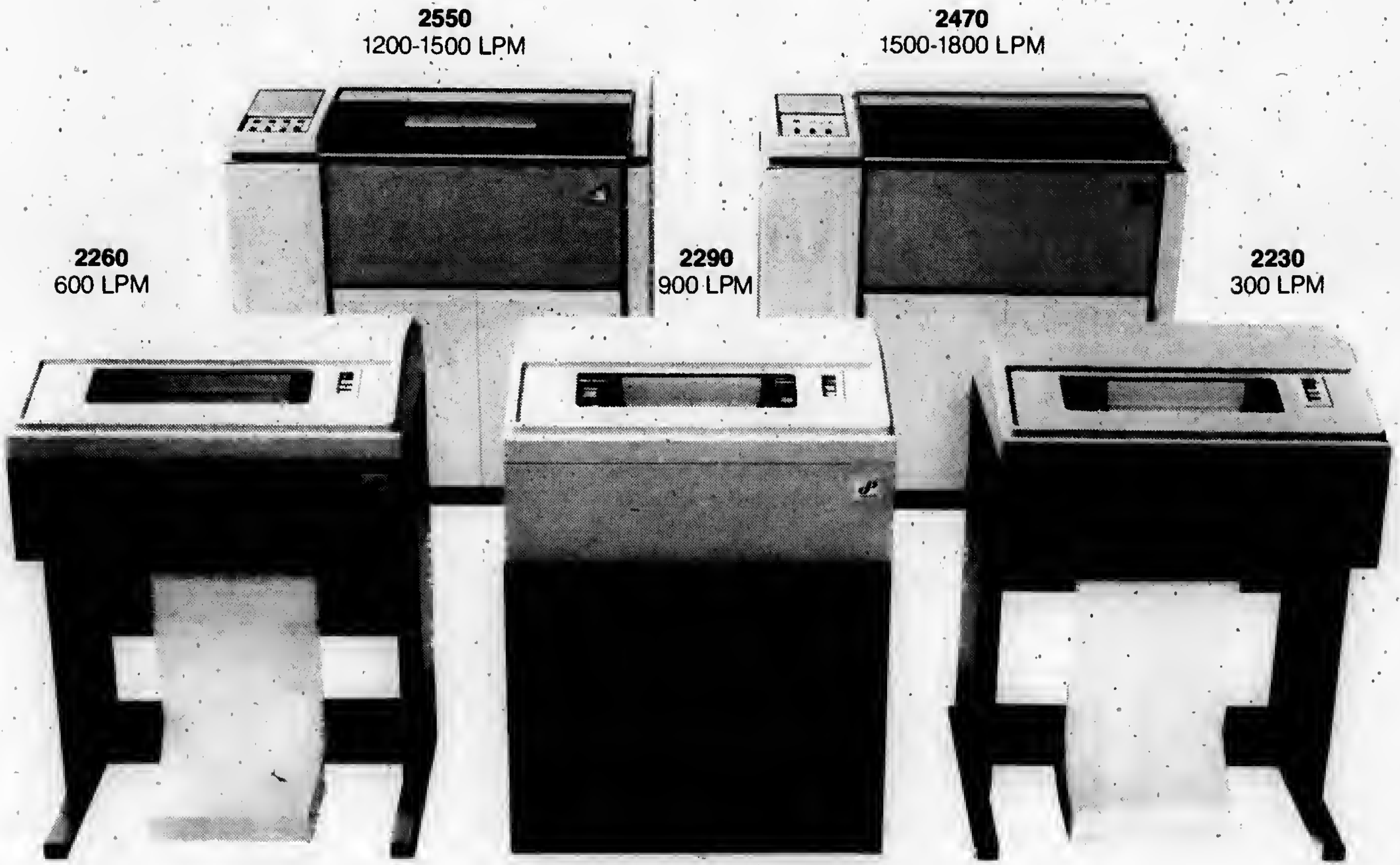

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Professor Looks at EFT and 'Quality of Life'

By a CW Staff Writer

ANAHEIM, Calif. — How will electronic funds transfer systems now under development affect the "quality of life"?

This question was addressed at a recent conference here by Dr. Rob Kling, assistant professor of information and computer sciences at the University of California at Irvine.

According to Kling, who based most of his presentation on a study performed by E. Gerson in 1976, the quality of life for an individual depends on his relative power in the social setting in which he functions as well as his relative social resources and satisfactions.

In order to consider the influences of alternative EFT arrangements upon the quality of social and institutional life, Kling examined their effect on six different aspects of social settings, including opportunities; ecology, or the extent to which EFT saves or consumes nonrenewable resources; and coordination, or the extent to which EFT affects the ease with which an individual can manage his activities in all settings.

Kling also looked at intelligibility — or the extent to which participants can understand social, organizational or technical arrangements; dependency, the extent to which one can live without EFT should it "fail" us; and agency, the extent to which someone can influence the social, organizational or technical arrangements in force.

Increased Opportunity

Kling noted that increases in "opportunity" are the raison d'etre of EFT. However, while EFT may bring financial services to people who otherwise wouldn't have them, EFT could also make possible "abusive surveillance and harassment" of unpopular political groups, for example.

In discussing "intelligibility," Kling noted that EFT can simplify or complicate specific transactions and financial contracts and can alter the demands made upon people to understand available products. "EFT systems become less coherent as they increase in versatility, scale and the extent to which they are coupled," Kling said.

To the extent that EFT systems replace current means of payment, Kling said, they will become more and more likely to entail hardship if they fail, as when power failed in the Northeast in 1965. In general, the larger the scale, versatility and accessibility, and the less costly EFT becomes, the more likely we are to depend on it, he said.

EFT systems can influence the control of either individuals or EFT-using institutions, Kling said. "While it may be easy to dicker credit with a small shop owner, EFT accessed through large institutions means one loses control over his financial arrangements," he said. Additionally, proposals for EFT systems usually neglect such things as stop-payment mechanisms that exist in current checking systems.

In the area of "ecology," Kling noted that some current EFT arrangements are used by banks to increase the volume of financial transactions. Ironically, a side effect of some "paperless" EFT systems is a net increase in the amount of paper flowing through the banking system, Kling said. Also, rising energy prices may shift the relative attractiveness of EFT services to traditional alternatives.

Requires Less Effort

Discussing "coordination," Kling said that in general, "people can spend less effort coordinating their lives in a society that depends on a large variety of EFT-related services to the extent that they lead to greater intelligibility, control and less dependency for people."

Kling concluded by listing areas needing further study. He said the market structure of firms using and providing EFT systems should be examined to determine which systems foster increased concentration among a few firms and which support a diverse array of small businesses. Important social costs should be identified and ways should be developed to internalize them into pricing schemes for EFT systems.

If social costs cannot be internalized into EFT pricing, he said, the industry should determine how to best inform the public about what they are: It should examine the structural role of consumers relative to EFT-providing institutions. It should understand which EFT arrangements are most consistent with a low-growth, rather than high-growth, economy, he said.

Finally, he urged that the industry learn how to develop EFT technologies so they are easy to roll back, if necessary, without major social upset.

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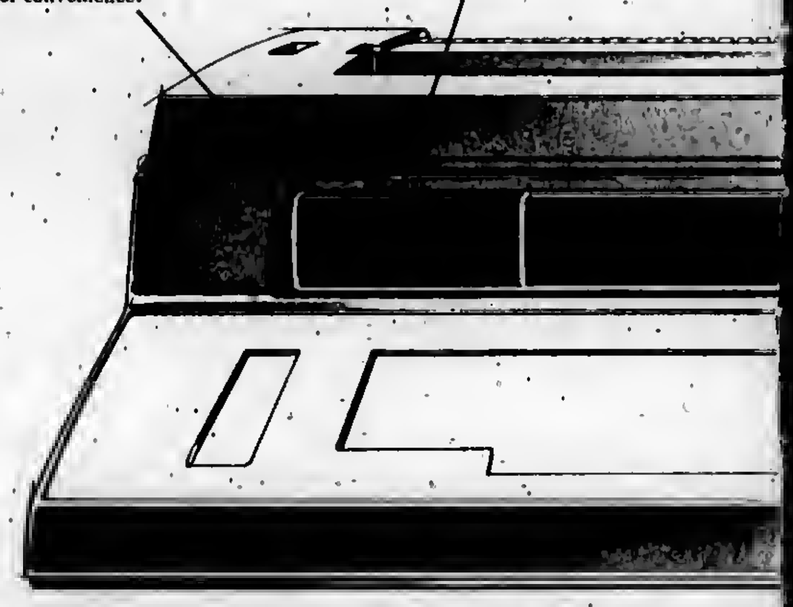
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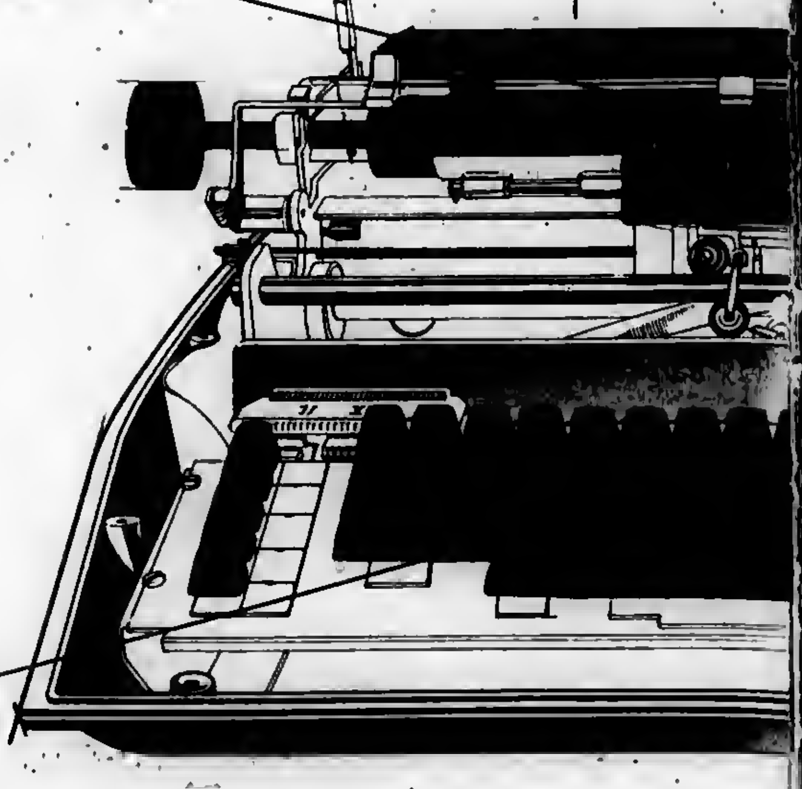
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Replacement Gear Not Covered

Many Lessees Underinsured, Report Cautions

By Brad Schultz
CW Staff

WINTER PARK, Fla. — Many users of leased computer hardware do not carry enough insurance to cover termination of the lease and replacement of the equipment if the leased gear were to be destroyed by natural catastrophe, a computer negotiations report has warned.

And to add insult to possible economic disaster, "full, adequate coverage" can be obtained for only "slightly more" than what lessees tend to pay for inadequate coverage, according to *CNReport*, Volume 2, Issue 2.

Users often obtain disaster insurance from the lessor, rather than from an insurance company. They are convinced the lessor — as a specialist in computer sales — can buy the policy for less and thus pass on the savings, the report indicated.

The price for this coverage is typically expressed in the lease schedule as a decimal multiplier of the monthly lease payment, the report said.

A user may not realize until after its computer facility has been gutted by a flash fire that under terms of the lease it must continue making all payments and must provide replacement equipment, the report explained.

The only possible "out" in this predicament is for the user to pay a full "termination value" specified in the lease agreement — a large sum that is not matched by the insurance coverage.

"The insurance procured by the lessor does not even name your company as an 'insured' or an 'additional insured' under the policy," *CNReport* said, explaining "the primary 'insured' named is the bank that furnished the senior debt financing for the hardware." Other insureds are "the equity investors in the leased hardware and the lessor himself," the report added.

Not Insured Against Causes

The user's policy may insure against the results of disaster, but not against the causes: For example, computer fires are typically caused by short circuits or other electrical mishaps, the report noted, but disaster insurance may not cover the "blow-out" of components that precipitated a fire.

Hence, the policy may apply to damage that resulted from a fire without applying to the lost and very expensive components that were the fire's source.

CNReport advised users acquiring insurance on third-party leased hardware to determine the liability of all concerned in the event a disaster strikes and ensure that the lease contains a termination value as a possible "out."

It also urged users to obtain a number of bids on specified coverage from a personal broker and carefully compare these bids.

If coverage by the lessor seems unwarranted, users should obtain the prospective policy and premium quotation before signing the lease and should carefully evaluate coverage amounts and exclusions, *CNReport* said.

If the lessor is to furnish the insurance, the lessee should try to delete any lease provisions that excuse the lessor from any liability to provide adequate insurance coverage, the newsletter said, adding that the lessee should be named as an additional insured under the policy, with payment as the lessee's interest may be evident.

In addition, the newsletter urged users to be sure the insurance cannot be cancelled without 30 days' advance notice to the lessee and to seek advice from legal counsel and insurance experts on all aspects of the prospective coverage.

If the lessor is to furnish the insurance, the lessee should receive copies of the policy, all premium notices and evidence of premium payment. In addition, the choice of the insurance carrier should be subject to lessee approval, and the lessee should be allowed to supply the insurance through its own carrier, *CNReport* said.

CNReport is published monthly by International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

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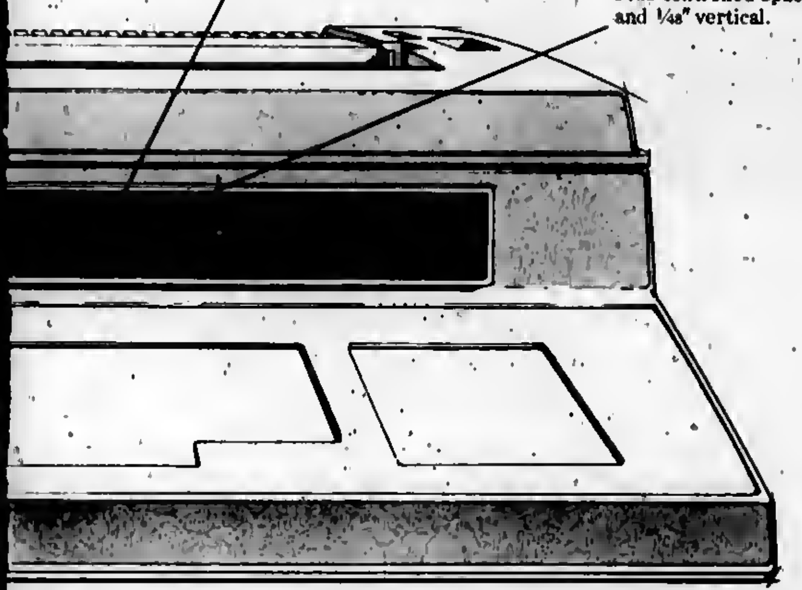

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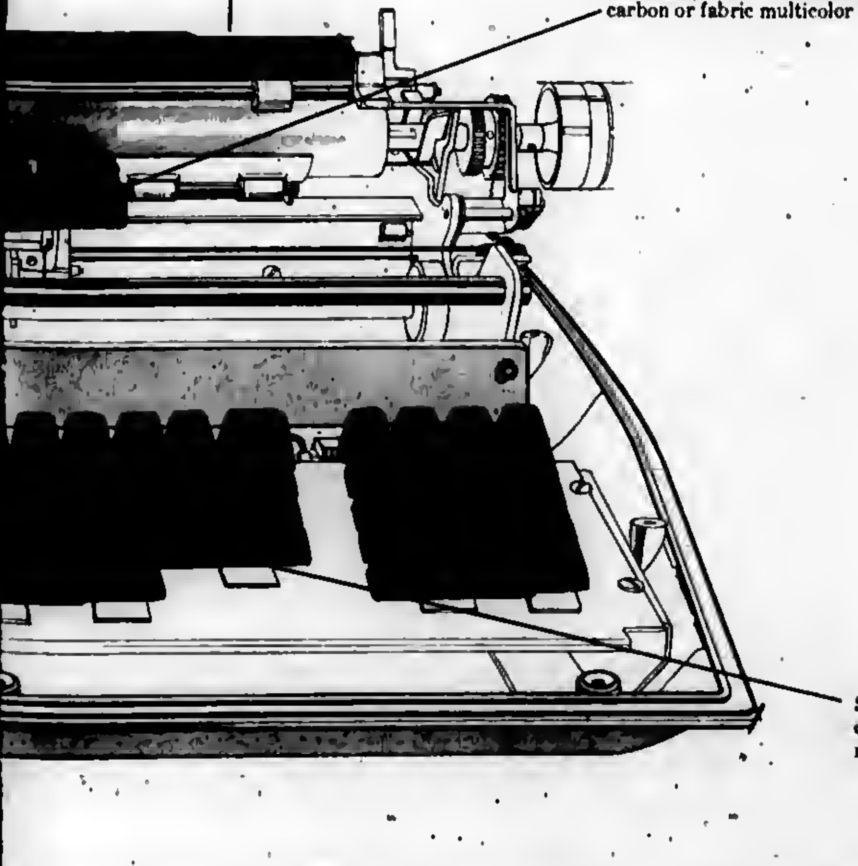

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Maintenance Contracts at Issue

User Suit Charges Univac With Trade Restraint

By Howard A. Karten
CW Staff

NEW YORK CITY — Robert Heller Associates, Inc., a management consulting concern here, has filed a lawsuit against Univac, charging the Blue Bell, Pa., computer manufacturer with activities in restraint of trade under the Sherman Antitrust Act.

The suit, filed recently in the U.S. District Court for the Southern District of New York, alleges that in negotiating renewal of equipment leases and maintenance contracts, Univac forced Heller against its will to execute maintenance contracts on all the equipment. Heller said the previous owner of the equipment, New York University (NYU), had a contract with Univac that exempted two pieces of equipment, the CPU and an I/O channel expander, from the maintenance contract.

Heller has also charged it was subject to the economic dominance of Univac since its ability to keep its customers and attract new ones requires uninterrupted operation of its computer facilities. Because replacement of the Univac equipment by a third party would have required lengthy delays, Heller had no alternative except to continue to rely on Univac, the user said.

NYU had an arrangement with Univac under which it was charged on a time-and-materials basis for maintenance of the equipment, instead of a monthly maintenance agreement with fixed monthly charges, according to the lawsuit. Forcing Heller to sign maintenance agreements for all the equipment as a condition of renewing the lease for the hardware was a violation of Section 1 of the Sherman Act, Heller has claimed.

Under the provisions of the act, Heller is seeking treble damages and attorneys' fees. Univac has until July 5 to answer the suit.

D.C. Fighting Bus Crime With Mini-Based Tracking

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — In response to an increasing number of crimes against bus drivers and passengers, the Metropolitan Transit Authority here recently instituted a computerized bus tracking system to help pinpoint the location of a bus when its driver activates a radio-controlled; silent alarm connected to the central control office.

When a bus driver activates the alarm, the bus' identification number is automatically transmitted via two-way radio, to a Digital Equipment Corp. PDP-11/35 minicomputer. In memory, the bus' identification number accesses the bus' transportation assignment for that day and is compared to the "checkpoint file," which pinpoints where a bus should be at a particular moment if it is on schedule.

A console operator, working at one of eight TEC, Inc. Datascreen 415 CRTs in the divisional offices, sees on the screen the bus identification number, the bus' transportation assignment and the geographical point where the bus should be if it is on schedule, according to Joseph Greenway, head of the transit authority's Systems Maintenance Division.

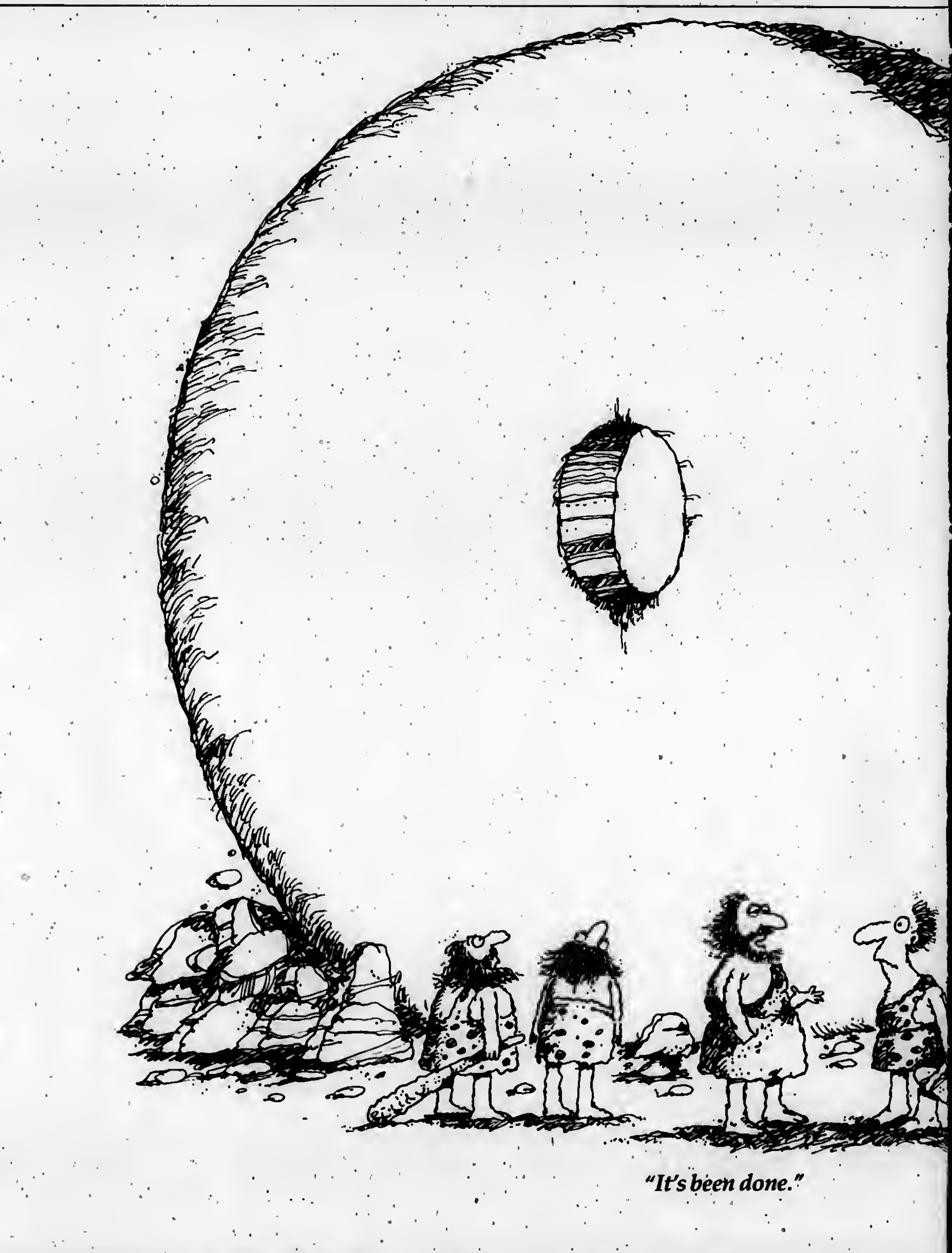
The central control office then calls the Police Department, which dispatches personnel to the scene of the incident.

"If the bus is off schedule, the program doesn't work as well, but it still works," according to Marilyn McGinty, spokeswoman for the Metropolitan Transit Authority.

In setting up the system, 85,000 cards had to be punched with the district's bus schedules. There are 750 bus routes in the district and as many as 1,650 buses can be in service.

Even though the silent alarm equipment was installed a year ago, the task of punching the schedule cards was a "back burner item," done "when the operator could get to it," according to Greenway. Daily updating of bus assignments is done via the divisional CRTs, a task that takes "an hour or so," he added.

The complete system, including radios, costs $5 million to install. Greenway said so far he is "very pleased" with the system.



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Revamp Team Faults Federal DP Management

By Edith Holmes
CW Washington Bureau

WASHINGTON, D.C. — President Carter either needs to put the "M" back in "OMB" — the Office of Management and Budget — or establish a new agency that would focus primarily on management planning and policies for the entire executive branch, according to the President's DP reorganization team assigned to review DP and communications in the departments of Justice and Treasury.

"The absence of consistent management practices in the federal government is the major cause of most of the problems with 'information resources" and with the use of the computer and communications technologies on which these resources depend, the general government team said.

Without better management procedures and practices, the Justice and Treasury departments can't improve their use of these technologies, the study team concluded.

In addition, the team's draft report stated that management and technical assistance needs to be available to the several departments and agencies on a much broader and more standard scale. Ideally, this assistance would be independent from the day-to-day operations and control of such departments as Treasury and Justice so that candid, unbiased advice could be given.

Relatively few agency managers know how to direct an assessment of their needs in the context of a long-term information system or to evaluate this technology on the basis of their agency's mission requirements, the reorganization team found.

Boosting Assistance

Management and technical assistance could be expanded by increasing the staffs, resources and visibility of such existing facilities as the Federal Computer Performance Evaluation and Simulation Center and the U.S. Navy Cobol Center. These organizations could be reorganized in a "revitalized" Institute for Computer Sciences and Technology at the National Bureau of Standards (NBS), or at each of the Cabinet-level departments.

Whatever strategy is adopted, "a commitment is needed to expand the quality, quantity and types of assistance — whether provided by the government directly or purchased commercially or both — and to place a much greater emphasis on the need for managers and users within the agencies to take advantage of this assistance," the draft report stated.

The general government team also called on Carter to implement the Brooks Act more fully. That law — which split the central responsibility for effective management of federal DP among OMB, NBS and the General Services Administration (GSA) — should not be changed, according to the reorganization team. Rather, "the burden remains within the executive branch to provide the leadership necessary to improve information resource management," the team said.

Since the Brooks Act was passed by Congress in 1965, the federal government has been faced with the need to bring information resources under management control. Congress has lost confidence in the executive branch's ability to manage these resources and their underlying technologies, and more agencies and congressional committees have become "intimately" involved in the details of individual agency proposals for computer system upgrades or replacements, the draft report noted.

Individual managers with responsibility for an agency's tasks or mission have little real authority for acquiring the DP and communications tools they need, the team found.

'Overcontrol of Technology'

This "overcontrol of information technology has led to a system of management by red tape in which persistence, luck and pseudo-illegalities count as much or more than logic and reason," the reorganization group concluded.

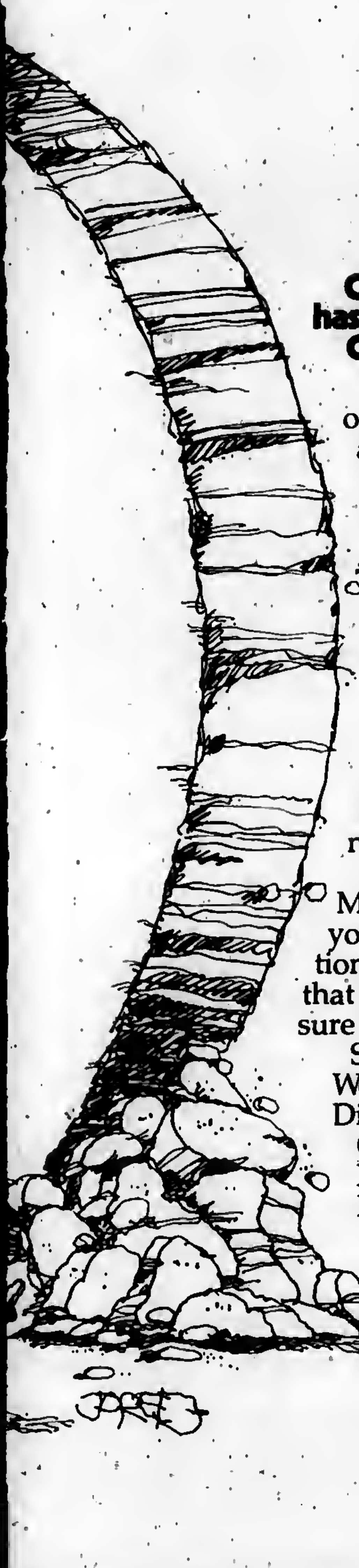
The Justice Department's Federal Bureau of Investigation has run into these problems in its effort to upgrade its National Crime Information Center, and the Treasury Department's Internal Revenue Service has been forced back to the drawing board as a result of criticisms of its proposed Tax Administration System, for example.

Many agency managers simply ignore this procurement system or they bend its rules. But others have become "gun-shy" about even attempting computer system upgrades, the reorganization team said.

The general government group's draft report also highlighted the problem of hardware, software and people obsolescence in the Justice and Treasury departments. By failing to replace worn-out hardware, departments and agencies throughout the government keep their programmers busy patching systems rather than employing state-of-the-art programming skills and software.

The decreasing cost of hardware contrasts sharply with the higher costs of software and people, the team noted, and yet the government continues to be preoccupied with equipment.

Few appointed senior government officials remain agency heads very long — the average tenure is between 18 and 22 months — leading to an inability to relate political goals and priorities to the career staff responsible for information services, the team stated.



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Agricultural Pests Up Against New Enemy: DP

By Marguerite Zientara
CW Staff

FRESNO, Calif. — Computers are becoming the new "farmer's friend" in the age-old battle against insect pests. Because of the rising costs of pesticides and the continuing objections to their use by environmentalists, more and more farmers are turning to what the experts call "ecologically based methods of pest management" — methods aided by computerized mathematical projections of what a particular insect population will do in a certain amount of time.

"Ecologically based pest management is based on the natural mortality of crop pests; we attempt to control them with minimum damage to the rest of the life in the fields," according to Dr. Charles Summers, associated professor of entomology at the Univeristy of California at Berkeley (UCB). Summers is a research specialist working out of a university field station near Fresno.

Once an insect specialist has determined what insects are in a field after daily visits over a period of weeks, computers construct mathematical models that can predict how fast the pest population and the natural enemy population will grow, Summers explained. The projections are based on the numbers of insects present in the field and the conditions of the field.

In higher temperatures, insects develop more rapidly than in lower temperatures, Summers noted. After it is determined how rapidly a particular type of insect grows, how long the insect will live, how often it will reproduce and how many offspring it will have, the computer provides a readout of the projected total number of insects per unit area at any given point in time.

Edge for Enemies

After Summers gathers data about a particular field, he sends the information to his colleague and the major developer of the program, Dr. Andrew Gutierrez, also a professor of entomology at UCB, 200 miles away.

Gutierrez processes the information on Lawrence Radiation Laboratories' Control Data Corp. 7600 mainframe or on the CDC 6400 in UCB's mathematics department. The specialist then decides the best method of reducing the odds against the natural enemies of the pest.

"Generally what we try to do is make life on the farm more conducive to the natural enemy population and less conducive to the pest population," Summers said. "In alfalfa, for instance, if we cut down alternating rows, the pests will generally leave the area while the natural enemies will stay in the rows growing and multiply. By the time the pests return, the natural enemy has multiplied in sufficient numbers to control the pests." Summers said pesticides are used sparingly and only as a last resort if other methods don't work.

In order to get the service, California farmers buy pest management services from commercial firms. This computer service is furnished free because it is still in the developmental stages.

Exam for CDP Passed by 919

CHICAGO, Ill. — A total of 919 candidates out of 2,835 passed the qualifying examination for the Certificate in Data Processing (CDP) given last February, according to the Institute for Certification of Computer Professionals (ICCP).

The exam was offered at 136 sites compared with 124 sites last year. The largest number of candidates came from Illinois, California, New York and Texas, respectively, the ICCP said.

An analysis of the candidates prepared by The Psychological Corp. showed 35% were members of middle management and 49% held staff positions in education, government, financial institutions, insurance or consulting/service organizations.

Most candidates were between the ages of 26 and 35, but the number over 35 showed a "definite increase," the ICCP noted.

The next exam will be offered on May 5, 1979. Information on that exam is available from the ICCP at 304 E. 45th St., New York, N.Y. 10017.

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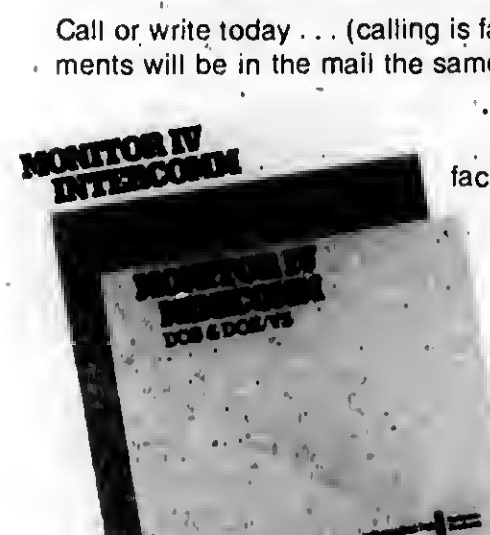

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For Users When Disaster Strikes

DPS Planning Recovery Operations Centers

By a CW Staff Writer

HURST, Texas — Recovery Operations Centers (ROC) — preconstructed facilities standing ready to accommodate computer installations — are necessary if American businesses are to avoid the "potentially devastating effect" of losing DP facilities when natural disasters occur, according to Louis Scoma Jr., president of Data Processing Security (DPS) here.

DPS is planning to construct five ROCs, which will be supported by the sale of memberships in the centers.

Scoma estimated that 90% of American companies using computers would have to shut down for months if their computers were destroyed. A ROC would include appropriate power supplies, air conditioning and humidity systems and communications networks, allowing a CPU to be installed immediately on behalf of a member company whose computer facilities had been destroyed.

No Alternative

Scoma sees no alternative to the development of ROCs. In almost all cases, he said, firms would not be able to turn to other companies for DP support.

"Most companies lack the compatibility with another company's computer operations, both from a hardware and software standpoint — assuming they could find availability," he said. "Most companies are operating their computers at or near capacity and cannot afford to provide backup support for another company for any extended period of time without affecting their own operations."

DPS intends to get written commitments from suppliers regarding the availability of computer hardware and the time within which it could be delivered and made ready for processing.

"There will be some equipment which members of the ROC will want to preorder and install because of the unique characteristics or long lead time," he noted. Such equipment might include check sorters, scanners, computer output microfilm equipment and optical character readers, he said.

Membership in the first ROCs will be offered to selected companies at $12,000 annually. A number of services will also be provided by DPS.

Members will be offered record storage and magnetic tape and disk file verification services for files stored at the ROC. The ROC will be made available to members installing a new computer system and phasing out an existing system.

Members whose computer facilities have been destroyed may use the ROC to house their new computers while their facilities are being rebuilt.

Texas Site First

The first ROC will be completed in the Dallas-Fort Worth area this year, after the selection of the first members, initially limited to 35 companies, Scoma said. Other facilities will follow during the remainder of 1978 and in 1979 in Los Angeles, Chicago, New York and Atlanta.

"The ROC will be large enough to accommodate the essential computer processing for any three of its members in the event they simultaneously experience a major disaster," Scoma said. For this reason, no more than three member companies will be located within a one-half square mile radius of each other.

DPS will also be able to make available, for staff support, as many as 150 hotel rooms within a 24-hour period, he said.

The five ROCs will be connected through a communications network to provide backup capability.

Fraud Conference Set On Board Cruise Ship

SURREY, England — An international conference on computer fraud will be held Sept. 20-25 aboard the Queen Elizabeth II on her scheduled Atlantic crossing from Southampton to New York.

The price of the conference for U.S. attendees, is $1,300 which includes a tourist class flight to Southampton and a "good" tourist berth to New York, according to the sponsor, 20th Century Security Education Ltd.

Comer to Speak

Among the speakers at the conference will be Michael J. Comer, author of *Corporate Fraud*, and Peter Hamilton, computer and security expert and a member of the Chubb worldwide security team.

Additional information is available from Peter A. Heims, Cleeve Road, Leatherhead, Surrey, England.

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Federal Board Rules on S&L Teller Machines

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — The Federal Home Loan Bank Board (FHLBB) has approved final regulations governing the use of remote electronic teller facilities by savings & loan (S&L) associations, including a number of consumer safeguards.

The action in late May preceded oral arguments scheduled for today, June 26, in a lawsuit filed by the Independent Bankers Association of America (IBAA) claiming the FHLBB has illegally entered the field of banking by giving S&Ls demand-deposit capability via electronic tellers.

The bank board has been authorizing remote teller facilities under temporary regulations on a case-by-case, "experimental" basis since 1974. The last extension of the temporary regulations expires June 30.

Under the final regulations, remote service units (RSU) can be used for crediting and debiting savings accounts, making loan payments and for "other financial related services." The board defined an RSU as an information processing device, including a computer system, located off the premises of a federal association and requiring an activator for access.

The definition excluded telephone banking systems, according to bank board attorney Lois Jacobs.

The regulations, which will take effect July 1, call for the consumer to have a machine activator such as a card or, in the future, fingerprint or voiceprint and a personal security identifier (PSI), not necessarily a number, Jacobs said.

The regulations stipulate that an S&L must disclose to a prospective customer all the terms of the agreement, including what happens if the customer's activator is lost or stolen. The association must tell the customer that the PSI is a security measure and that it should not be given out, written on the card or kept with the card, Jacobs said.

Correcting Statement Errors

A holder of an active account must receive a statement every month; a holder of an inactive account must receive a statement quarterly.

In the area of error resolution, a consumer must notify the S&L within 60 days in writing of any error on a statement. The S&L then has 10 business days after receiving the error notice to resolve the matter by either correcting the error or by furnishing written proof of the transaction as it appeared on the statement, Jacobs explained.

The regulations hold the financial institutions liable for RSU losses in most cases — if a transaction is not carried out correctly, if an error is not corrected within 10 business days of notification or if the bank processes a transaction from an unauthorized person — unless it can show the consumer was negligent.

The regulations provide that the customer must receive a receipt of each transaction printed by the machine; if the transaction is written, both the customer and RSU operator must sign the document, Jacobs said.

Privacy Provisions

Concerning the privacy of account information, the regulation allows an accountholder to access any information about his own account. However, except for generic data, no information can be disclosed to a third party except the bank board.

The FHLBB examiners need general information in their annual examinations of S&Ls' financial conditions, Jacobs explained.

The bank board, once it gets the information, is subject to the Privacy Act of 1974, she noted. "I think we've made excellent and specific attempts to keep account information private," she said.

When a federal association shares a system or has a contract with a third party, such as a merchant, the third party must treat account data as the association treats it, according to the regulations.

Security Clearance

The regulations state that an association needs a security clearance before filling out an application for establishing an electronic teller system.

If a system has anticompetitive implications, the board may ask the Justice Department to comment on it, Jacobs said.

Many of the recommendations made by the National Commission on Electronic Fund Transfers were implemented in the regulations, Jacobs said.

"All this time we've approved RSU systems in federal associations, so we know when they've worked and when they haven't. Hopefully these current regulations reflect the best thinking of these years of practical and philosophical experience," she added.

Lawsuit Issue

According to FHLBB counsel Harvey Simon, the issue in the lawsuit concerns a section of the Homeowners Loan Act stating that savings accounts are not subject to negotiable or transferable order or authorization, but may be subject to nonnegotiable order or authorization.

"The question is whether the machine-readable card used to access the savings accounts through an RSU is the same as a negotiable instrument. We think it pretty clearly is not," Simon said, adding that the bank board is optimistic about the outcome of the case.

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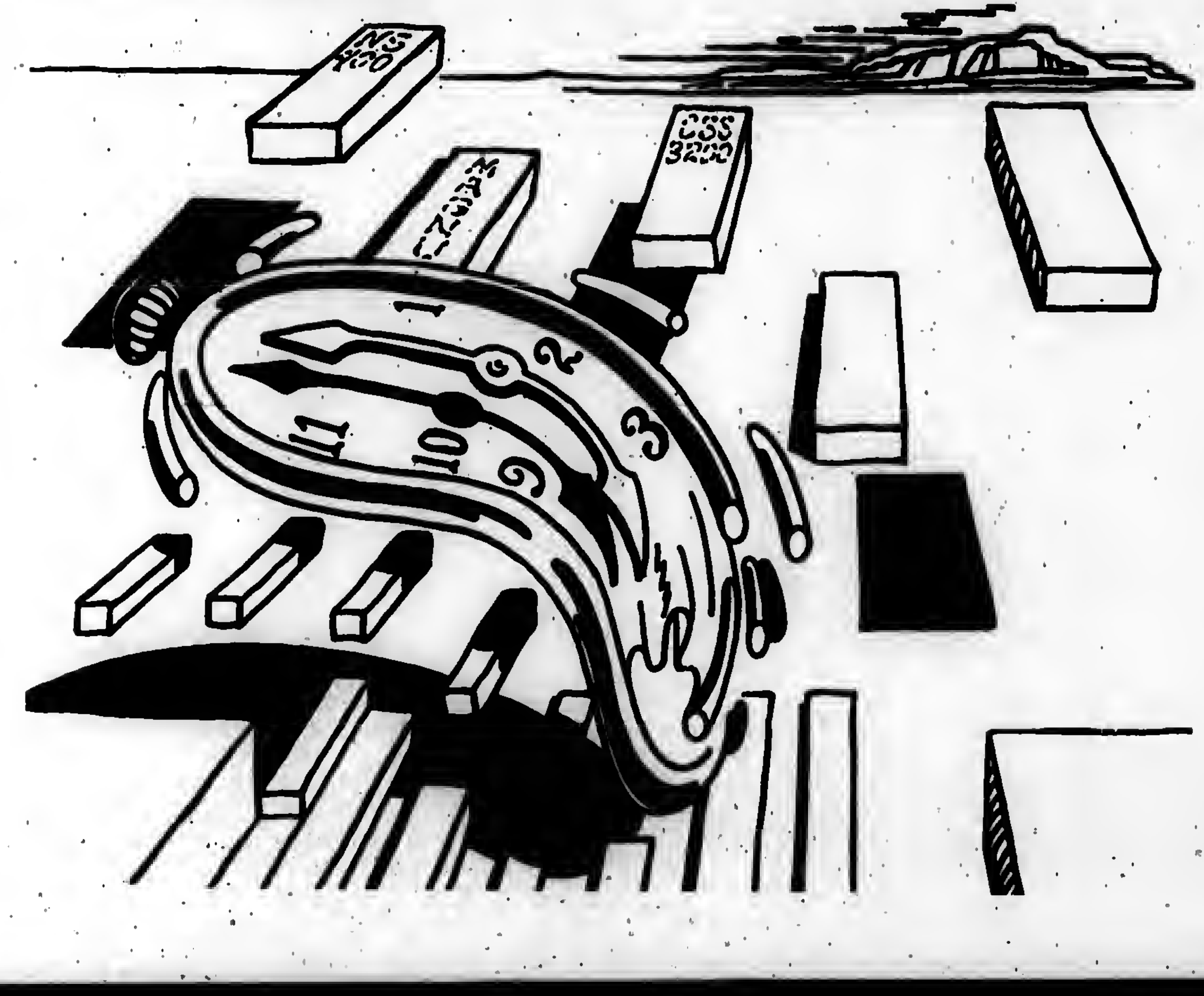

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Panel on Document Dispersal:

End-User Role Vital in Office System Plans

By Marguerite Zientara
CW Staff

ANAHEIM, Calif. — The solution to inefficiency in office automation lies in integrating word processing and message switching systems, and successful implementation depends on end-user involvement at the planning stages.

These were conclusions reached by a panel of experts at a National Computer Conference session here recently on computer-based document distribution.

Document distribution, defined as a subset of electronic mail, can include voice, facsimile or computer-based systems, according to session chairman Gwen C. Edwards, assistant director for policy development at Bell Canada.

According to a Bell Canada survey of 200 institutions — 40% of which were government agencies, 30% industry and 30% research organizations — personnel resented computer-based document distribution systems if they were not involved with them from the beginning, Edwards said.

People with positive perceptions of such systems used them more, and the more they used them, the more positive their perceptions became, she said.

Twenty-two percent of users surveyed developed more negative attitudes over a period of one year, and the reason was overwhelmingly access problems, the survey showed. Most users however, experienced positive changes in their perceptions, Edwards said.

According to the survey, people will not tolerate problems associated with access and response time, Edwards said. In addition, it is essential to them to be able to retrieve messages sent, which the survey indicated they did an average of 15 times per week. In this area, electronic message systems are superior to the traditional TWX and Telex systems, which generate "cumbersome" hard copy, Edwards said.

Army Case Study

A case study of one organization's electronic mail system revealed both positive and negative effects on personnel. The U.S. Army's Development and Readiness Command (Darcom) in Alexandria, Va., uses a Texas Instruments, Inc. Silent 745 portable terminal to hook up with the Arpanet network for frequent transmission of "very complex documents," according to John Gilbert, Darcom's director of management information systems (MIS).

He was enthusiastic about the system, noting it has text-editing, filing, searching and spelling-correction capabilities.

Gilbert said Darcom began using the system in November 1974 as an experiment with no particular objective, "just to see if our business operations changed in any way in the course of a year." By December of the same year, Gilbert said, "I was hooked." Within six months, substantial effects were being felt.

First of all, the system became a substitute for phone calls, Gilbert said, noting that it eliminated interrupting other people and also eliminated the "missed phone call" syndrome.

In addition, his travel patterns changed. He used to visit associated offices about once a month, but with the electronic mail system he now goes six months at a time without visiting, he said.

Gilbert also mentioned that he can now communicate with large numbers of people on the same matter simultaneously by entering an address list into the system for forwarding the message to the desired people. "This results in a broader base of information for everyone involved," he said.

He pointed out that when he logs into the terminal for receiving his mail, he is psychologically in a more receptive frame of mind and is ready to get the most information input.

By the summer of 1975, nine months after its installation, the system's use began to spread, Gilbert said, as others became aware of it. It is now being used by a number of other Army communities, such as the International Logistics Committee, Test and Evaluation Command, the Arctic Test Center and the Tropic Test Center, Gilbert said. The system has overcome time zone lags and speeds up communications "tremendously," he said.

Some Problems

The system has presented a few problems, according to Gilbert. First, message-switching and text-editing functions are not well integrated, resulting in "irritating confusion" for the user of the terminal, he said. In addition, access problems, or "busy signals," also annoy users.

Further, managers are reluctant to touch terminals because they view them as "demeaning." Gilbert suggested this problem could only be solved by "dying off this generation of managers."

A way of monitoring the quality of service should be developed, he added. Gilbert also advised MIS managers to "learn to type."

Another case study of the use of electronic message switching — this time by Hotline International (HI), a nonprofit service organization based in New York — illustrated document distribution worldwide.

For the past four years, HI has worked with United Nations consultants around the world using document-distribution and message-switching technology to extend participation in pertinent conferences and to help political figures make informed, intelligent decisions on timely issues, such as the environment, according to Glen Leet, director, and Mildred Robbins Leet, codirector of the firm.

Thirteen colleges and universities and 100 national and international nongovernmental organizations are involved in HI. The service organization's activities are focused in 10 U.S. cities and in London, Paris, Montreal, Toronto and Vancouver.

The first conference hookup was between Nairobi, Kenya, and the U.S. in 1974. The Leetses used a TI Silent 700 terminal transmitting over telephone lines to an IBM 370/168 in the U.S. Once they got the Nairobi telephone operators to understand that a tone, not a voice, would be transmitted over the wires, they had no problems, they said. Government cooperation was no problem either, they said, because "Kenya was extremely proud to have direct communications with the U.S."

They noted that with electronic communication, the input is often "less emotional, more precise and more concise." Concerning the U.N., the Leetses said the system reduces costs and improves the quality of decisions made.

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Whitman College Sharing Admissions Software

By Ann Dooley
CW Staff

WALLA WALLA, Wash. — Whitman College here is sharing its admissions software with Seattle University's admissions office so both schools will have a more efficient student tracking program.

The software system, developed by Whitman College last fall, tracks a prospective student from his first contact with the school through the entire admissions process, according to R.R. Thomassen, director of the school's computer center.

Each of the schools use a Hewlett-Packard Co. 3000 Series II Model 8 system. When Seattle University administrators heard about Whitman's admissions package, they approached Whitman officials for help.

"We were pleased Seattle University felt free to ask for help. Such cooperation is all too rare among schools in higher education," Whitman President Robert Skotheim said.

Whitman decided to give the admissions program package to Seattle University as a gift because both colleges' requirements are very similar. "Seattle University needed a program such as this, but was not really equipped to develop one for itself. Our program was readily adaptable to its needs and we decided to share our system," systems analyst Wayne Holt said.

Holt worked with Seattle University admissions personnel in installing the software. The system consists of 50 files and 32 programs; all of them were used, since Seattle's admissions program is very similar to Whitman's.

The program was modified only slightly by Seattle University. The changes were few and amounted mainly to changes in wording, Holt said.

"Essentially, Holt brought a tape over and loaded it up in two days," Mike Fox, Seattle University's program director, recalled. The initial phase went very smoothly and there have been only about 20 hours of revisions spread out over the six weeks since the program began operating, he said.

If there are any problems, Holt "comes over and irons them out," Fox said.

Seattle University still hasn't received the documentation, which is being done more slowly than the installation phase, Fox said. But since there haven't been any bugs, it's been no problem, he added.

When the system was installed, Holt and the Seattle University admissions staff ran all the programs to make sure they were operating properly and then printed them up as a final check. The process required a lot of cooperation between the user and the computer center, Fox noted.

"We're very pleased with the program and Whitman's cooperation in working with us," according to Mike Lyons, director of Seattle University's high school/college relations. Seattle University's old method of keypunching the information took much longer and was not as easily accessible, he said.

Student Tracking

In developing the initial system, admissions officials at Whitman knew what they wanted and worked closely with the computer center to get it, Thomassen said. The system was designed so that when the admissions office gets an inquiry from a prospective student, the student is assigned an identification number.

The student's name and address as well as details about his interests are entered into the system's data base via CRTs. Additional information is entered as the student makes further inquiries or applies for admission.

The system prints a mailing label for all correspondence with the student, Thomassen said.

Information such as high school grades, entrance test scores, ethnic background, how the student found out about the school and outside interests is entered into the system.

In addition to its use in tracking prospective students through the admissions process, the data base is accessed for statistical analysis reports, according to Thomassen. Any common group of students can be extracted from the data base for special purposes, such as when the football coach wants to know which entering students had experience in the game.

A student's privacy is protected because users must know the right password before getting into the system, Thomassen said. A daily audit trail is run to determine who used which files and for what purposes.

Other schools have expressed interest in Whitman College's admissions program package, but difficulties arise when working with non-HP equipment, Thomassen said.

Conference to Focus On DP Productivity

WASHINGTON, D.C. — The Second National Conference on Computer Systems Productivity will be held here June 28-30.

Featured topics include an update on the latest enhancements to data base management systems, a review of the most recent security and privacy issues relating to computer systems, a special intensive general session on structured analysis methodology and a review of the microcomputing revolution.

The fee is $325. For additional information, contact the Institute for Professional Education, 1901 N. Fort Myer Drive, Arlington, Va. 22209.

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IBM Leasing: How to Optimize Your Cash Flow

By Marcia L. Geyer

IN DEPTH

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Financial advantages are buried in the text of IBM's new Lease Rental Agreement (LRA), compared with earlier IBM leases, that data processing managers can use to their companies' benefit.

The most notable improvements are:

- Lower termination charges, especially in the last six months of the lease.
- Some no-charge conditions for early termination of features and, in some customers' LRA Supplements, a documentation deficiency that lists features as not subject to termination charges at all.
- Purchase price protection and documentation of purchase credit accruals during the life of the lease.

But there are a couple of points of which users should be aware. One is the need to give 30 days' written notice when discontinuing or downgrading a machine at the end of a lease term. The other is the "Upper Limit Percent" box, which some day will mark the end of price protection for the monthly lease charge during the term of the lease.

Differences in Plans

The differences between the older types of IBM leasing plans and the LRA are not in monthly lease payments. Monthly payments for, say, a two-year lease of a Model 3350 disk unit will be the same under the LRA, Fixed Term Plan (FTP) and Extended Term Plan (ETP) agreements. The monthly lease payment comes from the IBM sales manual.

But the default billing action (if you neglect to cancel or renew the lease for a piece of equipment at its expiration); the early termination charge if you cancel early or require a factory modification of the machine; the price protection of the monthly lease payment and of the purchase price; and the applicability of termination charges to optional features — all of these are handled differently in the LRA than in the previous leases.

A DP user's changes of plans that cause early termination are given better treatment under the LRA than under the earlier lease plans in almost all cases. The few exceptions will be noted later, and we will examine the impact of termination schedules in depth.

Customer Financial Management

The LRA lease may have been written by IBM with the intention of fostering better customer financial planning and lease management. Certainly that effect is promoted in a conversion to the LRA lease because all the leases which have been executed over the past years are gathered into one bundle of LRA Supplements (the individual pages executed for each equipment type).

The purchase-price ceiling during the term of a lease under the LRA may only reflect the current reality that IBM purchase prices will, if changed, go down rather than up. Or the ceiling may be a swap for the new IBM option to increase monthly lease charges during the term of the lease, subject to a maximum percent increase per year.

In any case, because the maximum purchase price — the current purchase price at the time the Supplement is executed — and the rate of accrual of purchase-option credits are documented in the LRA Supplement, the alert DP manager can, for the first time, calculate exactly when exercising the purchase option will be most advantageous and can budget this move well in advance.

There is a fascinating little box on the LRA Supplement marked "Upper Limit Percent." It stipulates the amount that lease payments may be annually increased during a lease.

The practical significance of this new IBM option was not evident in my research of pricing for a number of machines because in each case the Upper Limit Percent was zero, indicating no increase.

My best guess is that the option will be applied after previous forms of leases have been totally withdrawn from use, perhaps when a future generation of equipment is introduced.

Discontinuing Features

The terms for discontinuing features attached to leased machines are clearly better under the LRA than under previous leases. Under the FTP and ETP agreements, the monthly lease charge for a machine and the features installed with it are listed as a single amount on one line. The termination charge is a certain number of months multiplied by this amount.

On the LRA Supplement, however, there is a separate line for each model or feature number that lists, among other things, the monthly lease charge and the termination values. There are several conditions under which early termination of a feature leased under the LRA does not subject the customer to any early termination charge at all.

Unfortunately, policy in this area is not as clearly documented as the other LRA financial variables. One installation's LRA Supplements list the early termination charge for each of its features as "N/A," or no applicable charge. Its IBM support staff, however, informed it of a list of conditions under which termination charges would not apply, implying that in other cases there would be termination charges.

Since the no-charge categories for features are not listed anywhere in the LRA or its Supplements, and this installation's contracts say "N/A" for each feature's termination charges, the site will have excellent grounds for a billing argument later on if it discontinues a feature in a manner that does not happen to fall under the "no-charge" categories quoted to it and if IBM attempts to bill it for early termination of a feature. Perhaps you, too, will be equally fortunate until such time as IBM documents its policy within the contract itself in a clear and unambiguous manner.

Early Terminations

After establishing the suitability of a new type of equipment within one's hardware/software configuration, the best reason for not signing a two-year lease is the expense of changing plans if new gear with an improved price/performance ratio becomes available or if any number of conditions change within the organization, leading to a change of configuration.

In the real world of DP management, a clear vision of the next 24 months' equipment needs, as perceived by one's senior management and users, may indicate miraculous powers of clairvoyance in addition to normal business acumen.

However, there is good news: the LRA treats customer changes of plans in the later months of the lease considerably less harshly than previous IBM leases. The incentives for leasing have been increased because the difference

(Continued on Page 20)

EARLY TERMINATION CHARGES AS NUMBER OF MONTHS' LEASE PAYMENTS FOR TWO-YEAR IBM LEASES

Month of Lease	Type of Lease		
	LRA	FTP	ETP
1	5.00	5.00	5.00
2	5.00	5.00	5.00
3	5.00	5.00	5.00
4	5.00	5.00	5.00
5	5.00	5.00	5.00
6	4.75	5.00	5.00
7	4.50	5.00	4.00
8	4.25	5.00	4.00
9	4.00	5.00	4.00
10	3.75	5.00	4.00
11	3.50	5.00	4.00
12	3.25	5.00	4.00
13	3.00	2.50	3.00
14	2.75	2.50	3.00
15	2.50	2.50	3.00
16	2.25	2.50	3.00
17	2.00	2.50	3.00
18	1.75	2.50	3.00
19	1.50	2.50	2.00
20	1.25	2.50	2.00
21	1.00	2.50	2.00
22	.75	2.50	2.00
23	.50	2.00	2.00
24	.25	1.00	1.00

Figure 1

(Continued from Page 19)

between the lower lease rate and the early termination payment is likely, under the LRA, to be in the customer's favor.

Basis of Comparison

It took considerable digging to discover the superiority of the LRA early termination charges. The problem was translating early termination charges into commensurate terms among the leases by using a unit of measure that can be compared at each month in the life of the lease.

The FTP and ETP formulas for early termination charges are quite straightforward. For example, early discontinuance during the second six-month period of a two-year ETP lease entails four months' lease payments.

Like the other financial terms, the early termination charge of the LRA is a variable filled in on the individual Supplement. To further complicate matters, the charge is the lesser of two amounts, either "x" percent of the total remaining contract value or "y" months' payments.

In all the cases I have examined, the value of "x" is 25% of remaining contract value, and the value of "y" is five months' lease payments. So I didn't need a computer to translate the remaining value of the contract into a specific number of monthly lease payments at each month of the lease.

Figure 1 shows the termination values for each of the three leases, expressed as number of monthly lease payments. I would caution contract administrators to check the column on the far right of the LRA Supplement for the numbers ".25/5."

If the first number is not 25, the remaining contract value for that machine must be recalculated, working back in time from the last month to the month when the percent of remaining contract value is greater than or equal to the number of monthly payments listed as the second termination value on the Supplement.

As Figure 1 shows, early termination charges under all three lease plans are five months' lease payments if termination occurs during the first five months of the lease. Thereafter, LRA early termination charges are lower than those of FTP except in months 13 and 14 and lower than those of ETP except in months 7, 8 and 9.

Usually, then, early termination costs less under the LRA than under previous forms of leasing. This is always the case after the 14th month of a 24-month lease.

It should be noted that the values listed under months 13 through 24 of the LRA are the termination values, i.e. 25% of remaining contract value, in months 1 through 12 of an LRA one-year extension. But the amount of the monthly lease payment by which these values are multiplied is higher for a one-year term than for a two-year term.

Conversion Loophole

The pattern of early termination charges revealed above is of practical significance if your installation is currently leasing gear under the FTP or ETP that you would like to discontinue. You may profit by converting the gear to LRA before giving notice of early termination, even if the LRA conversion delays your notice by one additional billing cycle.

Particularly in the final two months of a lease, the LRA assessment of 25% of the remaining value of the contract stands out in favorable contrast to the ETP and FTP assessments of the whole remaining contract value as the early termination charge.

If there are any optional features attached to a leased machine, there may be further improvement through the omission of their lease payments from the amount of the monthly payment which is multiplied by remaining contract value to obtain the early termination charge.

If the features are listed on the Supplement as having a termination value, you can still check with IBM for a list of no-charge conditions that apply to them. You will probably find a condition which you can use in your particular sequence of removing or reconfiguring machines.

Expiration Options, Defaults

At the expiration of any of the leases, your choices are as follows: execution of an LRA Supplement for the full term; a one-year LRA extension if the machine has previously been converted to LRA; a one-time less than one-year LRA Extension; monthly rental; discontinuance; or downgrading of the machine.

If the customer does not notify IBM that he wishes to take any of these actions, the default action at termination of an FTP or ETP lease is transfer to monthly rental at the premium Monthly Availability Charge (MAC) rate. Failure to convert from earlier forms of leasing to the LRA as leases expire and are withdrawn also results in reversion to MAC.

If the customer fails to take any action at the expiration of an LRA, the LRA default action is an automatic one-time, one-year extension, followed by transfer to monthly rental under the LRA if there is still no notice from the customer.

In the absence of any information, the LRA default to a one-year extension may well be the most economical way IBM can take care of the customer's interests. But as with any automatic renewal, you don't really want to be taken by surprise.

Execution of a new Supplement for a full term (presumably two years, although this, too, is a variable filled in on the Supplement), extension for a year or less than a year and conversion to rental can all be done as late as the day the LRA expires.

But beware: if you wish to discontinue or downgrade a machine at the expiration of its LRA lease term, you must give 30 days' prior notice. And although IBM is obligated by the terms of the LRA to inform you in advance of the new lease prices, it is not required to bring the expiration to your attention 30 days or more in advance.

To be safe, you may wish to establish a contract administration "tickler" file, alerting you at least 60 days in advance that it is time to obtain prices and to make a decision about the disposition of the leased gear.

Choosing a Renewal Term

If you know of a planned replacement or reconfiguration of your leased machine, it is not too difficult to select the term of renewal. The first likely month of replacement or downgrade or upgrade which is not field-installable should be the last month of your LRA extension, since you can always retain the machine on monthly rental if schedules slip a bit.

But if the future is less certain — if a contemplated replacement may or may not occur in about 18 months, for example — the economics of a one-year extension vs. a two-year new Supplement should be examined as to the total cash outflow for the cases you can foresee. The case study which follows demonstrates a simple method for finding the least costly LRA lease renewal option.

Printer Case Study

Suppose you are considering upgrading from a Model 3211 printer to a 3800 printer subsystem, on order, in December of 1980. But you don't yet know whether you will obtain approval for the additional expense in your annual budget.

If you can't upgrade, you would like to continue to accrue purchase option credits as quickly as possible and will probably convert the 3211 to installment purchase when it is fully accrued.

Futhermore, let us suppose that you have already converted your leased gear to the LRA and that the converted Supplement for the 3211 expires on May 1, 1979. Now you have to decide whether to execute a new two-year Supplement or a one-year extension.

The current monthly lease price quoted you for a 3211/001 is $1,680 on a two-year lease and $1,840 on a one-year lease or less than one-year extension.

Figure 2 shows the accumulated monthly lease payments for a two-year term in Column 1 and the accumulated monthly poayments for two on-year extensions in Column 5. For the purposes of this exercise, the dubious assumption is made that there will be no

CASH FLOWS FOR 3211/001 LRA LEASES

	TWO-YEAR SUPPLEMENT			TWO ONE-YEAR EXTENSIONS		
Month of Lease	Aggregated Monthly Lease Payments	Early Termination Charge	Total Cash Outflow at Termination		Aggregated Monthly Lease Payments	Early Termination Charge
Column	(1)	(2)	(3)	(4)	(5)	(6)
1	$1,680	$8,400	$8,400	$5,520	$1,840	$5,520
2	3,360	8,400	10,080	6,900	3,680	5,060
3	5,040	8,400	11,760	8,280	5,520	4,600
4	6,720	8,400	13,440	9,660	7,360	4,140
5	8,400	8,400	15,120	11,040	9,200	3,680
6	10,080	7,980	16,380	12,420	11,040	3,220
7	11,760	7,560	17,640	13,800	12,880	2,760
8	13,440	7,140	18,900	15,180	14,720	2,300
9	15,120	6,720	20,160	16,560	16,560	1,840
10	16,800	6,300	21,420	17,940	18,400	1,380
11	18,480	5,880	22,680	19,320	20,240	920
12	20,160	5,460	23,940	20,700	22,080	460
13	21,840	5,040	25,200	27,600	23,920	5,520
14	23,520	4,620	26,460	28,980	25,760	5,060
15	25,200	4,200	27,720	30,360	27,600	4,600
16	26,880	3,780	28,980	31,740	29,440	4,140
17	28,560	3,360	30,240	33,120	31,280	3,680
18	30,240	2,940	31,500	34,500	33,120	3,220
19	31,920	2,520	32,760	35,880	34,960	2,760
20	33,600	2,100	34,020	37,260	36,800	2,300
21	35,280	1,680	35,280	38,640	38,640	1,840
22	36,960	1,260	36,540	40,020	40,480	1,380
23	38,640	840	37,800	41,400	42,320	920
24	40,320	420	39,060	42,780	44,160	460

Figure 2

increase in lease price at the beginning of the second one-year term, since we cannot know in advance how much it will be.

Early termination charges are shown in columns 2 and 6. The numbers in Column 2 are the product of $1,680 times the LRA values in Figure 1. The numbers in Column 6 are the product of $1,840 times the values in the LRA column of Figure 1 in months 13 through 24 (as explained previously) and are repeated for each year of the lease period under consideration.

Finally, the numbers in columns 3 and 4 are the total cash outflow if the lease is terminated early at the month shown (not including sales tax). The numbers in Column 3 are the sum of the prior month amount from Column 1 — that is, the monthly lease payments to date — and the current month termination payment from Column 2.

The numbers in Column 4 are the sum of the prior month lease payments from Column 5 and the current month termination charge from Column 6.

Comparing columns 3 and 4 in Figure 2, we see the two-year term is less costly if the 3211 is kept for more than 12 months.

Let us assume, however, that you would know at the expiration of the one-year extension what the correct number of months for a less than one-year second extension would be and that you would thereby be able to avoid early termination charges. Comparing columns 3 and 5, we see that the least costly method of leasing for a period of 13 to 15 months is a one-year extension followed by an extension of one, two or three months.

But for a period of 16 to 24 months, the total of monthly lease payments and early termination charges under the new two-year Supplement is less than monthly lease payments alone under two extensions. This is a finding worth considering seriously.

To repeat, for it is surprising, the current discount structure of the 3211, to which we have just applied a cost accumulation procedure, is such that, when combined with the LRA termination charge formula, *it costs less to sign for two years and cancel during the final nine months than to lease for a precise 16- to 23-month period.*

Further, we have obtained this result without considering the present value of money or factoring in a probable increase in the monthly lease payment at the beginning of the second term.

For the circumstances of this case, therefore, you would choose a two-year LRA term as the option which will certainly be least costly, whether you trade in the 3211 for a 3800 after 18 months or keep it for the full term.

The Context of Incentives

Placing the increased financial incentives of the two-year LRA lease in proper context is both a speculative endeavor and an evaluation which each installation's management must make by taking into account the shop's growth pattern, its tendency to stay at the leasing edge of hardware and software technology and the direction of its major application development efforts.

Certainly there is a correlation between the highly visible reductions of purchase price we have witnessed during the past year and the several relatively obscure financial incentives of the LRA, which have been analyzed here.

Many knowledgeable users await the announcement of the next real generation of IBM hardware, viewing recently announced systems like the 370/155 as transitional models. At the same time, acute shortages and horrendous lead times are the rule for many lines of IBM equipment.

A long-term commitment to a tape drive is not equivalent to a long-term commitment to a terminal or teleprocessing controller. The tape drive is not likely to stand in the way of user progress; but a teleprocessing device unsupported by the interactive financial program product desired by a powerful user could become useless in some environments.

Recent price/performance trends might give pause to the larger shop's DP executive when it comes time to renew a lease for a group of 3330 Model 1 disk drives. But in a stable DOS/VS shop which carefully limits its disk requirements, another two-year lease of these disks might be a very sound, economical management decision.

So the advisability of leasing depends upon the particular equipment, both in the context of a particular installation's DP objectives, scale and state-of-the-art inclinations and relative to the particular machine's progress toward obsolescence.

Marcia L. Geyer is president of Geyer Human Information Services, Inc. in New York City. Her firm, which offers DP management consulting services to users and vendors, specializes in the writing, negotiation and administration of contracts, in management planning assistance and in analyses of technical and financial problems and goals.

Geyer began her career in DP at IBM's Systems Development Division in Poughkeepsie, N.Y. She spent several years with American Airlines as a systems programmer and DP training coordinator and with Inco Ltd. in several DP management positions.

Editorial

Communications Bill of '78

No one likes to have his security blanket wrenched away from him with unexpected vigor. But that is what the Communications Act of 1978 would do to many sectors of the common carrier area if it is enacted into law in its present form.

Already there are rumblings that the long, drawn-out rule-making proceedings before the Federal Communications Commission actually have a "stabilizing effect." Others claim that the so-called Section 214 authorizations which explore a carrier's ability to provide service are provisions which must be tolerated.

These statements are motivated by the uncertainty of what a deregulated industry would spawn: Those previously favoring an AT&T with freedom to compete now ask for guarantees against unfair competition: And the prospect of an independent Western Electric Co. is tempered by the thought that such a vendor, if it chose, would have quite a clout in the medium-scale mainframe area.

In the shorter term, it is puzzling to consider the role of a competitive AT&T affiliate without in-house Western Electric equipment to offer. Even the most effective network suppliers need the latest equipment to get the full benefit from their service. Would a phone company without a manufacturing affiliate have to bargain on the outside for its equipment like everyone else?

The key element remains whether Bell can be persuaded that entry into DP is worth casting off Western Electric. Up until now, the phone company has introduced terminals, such as the Dataspeed 40/4, that operate with DP-type functions, and it has offered Transaction Network Service as a possible forerunner of more extensive services tailored to DP users.

With its features encroaching more and more into the DP area, Bell is much safer under the protective umbrella of regulation. AT&T has never said it favors full competition in nonregulated areas for itself. Perhaps it considers that too much of a business risk, even for a separate affiliate.

The features of the communications act concerning competition are obviously aimed at Bell. It remains to be seen how the phone company will react. More important, if members of Congress see this as legislation that threatens their communications carrier supporters, including Bell and the unions, the bill may never get passed, regardless of its merits.

Hearings scheduled to start in July will help determine whether this bill can reshape an area bogged down in regulations into a streamlined industry full of innovation and altornatives that allow usors to get the business communications they need.

Application That Hits Home

Of the hundreds of applications one can read about in *Computerworld* every year, few have such a direct, positive impact on the little man as the recenty implemented computer system in New York City's housing courts [CW, June 19].

In recent years, tenants have threatened to withhold payment of rent and in fact have withheld those payments as a weapon of last resort when necessary repairs have not been made on their apartments, This action has landed many tenants in court as defendants in suits charging nonpayment.

It is difficult for the tenant under such circumstances to gather much evidence against the landlord except for the few items in dispute within the tenant's own apartment.

Now, however, with the computer terminal right at the bench, the housing court judge hearing a case can access a data base of information maintained by the city on each landlord and his buildings, including such data as the number of complaints against his properties, the number of code violations uncovered by city inspectors and whether the landlord is up-to-date in his tax payments. The judge can determine pretty quickly what kind of landlord he has before him and whether the tenant has a legitimate reason for withholding rent payments.

Under consideration is a very useful by-product of the system — a plan to sell computer printouts of the housing data to make public information on the buildings in the city and to encourage potential litigants to act.

This could go a long way toward making landlords live up to their end of lease agreements, providing better living conditions.

Data Past

Five Years Ago
June 27, 1973

NEW YORK — In one of its strongest moves to date, the Justice Department asked Judge David N. Edelstein to impose stiff civil and criminal penalties against IBM if it continued to refuse to turn over documents to the government for its antitrust action.

Eight Years Ago
July 1, 1970

WASHINGTON, D.C. — An investigation by the National Bureau of Standards found that the noise levels in computer centers were frequently of sufficient magnitude to cause permanent hearing damage in addition to "relatively simple errors by programmers."

'Guess What — This One's Empty, Too!'

Letters to the Editor

'Congratulations, Wisconsin'

Concerning "Wisconsin Kills 4% Sales Tax on DP Services" [CW, June 12], congratulations to all data processors in Wisconsin, especially to the members of Cute and specifically Glenn Jacobson.

The repeal of the unfair tax is another link in the chain that our industry is forging to solidify our stand throughout the country on this issue. As national coordinator for the Data Processing Management Association's (DPMA) Sales Tax Subcommittee, I am most encouraged by the "grassroots" effort (as exemplified in the Wisconsin case).

With recent victories in at least six states, we are an active force that state legislators and taxing authorities now respect.

Steve Vajda
Miami, Fla.

DP Studies at Southwest Texas

The computer scientists of the Department of Mathematics at Southwest Texas State University are concerned that *Computerworld* readers may form an inaccurate and negative impression concerning the philosophy and structure of computer science studies on our campus ["DP Graduates Lack Business Savvy: Survey," CW, May 8, and "A Sad State of Confusion," CW, May 22].

The Department of Mathematics offers a B.S. degree in computer science which is modeled after the Association for Computing Machinery's Curriculum '68. We also offer a teaching field in computer science, a graduate [M.A./M.S.] minor, and hope soon to offer the M.S. and M.A. degrees in computer science.

The Department of Accounting and Computer Science offers a bachelor's in business administration with a concentration in computer science and a bachelor's degree in management information systems.

Grady Early
S. Gene Crossley
Southwest Texas State University
San Marcos, Texas

Federal Government and DP

The front-page article "Government Treating DPers Ineptly" [CW, June 5] mentioned, in passing, the "noncompetitive [government] salaries for [both] entry-level programmers and highly technical jobs . . . " All too often, such statements go unchallenged and are accepted as fact by an uninformed public.

Our firm specializes in recruiting computer professionals. During the last 10 years, our Washington, D.C., area office has been extensively, and exclusively, involved with the local employment marketplace. Based on our observations, the federal government has consistently been more than competitive at all computer industry hiring levels except top management. The entrenchment of present management is the source of that problem.

David Samuelson
Quest Systems, Inc.
Washington, D.C.

Preventing Privacy Abuses

Matching welfare rolls, tax rolls and payrolls should not pit efficiency against privacy. Corporations and tax agencies, which lend their files to welfare agencies, should first delete personal details.

The loan of a bare list of numbers, names and addresses of taxpayers or employees whose income exceeds welfare eligibility would prevent abuse.

Richard H. Shulman
Bronx, N.Y.

The Human Connection

Listening Skills Key to Understanding Users

**By Jack Stone
And Ida Mason**
Special to CW

Yet another of the bewildering contradictions within our bizarre business is the use of ambiguous communications between the user and the analyst as the basis for systems design and programming. While everybody agrees that information systems development is an area in which there is no room for communications ambiguity, how often have you completed a conversation with one of your compatriots about a technical matter and felt you weren't really sure you made your point or you weren't completely certain you understood the other person's position?

We submit that what's lacking in the user/analyst dialogue is the capability for each of the parties to listen.

You see, most people have relatively little difficulty speaking to others since there is some measure of ego-display involved. But to listen, and listen closely enough to derive meaning and understanding, requires a temporary restraint on one's ego forces, and many are reluctant to exercise that restraint.

Ido Moson recently attended an informative seminar on business communications presented by Borboro Gennett of the Deerborne School of Corol Gobles, Flo. Gennett's views include some interesting and practical insights which may have value to the information system community. Here is Ido Moson's report on the seminar highlights:

In today's world, it is the spoken word, not the written word, which is the most influential medium of communication. In less than 100 years, we have progressed from Alexander Bell's primitive telephone to worldwide satellite communication systems that transmit telephone conversations, television pictures and digital data instantly between continents. Yet with all these communications facilities available to us, it is ironic that, on occasion, little information content is actually transported.

This may be the age of electronic communications services, but it is also the age of serious gaps in understanding. There are well-known and critical gaps between parents and children, between governments and governed, between nations and between races. Despite the many aids to human communications, we too often fail to convey our ideas to others or get their ideas from them.

Communications Snags

Let's briefly examine some of the problems that we encounter in oral communications.

Most people pay only "selective attention" to what they hear, in that they listen most closely to ideas with which they already agree.

It should be no surprise that people are not open to all points of view. Democrats listen to Democratic speakers. Businessmen listen to the businessman's point of view.

When we encounter ideas we don't like, we sometimes reinterpret them to make them conform with our own notions. We humans also show a greater ability to remember material that agrees with our position and forget material that opposes it.

Other difficulties arise when spoken words call up the wrong images in the listener's mind. Obviously, the meaning of words depends on both familiarity and the feelings that are aroused. For example, the word "citation" could mean either merit or traffic ticket, depending on our past experiences.

Then there are the confusion factors sent via nonverbal communications, gestures and facial expressions. Unintended meaning may be conveyed from a listener's smile or frown or seemingly indifferent stare. Or a speaker may say he is requesting something when his expression and posture suggest he is really demanding it.

We should realize that in all phases of our life — at business, in the home, during recreation periods — our experiences are vastly different. For successful communications, we must listen carefully. We must be very tolerant and patient in trying to understand the viewpoints, and ideas of others.

We must nurture curiosity. 'We must want to discover and learn from the experiences of others. Although it is rare to find a speaker with the final truth, it is just as rare to find a person who doesn't have something significant to say.

John Culkin's comment certainly applies to all walks of life: "Communication consists not in saying things but in having them heard."

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

The Taylor Report

'Claims-Made' Insurance Covers DP Malpractice

By Alan Taylor
Special to CW

I recently commented about the DP errors and omissions policy of one of the major insurance companies [CW, June 12]. Now I have received a copy of a very different policy — a real malpractice policy for DPers.

Tully of America, Inc., headquartered in Indianapolis, Ind., tells me it has just started issuing the policy, having recently gotten backing from some of Lloyd's of London's underwriters. The firm's background is in malpractice in general, rather than in DP. It's worth commenting on the policy's provisions.

'Claims-Made' Coverage

There are two types of basic malpractice insurance, the "occurrence" type and the "claims-made" type. Under the first type, coverage is generally provided for any act or omission that occurs during the policy period, regardless of when the claim is made. By contrast, the "claims-made" type offered by Tully covers the claim regardless of when the problem occurred.

Naturally, there is a requirement that denies coverage for prior acts if they are known and concealed at the time the policy was issued.

There seems to be a question as to the validity of the claims-made policy in view of certain public policy considerations. The California insurance code asks for a prominent notice on the front page of claims-made policies bringing this question to the user's notice.

Claims-made policies usually cover something that has occurred, but for which a formal claim has not been made during the period. The method used to keep coverage going is for the professional concerned — doctor, lawyer or DPer — to give written notice of the occurrence of possible future claims before the policy's expiration.

The insured usually furnishes the insurance company with a list of every act and omission he reasonably considers may some day result in a claim and, of course, he keeps a copy of the list.

In fact, in deciding between policies it is particularly important to look at the termination situations, particularly why a company may unilaterally cancel or refuse to renew a malpractice policy. Usually the insured has the right, for some additional premium (such as 10% of the annual fee) to secure a limited extention of the coverage so that new coverage can be obtained.

The second major provision, coverage for errors and omis-

(Continued on Page 24)

Reader Commentary

Reader Explains Routine For Finding Julian Hours

By Richard Sternbergh
Special to CW

I recently developed a new Julian hour routine for use on the IBM 360 at my place of employment. Recalling a series of letters to the editor in *Computerworld* on this subject, I thought I'd share it.

It is based on the fact that there are approximately 365.25 days per year. The extra quarter days are incremented every four years. Therefore, the number of days between the beginning of this century and the beginning of any year is given by:

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(Year is two digit year)
DAYS=YEAR*36S.2S
```

This result should be truncated to a whole integer.

The number of days since the beginning of the year until the end of the the previous month is best found in a table lookup, since the lengths of the months do not follow a mathematical pattern. Each element of the table is the sum of previous element and the days in the previous month; for example, 0,31,59 and so on. The number of days until the end of the last month would be:

```
DAYS=DAYS+TABLE(MONTH)
(Days from previous computation)
(Month is current month)
```

Adding yesterday's date (TODAY-1) yields the number of days since 1900. Multiplying by 24 and adding the hour (on a 24-hour clock, 0-23) gives the final result, the number of hours since the base data/time of Jan. 1, 1900, 00 local time.

```
DAYS=(DAYS+TABLE(MONTH)
+TODAY-1) * 24+HOUR
```

The only exception occurs when the date is itself in a leap year. The algorithm places the extra day between December and January, while the calendar makers placed it between February and March.

Therefore, we have to "postpone" its "addition" until after

(Continued on Page 24)

```
FUNCTION JULHR (YR, MO, DA, HR)
IMPLICIT INTEGER (A-Z)
DIMENSION MODAYS (12)
DATA MODAYS/0, 31, 59, 90, 120, 1S1, 181, 212,
243, 273, 304, 334/
JULHR=IFIX (YR*365.2S)
JULHR=(JULHR+MODAYS (MO) + DA-1) *24+HR
IF (MOD (YR,4) .EQ.O.AND.MO.LE.2) JULHR=JULHR-24
RETURN
END
```

Julian Date Algorithm

Policy Aimed at DP Malpractice Protection

(Continued from Page 23)

sions against legal defense costs and damages, is fairly standard. However, the policy doesn't directly state what will happen if a malicious employee, who is reasonably supervised by the professional, actually causes the problem.

The policy's limits of $100,000 to $500,000 are probably reasonable at this time. The type of error a computer specialist can make can easily cause $100,000 worth of damage.

The upper limit of $500,000 might certainly be too low for a realistic situation, but it is a lot better than nothing.

Until experience has determined the extent of DPers' malpractice exposure and how it can be controlled, it is reasonable to expect somewhat lower limits than those for other types of insurance for which the limits have been set by many years of experience.

The deductible is also a fairly standard amount. I'm not too happy about Tully's limits of $2,500 to $5,000. When the situation of a single programmer is compared with that of a software house, one or the other of these is too low or too high.

There obviously has to be a deductible, but a range of $1,000 to $10,000 would give a better feel for the real situation.

Potential Buyers

The most interesting part of the whole operation is speculating on who will want such a policy. The Tully malpractice policy can be bought by software houses as well as by systems analysts, programmers and people who run service bureaus.

In each and every situation, this coverage will greatly improve the contractual situation of a person in modern-day business. More and more analysts and programmers are providing services as individuals, either directly to a client or by subcontracting. And more software houses are emerging as the real centers of activity, with the hardware selection being so rich that any of a number of mainframes is suitable. That good software should be able to move from one mainframe to another while still retaining maximum efficiency.

Service bureaus or people providing services for others are also coming into their own as a result of networking and other communication methods. All these outfits have not been able to offer any really substantial coverage to their clients. Normally they have, in fact, used the overly severe contractual restrictions that originated with the 1960 contracts for hardware. Few of them even offer the $100,000 maximum liability restricted coverage available from IBM.

Now these enterprises can beat IBM and show a competitive advantage by offering equal or better coverage limits — through an insurance policy backed by Lloyd's of London.

From a marketing point of view as well as from a professional point of view, I see malpractice policies assisting in providing the surety that people need before they will give their contracts out to software houses, systems analysts, programmers or processors. And, with these premiums, there are many outfits that could take the whole cost — $300 to $2,500 — in their stride.

How this particular policy will work out is anybody's guess. It will be interesting to visit with Tully in 18 months to two years and to keep a watch for other policies being offered in this area. You can keep track by reviewing the "Agent and Buyer's Guide," which your local independent insurance agent can get for you.

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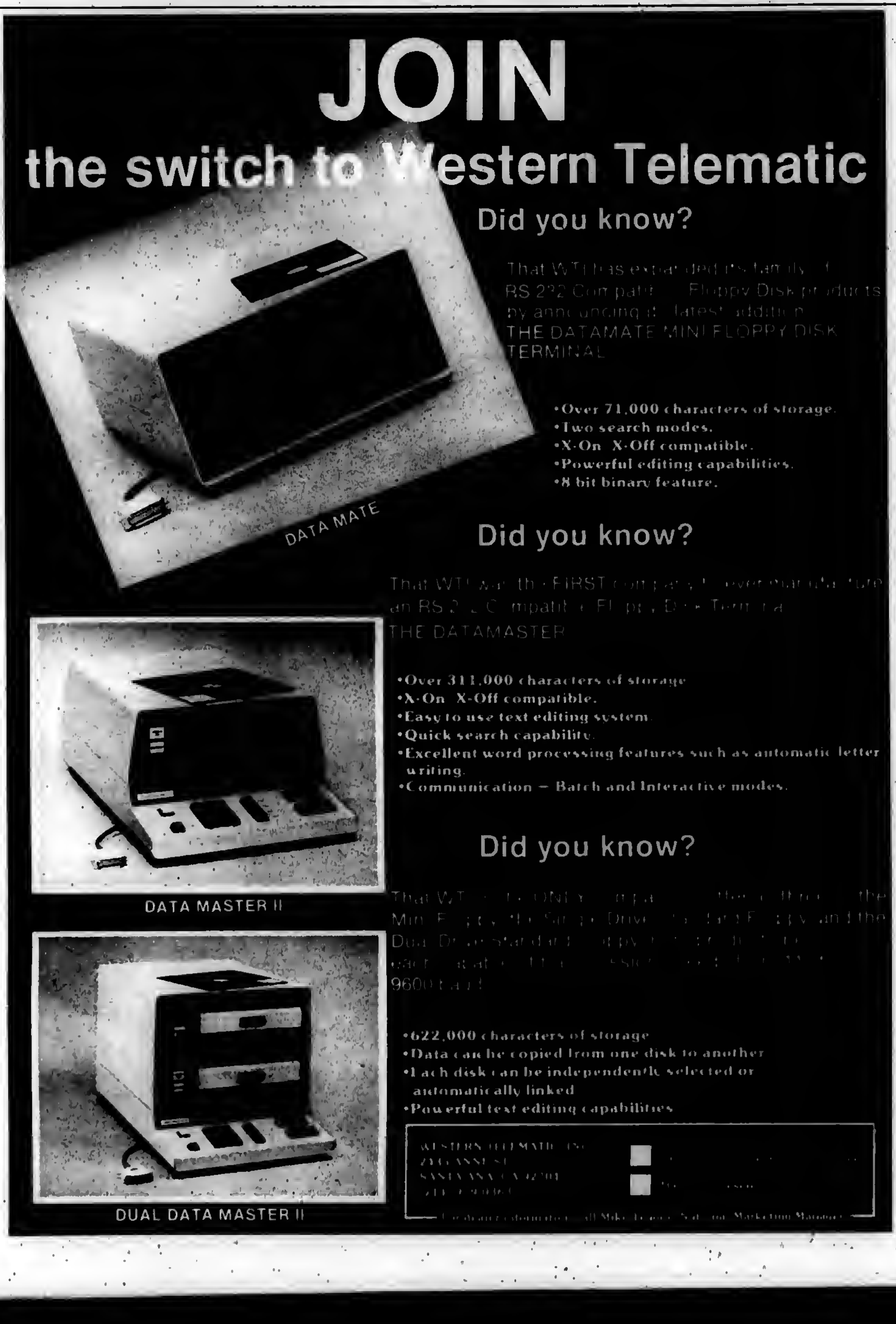
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Reader Details Julian Routine

(Continued from Page 23)

February.

The code shown on Page 23 would implement the algorithm in IBM 360 Fortran IV.

The IFIX is used to indicate the truncation and storage of the REAL result into the INTEGER JULHR. This is not necessary as this compiler does that when attempting to store REAL into INTEGER. To emulate the MOD function in Cobol, divide YR by 4 with the REMAINDER option and test if the remainder is 0.

The function, as written is valid until midnight, Dec. 31, 1999; using a 4-digit year minus 1900 will increase its life to the year 2099.

Since centuries are leap years only when divisible evenly by 400, any further extension requires another decision, eliminating the leap day in the years 2100, 2200, 2300, 2500 and so on. Since this won't be needed for 122 years, the overhead was deemed unnecessary.

Regarding storage requirements, all variables could be halfwords (or two to three decimal digits minimally) except for JULHR, which requires a fullword or seven decimal digits (the end of 2099 is 1738847 Julian hours).

Another UK Offering

CIS Cobol Extensions Aid Small Sites

LONDON — The Compact Interactive Standard (CIS) Cobol compiler now available from Micro Focus Ltd. for use on Intel 8080 and other microcomputers and small business systems was described as a subset of the ANS Cobol 74 specifications with extensions particularly useful for interactive DP.

The enhancements provide for interactive working, program control of files, text file handling, rapid development and testing, a spokesman explained.

These facilities permit the programmer to specify everything for the application from one place, the Cobol program itself. For example, the spokesman said, all operational control is inside the program; there is no need for external job control definition or screen definition.

In particular, CIS Cobol provides advanced screen formatting and data entry facilities, runtime input of file names, line sequential files and hexadecimal literals, he noted. Upper and lower case printouts are also possible, providing easy reading of reports, he continued.

During development, compiled programs can be loaded directly by the runtime system "fast load" facility, avoiding time otherwise spent in linking. The compiler is said to accept its own list file as source code so the user can develop programs quickly and easily from the CRT.

Interactive debugging is said to permit the setting of breakpoints, along with the examination and modification of memory locations as those points are reached during execution. Each Cobol statement is identified by a four-digit hexadecimal number, the spokesman noted.

The single-pass compiler is available in two forms, as a single monolithic program suitable for residence in read-only memory (ROM) or as an overlaid program, suitable for a disk-based system but taking a minimal amount of memory. The overlaid version consists of a base module and three overlay modules which are loaded successively during compilation, he said.

End users can acquire the overlaid version, distributed on a floppy disk, for $500. A range of supporting programs, including a sort and the ROM-based compiler, are available at additional cost.

Micro Focus is interested in establishing U.S. distributorships, the spokesman added from 18 Vernon Yard, Portobello Road, London W11 2DX, England.

Meeting This Week to Show Broad View of Productivity

ARLINGTON, Va. — The Second Annual Conference on Computer Systems Productivity, to be held at the Ramada Inn Rosslyn here Wednesday, Thursday and Friday of this week, will focus on both people and machine factors, according to general chairman Kendall E. Burroughs of the U.S. Chamber of Commerce.

The keynoting chores, for example, will be shared by Arthur Kirsch, vice-president of Citibank, who will discuss "Integrating Computer Systems Into the Organization," and *Computerworld* columnist Jack Stone talking about "Enhancing Productivity Through the Human Connection."

Structured Analysis

Wednesday morning will end with a session on structured analysis chaired by Dr. Thomas E. Kirchgessner of the University of Southern California and a luncheon talk by John C. Collins of General Scientific, Gaithersburg, Md.

The first afternoon will include two concurrent panel discussions, one focusing on distributed systems made up of minicomputers and microcomputers, the other on "Efficiency in Data Center Management." Thursday morning will follow the same pattern, with sessions on simulation to increase productivity and computer performance measurement.

Albert Eisenstat, vice-president of Tymshare, will speak on time-sharing in the 1980s at Thursday's luncheon, and a trio of concurrent sessions will fill in the afternoon. Subjects to be covered will be "Security and Privacy in Information Systems," "Managing Human Resources" and "Auditing the Computing Function."

'Update for Professionals'

Friday morning will start with three addresses under the general title "Update for Professionals" and end with two more under the umbrella "Waves of the Future."

The update sessions will include Assistant Prof. Donald V. Steward of Virginia Commonwealth University on "Use of the Computer to Define Systems Structure," Richard A. Mackay of the Federal Home Loan Mortgage Corp. on "Development of a Data Processing Steering Committee" and Dr. Donald Fitzpatrick of Arthur Young & Co. on "The Integration of the DP Function With Organizational Goals."

Presented by the Institute for Professional Education, the conference costs $325/person, including lunches and all meeting materials but not hotel accommodations.

The Ramada Inn Rossyln is at 1900 N. Fort Myer Drive, a spokesman noted from the institute's headquarters across the street at 1901 N. Fort Myers Drive.

'Resolve' Update Introduced; MVS Support Downplayed

SUNNYVALE, Calif. — Reversing a trend in many package upgrades, Release 1.3 of the Resolve computer operations support system from Boole & Babbage, Inc. is specifically directed at enhancing its use on non-MVS systems.

The package already included a number of services to help MVS and other IBM OS and OS/VS users eliminate system problems which, unresolved, cause sluggish performance and, in a number of cases, unscheduled "crashes" followed by IPLs, a spokesman said.

Under the lastest release, however, the VS1 user's ability to run Resolve outside a partition was described by the spokesman as a major enhancement. This facility makes it possible to begin using Resolve without disrupting job scheduling or class and partition assignments, he explained.

Another extension provides five functions directed toward the users of IBM's Time Sharing Option (TSO). This service can be used to examine the status of TSO users, their CPU swapping, occupancy time and main storage usage, the spokesman noted.

A "Buffers" function permits the TSO user to evaluate the availability of buffers and their effect on system performance. A "Regions" function displays TSO user queue status and a "Locations" function provides systems programmers with access to the addresses of key TSO control blocks.

The overall TSO support will supplement Resolve's other capabilities and further enhance the user's ability to communicate with the operating system and determine job and system users' status, the spokesman added.

Depending on system and site requirements, Resolve costs $5,000 to $21,000, he said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

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Editor Aids DG Users

ROCHESTER, Minn. — An editing system from CRR Associates dubbed Credit enables users working with RDOS-oriented Data General Corp. minicomputers to edit text at a CRT screen more easily than with DG software, CRR claimed.

Credit is said to support full screen — 24 lines of 64 characters each — context editing as well as complete mobility to move through a file forward or backward. Insertion or deletion of individual characters or entire lines is permitted with Credit, the spokesman said.

Lines can be copied from one file to another and between two places in the same file; the editor also supports string search and replace commands, he added.

The user has the ability to alternate editing between two independent files — or different positions in the same file — without losing his current location in either file.

Credit is provided on 9-track, 800 bit/in. magnetic tape in RDOS Dump format, he said, adding that the editor can be licensed for $500.

CRR Associates is at 2120 67th St. N.W., Rochester, Minn. 55901.

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'Secure/IMS' Guards Data From Invalid TP Accesses

SACRAMENTO, Calif. — Described as "maintaining 100% compliance" with the Privacy Protection Study Commission Report of 1977, Secure/-IMS prevents unauthorized access to on-line IMS data bases through the teleprocessing (TP) network, according to its vendor, Software Module Marketing (SMM).

Attempted violations are reported by Secure/IMS within seconds, a spokesman claimed, adding that hard-copy audit reports detail all activity on the system by date, time, operator, terminal and type of work performed.

Operators are given customized menus that allow them to select and work on only those applications for which they are authorized. Operators may move from terminal to terminal, for example, in the event of hardware failure, he added.

Chargeback Billing

At the same time, the optional Transaction Billing System — also available from SMM — interfaces with Secure/-IMS to provide direct chargeback billing for specified cost centers. But billing is done only for those transactions controlled by Secure/IMS, the spokesman emphasized.

While Secure/IMS provides support for operators, auditors and management, it imposes no special burden on programmers. No changes in application program coding is needed to install Secure/IMS, he stated.

The Transaction Billing System utilizes the long-term history file from Secure/IMS and a cost schedule specified by the installation management. Costs are determined for individual transactions (or functions), areas supported by one or more functions and cost centers made up of areas.

Secure/IMS costs $30,000. The Transaction Billing System is available for an additional $10,000, the SMM spokesman said from the Crocker Bank Building Penthouse, 1007 Seventh St., Sacramento, Calif. 95814.

'CAM' Eases Finance Plans

FAIRFIELD, N.J. — A comprehensive Capital Asset Management (CAM) system of interrelated modules is now available through the facilities of Rapidata, Inc., according to a spokeswoman for that remote computing services firm.

Described as a project evaluation and management tool for financial managers, CAM is composed of three major modules: Capital Budgeting and Analysis (Capbud), Capital Project Financial Analysis (CPFA) and Capital Tracking (CPTrac).

Capbud is said to assist users in optimizing capital project returns and in assuring a project mix and risk profile consistent with a corporation's objectives, the spokeswoman said. Project profitability screening and ranking and consolidated, pro forma projections based on user-determined input are key capabilities, she noted.

CPFA assists the analyst in minimizing financing costs. It includes programs for both investment and financing analysis.

CPTrac monitors and forecasts project implementation costs to quickly spot overruns and minimize excess cash reserves, she continued.

The nationwide service is headquartered at 20 New Dutch Lane, Fairfield, N.J. 07006.

SPSS Available On Calldata Net

WOODBURY, N.Y. — The facilities of the Statistical Package for the Social Sciences (SPSS) from SPSS, Inc. are now available as a batch-oriented offering on the Calldata Systems, Inc. remote computing service network.

The package offers users a comprehensive set of procedures for data transformation and file manipulation and a large number of statistical routines commonly used in the social sciences, according to Calldata.

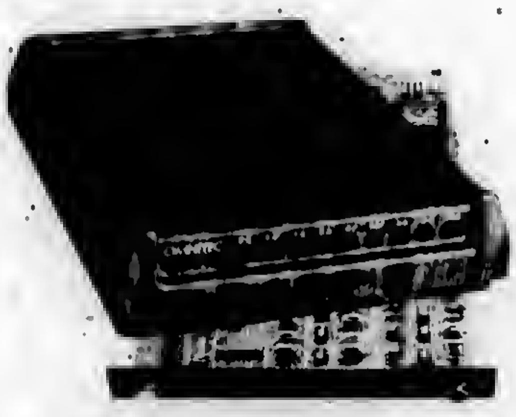
In addition to descriptive statistics, simple frequency distributions and cross-tabulation support, SPSS contains procedures for simple correlation, partial correlation, means for variances for stratified subpopulations and one-way or n-way analysis of variance, the spokesman said.

Multiple Regression

Other facilities are said to include multiple regression, discriminant analysis, scatter diagrams, factor analysis, canonical correlation and Guttman Scaling.

The data management facilities can be used to modify a file of data and can be used in conjunction with any of the statistical procedures, the spokesman added.

While its network facilities are available nationwide, Calldata is based here at 20 Crossways Park North, Woodbury, N.Y. 11797.



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We bit the bullet and did it, and now it's behind us. Our users, many of whom literally run their businesses or organizations with IDMS, need these capabilities to meet their needs for the future. In all cases they receive IDMS release #5 at no cost, and since it is fully compatible with IDMS release #4.5 there is no conversion cost.

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Package Aids Utilities

ANDOVER, Mass. — The unique requirements of utilities and the construction and energy distribution industries can be handled by the IBM 360- and 370-oriented Financial Reporting and Work Order Management System (FR/Woms) now available from Software International, according to a spokesman.

Major areas handled by FR/Woms are work order processing, performance reporting, project tracking and regulatory reporting. Generation of consolidated operating statements and support for budgeting are also highlights of the system, the spokesman noted.

The work order processing reportedly includes support for new construction and maintenance projects, the handling of capitalization and transfer of funds and the recapping of life-to-date information for open work orders.

The performance reporting facilities utilize a data base containing up to 10 years of experience, which can be used for trend monitoring while the project tracking feature highlights projects costing more than user-specified limits.

The spokesman also noted that the system handles Federal Power Commission 100 and 300 series accounting when that is appropriate.

The package costs $47,500 for the DOS version and $52,500 for the OS implementation. Software International is at Elm Sq., Andover, Mass. 01810.

Interdata Users Offered Multifunction Accounting

AUSTIN, Texas — An accounting package said to allow users of Interdata's 16-bit minicomputers to perform a range of functions without program modification, AIS-10, is now available from AIS Data Systems, Inc.

The package includes general ledger, accounts receivable and payable and payroll functions. The logic is tailored to the using installation when its chart of accounts is established, a spokesman noted.

Among the general ledger facilities is support for unlimited subaccounts, multilocation and departmental financial statements and unlimited source journals. Consolidations and closeouts are handled automatically and budgeting, comparative studies and job-costing reports are also part of the system, the spokesman said.

The accounts receivable subsystem can furnish either open item or balance forward statements, in addition to supporting finance charge calculation, statement cycling, group reporting, aging and detailed receivables reporting along with automatic posting of descriptions.

Payroll Subsystem

The payroll subsystem can deal with multiple pay rates; salaried, hourly and mixed earning periods in the same process; input overrides on pay rates or deductions; tax computation based on annualized earnings; and other "special situations," the spokesman claimed.

AIS-10 was designed primarily for small and medium-sized business environments, he said, pointing to support for prior period reporting "after a fiscal year has closed out" as an example of how "user-oriented" and "forgiving" the system is.

The package has been implemented on the Interdata 16-bit minicomputers and is scheduled for adaptation to the Texas Instruments, Inc. 990 environment as well. It is available for $7,500.

AIS can also provide the appropriate hardware for "less than $15,000," the spokesman said from Suite 101, 5511 Parkcrest, Austin, Texas 78731.

Program Tests Print Systems

ANAHEIM, Calif. — A program for testing the quality of virtually any printer that can be attached to an IBM OS or OS/VS system is now available from the Eon Co., according to a spokesman. The program is said to exercise all aspects of a printer's capabilities and clearly show any failure to the user.

No special knowledge is required, nor is any special setup needed; the test routine runs as a regular print job and the printer can be returned to regular production work as soon as the test is over, the spokesman said.

Breakdown Forewarnings

Used on a regular basis, the test routine can indicate when the printer is failing, before the breakdown occurs. It can also be used to compare print quality of different brands and models of printers, he suggested.

If the user is sure the printer itself is working properly, the Eon package can be used to test a communications network, documenting what was received, for example, for comparison with what was sent.

The package costs $190. Eon can be reached through P.O. Box 6375, Anaheim, Calif. 92806.

Correction

The UCC Three-Automatic Direct Access Management (Adam) package from University Computing Co. [CW, May 29] costs $11,000 regardless of the environment in which it is to be used, not the $15,000 originally reported, a UCC spokesman noted from Dallas, Texas.

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Every company has a great variety of different jobs that computers must do, but no two jobs are exactly the same. You need one kind of system for interactive applications like order entry. A completely different kind of system for real-time applications like running a lathe. It has to follow that no computer company can even begin to talk about "optimizing your network" unless it can give you a choice of computer systems as varied as your list of tasks.

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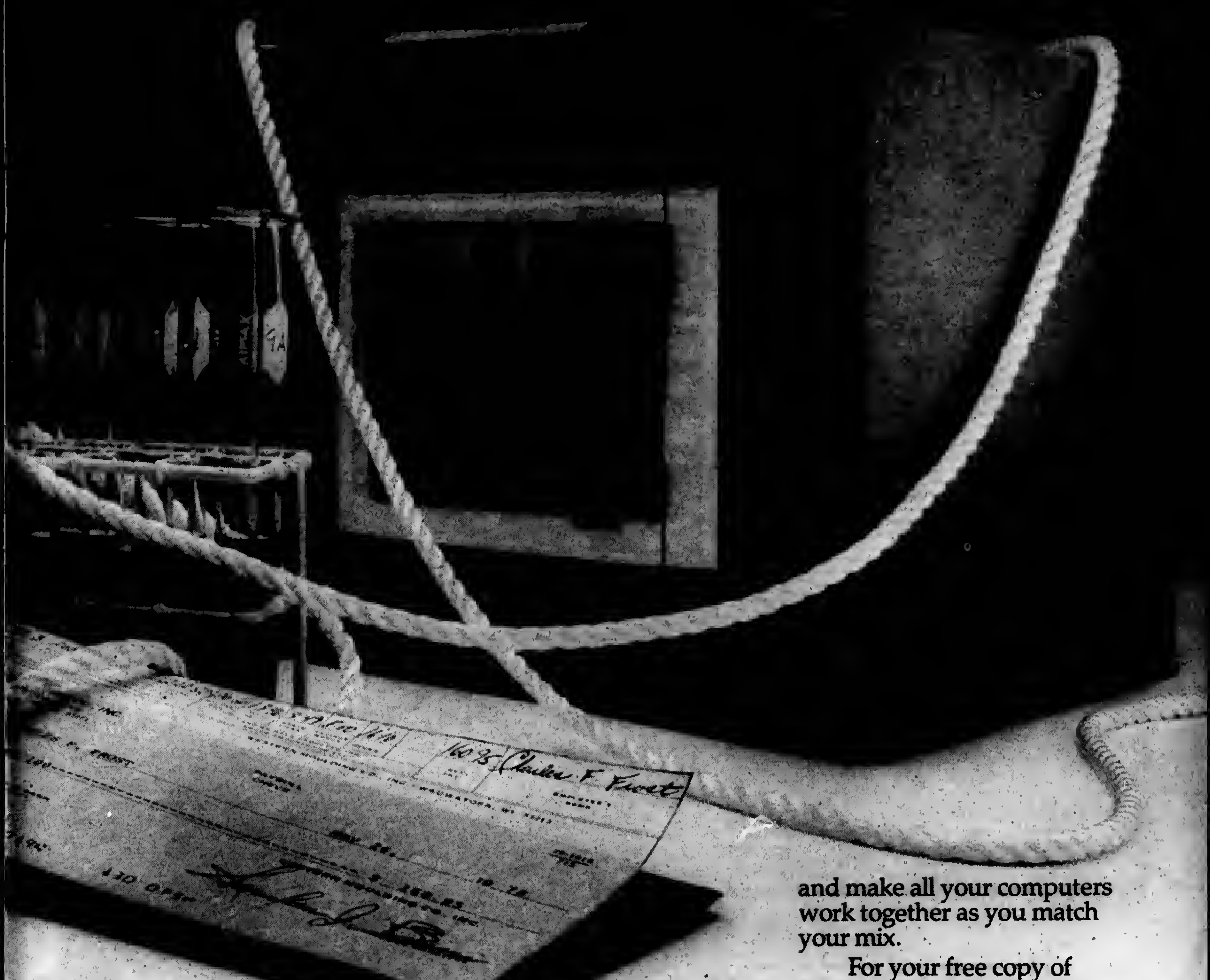
Massive real-time computational systems like 32-bit VAX-11/780 can be configured to handle everything from complex scientific, engineering and



business problems to simulation, large-program runs, and other applications requiring high input-output traffic in multi-user environments.

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CW6268

DBMS Impact Seen Unexpected by Managers

By Brad Schultz
CW Staff

ANAHEIM, Calif. — Management typically does not understand what the long-term impact of a first data base management system (DBMS) will be on its organization when it decides to "go data base." Nor does it usually make this decision on the strength of cost/benefit projections, even in cases where the choice eventually proves justified.

Panelists reached that consensus based on their personal experiences as DBMS users at a recent National Computer Conference session here entitled "Making the Decision to Go Data Base."

The U.S. Forest Service acquired its first DBMS piecemeal in response to diverse and somewhat independent demands for data generated by fluctuations in federal land use policy, according to Jon Kennedy of the government agency.

Chemical Bank of New York's highest officers decided to adopt a system with a leap of faith in its "pleading" DP management, rather than on the basis of cost/benefit analyses, the bank's Frank Korahais indicated. Richard Schubert of B.F. Goodrich Co. remarked this was also true of his firm's DBMS procurement.

Obvious Need

The panelists seemed to agree that a valid long-term cost/benefit projection is nearly impossible to make in evaluating such systems, although it may be obvious when some sort of DBMS is called for in the life of an organization.

For example, Chemical Bank's central DP section found itself besieged by demands for different types of data manipulation. The nation's sixth largest bank with about $30 billion in assets, Chemical needed "grass roots" information for its four principle divisions — corporate finance, international finance, personal services and trust banking — and the DP section began meeting this need with a DBMS structured according to function, Korahais explained.

Resistance Expected

Management should expect some resistance to the incorporation of a new DBMS on the part of some personnel, Schubert warned. Many people cannot conceive of performing their jobs in alternative ways and management may find a "moving around" of employees justified, he explained.

At Goodrich, a number of high-level administrators had to be removed before the firm's new system could be applied smoothly, Schubert recalled.

An important consideration in selecting a DBMS is whether data must be immediately up-to-date, Schubert continued, noting that in some applications, "instantaneous" on-line updating is needed while in other cases a dated memo scheme is adequate.

There is some controversy about the extent to which data must be centralized within a large financial institution, Korahais said, noting that Chemical favors a much more centralized arrangement than does Citibank.

The people who operate a DBMS as system analysts should be able to work well with personnel untrained in computer technology, and should recognize and appreciate what expertise other personnel do have, which might often be critical to the success of certain applications, Schubert said.

Student Stress

The session's chairman, Prof. James McKenney of Harvard Business School, remarked that the aspiring data base administrators among his students are often assigned "real world" problems in data base management without any opportunity for feedback from others. These students then learn the frustration of confinement to their own perspectives, McKenney said, and discover that "reality does not come in tidy little boxes."

Package Eases System/3 On-Line

SANTA ANA, Calif. — Any IBM System/3 Model 8, 10 or 12 can be on-line in a matter of hours while still retaining full batch capabilities with the Super 3 software and controller package now available from Memorex Corp.'s Business Systems Division, according to a spokesman.

The package utilizes a local display controller (LDC) and an information display system (IDS) that allow the System/3 to go on-line in only two steps, file definition and screen format design, he claimed.

Although times may vary with the size of the records and number of fields to be displayed, a typical screen formatting can be done in about 30 minutes, he said, adding that system generation, conversion and recompilations are not necessary.

In operation, Super 3 enables on-line, full security use of the System/3 for file inquiry, file update and data entry while batch processing is performed simultaneously, the spokesman asserted.

In system resources, too, Super 3 outperforms IBM software, the spokesman continued. IBM's Communication Control Program (CCP) requires about 48K of memory, but the Memorex software runs in only 10K to 16K bytes, he said.

The Super 3 package is available for lease or purchase. The lease cost on a three-year plan will be about $125/mo for Memorex's local display adapter (LDA) and $100/mo for the software.

The software can be used with an LCA/3271 and a LDA from IBM, the spokesman added from 3015 Daimler St., Santa Ana, Calif. 92705.

Book Discusses QA Teams in DP

WELLESLEY, Mass.— A methodology for implementing a quality assurance (QA) function in DP organizations is presented in a book just published by Q.E.D. Information Sciences, Inc.

Entitled *Effective Methods of EDP Quality Assurance*, the 340-page publication is said to offer a "how to" approach, bolstered by a sample QA manual.

The book costs $28.50 ($24.50 prepaid) plus $1.50 for postage and handling. It is available from Q.E.D. at P.O. Box 181, 141 Linden St., Wellesley, Mass. 02181.

Finances Run On PDP-11s

SUNNYVALE, Calif. — An on-line financial accounting system for use on Digital Equipment Corp. PDP-11s running under RSTS/E, FS-11 is now available from NCA Corp.

The system is made up of five subsystems integrated so one entry of data is carried through all appropriate operations, according to a spokesman. Currently available subsystems include order entry, sales analysis, accounts receivable, general ledger and accounts payable.

FS-11 costs $15,000 for the first module, $6,000 for each additional one, NCA said from 388 Oakmead Parkway, Sunnyvale, Calif. 94086.

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DBMS Setup Snags Held Usually Nontechnical

By Don Leavitt
CW Staff

ANAHEIM, Calif. — Most of the problems encountered in implementing a data base management system (DBMS) are not really technical, but that often makes them all the harder to solve, according to Hank Herre, manager of technical services or Fibreboard Corp. of San Francisco.

Appearing on a recent National Computer Conference panel here concerned with "Getting Ready for Data Bases," Herre urged anyone going into DBMS to understand, first of all, why a system was selected by their individual organizations.

The setting is quite different, he noted, if the choice was made because the company just wanted to keep up with the Joneses or if the selection was based on a serious evaluation of the system's capabilities.

Once the commitment is made, it has to be sustained, Herre continued. Because a data base system should be a model of the using organization itself, it could cause real strains that only strongly committed people could handle, he said.

in shaping the model, the data base people may well spot inconsistencies in the way the organization works. If that happens, those inconsistencies must be aired, discussed and resolved. Otherwise, the whole exercise is worthless, he warned.

Although he said he couldn't vouch for the absolute dollar amounts, Herre said he feels quite comfortable with the idea that for every dollar spent in implementing a DBMS, a corporation would easily have to spend $100 to back away later, whether bailing out of data base altogether or switching to a different system.

Political Problems

There are — or can be — strong political problems in the initial implementation, Herre cautioned. "Inevitably, someone will raise the question of who owns the data" along with the more serious concerns about who is responsible for maintaining it.

But someone has to make decisions, and they have to be sensible; it isn't necessarily wrong to round figures going into a sales analysis report to the nearest $100, for example, but figures used in accounts receivable and accounts payable "better be a lot more precise than than," he said.

In simple terms, "the best message I can leave with you," Herre concluded, "is to take your time. Time is the one thing that doesn't cost much. Use it, but use it wisely."

Panelist Jim Emerson, now with Peat Marwick Mitchell and Co., recalled his experiences at Norwalk, Conn.-based Burndy Corp., and his message was much the same as Herre's. Start by recognizing the major entities in the organization, what their processing needs are and what effect that processing has on the data entities and the organization, he urged session attendees.

The choice of the first application is important, psychologically for the implementers and politically for the organization. He said it should be a visible application, but not a complicated one.

It is better, he added, if the activity to be supported is peripheral to the corporation. "But don't pick something that is too trivial" — that makes the whole of DBMS seem trivial, he explained.

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'Jars' Adds Graphics Output

McLEAN, Va. — Release 3 of the IBM OS-oriented Job Accounting Report System (Jars) from Johnson Systems, Inc. includes an additional set of system use reports and "significant" enhancements to the basic package, according to a spokesman.

The extended capabilities are said to be particularly valuable to the OS/MVS user. All the relevant data captured by the MVS implementation of IBM's SMF is now "readily available" through Jars, both in the system use reports and as data elements in Jars report program, he explained.

Jars has been described as a comprehensive computer utilization reporting and billing system, tracking the DP environment and related activities. The system provides an accounting of all system resource use to assist DP management in financial control, operations monitoring, systems tuning and resource planning, the spokesman said.

The newly available system use reports are a set of graphs and tabular printouts which amplify the basic usefulness of Jars, he added. They were designed to help profile system utilization, identify trends and plan future workloads and resource requirements.

Although Johnson provides control cards to trigger production of what it feels are a good basic set of reports, the system also includes facilities by which the user can create report formats or modify existing ones.

OS Jars costs $8,000, the vendor said from 8400 Westpark Drive, McLean, Va. 22101.

'Earl', 'Datacom' Tied

DALLAS — The Easy Access Report Language (Earl), a nonprocedural retrieval facility originally developed in Europe, is now available to users of the Datacom DB/DC systems from Insyte Datacom Corp.

(Packaged as CA-Earl, the software utility is also available to the general IBM DOS, OS and VS user community from Computer Associates, Inc. in New York and from various affiliated companies in Europe.)

Using Earls' English-style, free-format command repetoire, the user can access both data bases and conventional files to produce reports on a regular production basis or in response to one-time requests, an insyte Datacom spokesman said.

The software allows up to 15 control breaks per report and as many as 15 reports to be generated from a single run of the program. Spacing, page control, page headings, column captions and total and subtotal identifiers are all handled by Earl once specified by the user, he noted

The utility can handle eight sequential or Isam input files and these may be on card, disk or magnetic tape, he added.

Earl is available for $7,500, Insyte Datacom noted from 325 Oak Plaza Bldg., 3707 Rawlins St., Dallas, Texas 75219.

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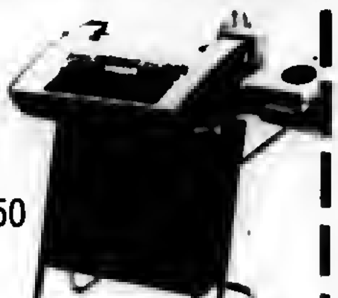

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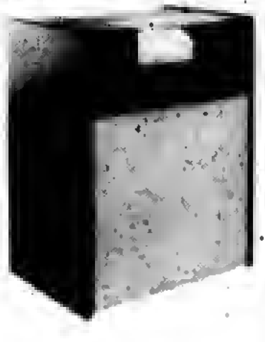

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Blindly Following Piper? — Part 2

User Programs Often Redundant

By Charles A. Gravitt
Special to CW

At the conclusion of last week's article, I noted that one effect of personal computing — encouraging end users to do their own programming as an adjunct to their regular tasks — might be that corporations lose the ability to support the programs upon which they have come to rely.

But there are other problems, too. For example, proliferation of the number of personal computing locations exposes a corporation to financing duplicate programming efforts.

To think otherwise presupposes that each personal computing location has unique needs that no one else in the corporation can use. Actually, few departments have unique needs — perhaps only Engineering and a couple of others.

Isolated Attention

Isolated needs get more attention than overall corporate needs. Data sharing between departments is less likely to occur. If the truth be known, one user department probably would not know what others were doing.

This has to lead to some redundant programming within the corporation, which should be taken into account to see if it is justified.

Everyone is cognizant of the fact that hardware vendors are in the business to sell hardware, and their success is measured by sales volume. Personal computing creates fertile ground for sales.

In addition to central site hardware, terminals and various support devices are needed. More demands for personal computing facility create opportunities for more sales.

Unpleasant Decisions

Multiplication of the personal computing sites is the main thing that could cause the unforeseen capital outlays — or some tough, unpleasant decisions when saturation of the central site is imminent.

It's a sort of progression that might happen. Sloppy, inefficient or unjustified programming by the personal computing users could place such demands on the host mainframe to cause the need for more expensive central site hardware. The user departments will have placed such reliance on it for their operation that the corporation will be hard-pressed to decline an upgrade.

More personal computing sites cause more upgrades — a cycle in which the process feeds on itself.

Early Danger Signal

Part of the rationale for personal computing is that a using organization will need less professional programming staff.

This virtue will be quickly tarnished when the first request is made by a user department for the transfer to that department of one of the professional programmers to do the personal computing.

Why will this happen? It is one way to answer the need for efficiency in the programming a user department will be expected to do once its request for personal computing facility is granted. The professional programmer, through long experience, has learned how to produce a product using the proper methods, even under heavy pressure. Having him would increase the likelihood that the user department will be able to deliver as promised.

If these transfers occur and the central site staff is dispersed, it is difficult to see where the savings to the corporation can be realized.

Distributed programming could undermine the checks and balances painstakingly developed over a number of years to control DP costs. From the corporate perspective, the overall knowledge of how the DP resources are being used, their effectiveness and their auditability are more difficult to grasp when widely dispersed.

Heavy controls will be required to ensure that unauthorized or marginally justified projects are not done. This could easily happen because the resources are under the control of those who want the computing work done, and some economic objectivity may be lost.

Unless personnel using the personal computing facility in user departments are selected with care and managed and monitored continuously, inefficiency will breed inefficiency and cause processing demands on the central site which inexorably lead to more hardware requiring substantial funding.

A corporation must weigh all considerations and ramifications before being stampeded down the glamorous personal computing path — or it may preside over the demise of cost-effective and productive DP services to its organization.

Gravitt is an attorney who served on the DP study team of then-Gov. Jimmy Carter's Georgia State Reorganization Project. He has had 16 years of DP management experience.

Interdata Adds Fortran Update

OCEANPORT, N.J.— An Extended Fortran IV compiler is now available for use on the 16-bit family of minicomputers from Interdata, according to a spokesman.

Described as "ideal" for use in environments where computing resources are at a premium, the compiler can be overlaid to function in less than 14.2K bytes of memory, he said.

It can compile most programs in less than 15.5K bytes of memory, generating executable object code directly from source statements, he added.

With this Fortran, the user can allow the compiler to determine allocated memory and page the symbol table to disk when available memory is filled. Extended Fortran IV is available now on magnetic tape for $250, Interdata said from 2 Crescent Place, Oceanport, N.J. 07757.

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Links Noncompatibles

Net Process Boosts Interface Options

By Ronald A. Frank
CW Staff

CUPERTINO, Calif. — Tymshare, Inc. has introduced a networking process that enables users to configure private packet networks by interfacing otherwise noncompatible equipment and protocols.

Called Advanced Communications Technology (ACT), the process includes hardware and software components that will also be introduced into the firm's Tymnet packet network. carrier subsidiary, a spokesman said.

ACT includes a minicomputer called the Tymnet Engine together with software designated Internally Switched Interface System (Isis). The Engine is a 32-bit machine with direct memory access, six levels of interrupt, 750-nsec cycle time, up to 32 high-speed synchronous channels and up to 256 medium-speed asynchronous channels.

Isis provides "dynamic internal switching" for dissimilar communications protocols, 64 job slots or communications interfaces and symbolic debugging facilities.

On one Engine, Isis reportedly can support asynchronous devices; synchronous network interfaces; packet assembler/disassembler (PAD) functions; gateway facilities to other networks under interfaces such as CCITT X.75; X.25 or Snap; and High-Level Data Link Control, Synchronous Data Link Control and the Advanced Data Communications Control Procedure (ADCCP).

Phased Introduction

Initially, the Engine and Isis will be supplied by Tymshare for configuring private packet nets, but the next step will be to introduce the ACT components into the operational capabilities of the Tymnet network to make the packet system operate with additional features. The final step will be to tariff the Engine and Isis for use at Tymnet subscriber facilities, a Tymshare spokesman explained.

The Engine is being built in-house by Tymshare, but components are off-the-shelf with little customized circuitry.

The key to the ACT system is Isis software, which was also written by the firm's staff. The software reportedly can support up to 64 separate partitions in one node, each of which can operate as an entirely separate communications environment, translating the protocol of an external device to a common internal protocol that passes through the Isis "dispatcher" to another partition. The second partition then translates the common protocol into that of the external device it is handling. Any number of partitions can communicate with the other partitions, the firm stated.

The ACT system is said to be particularly suited to users that have a diversity of terminals and protocols in operation and are considering a private network. Isis handler routines at each node take care of compatibility between otherwise noncompatible devices, the spokesman explained.

The key to interfacing devices or protocols to an ACT system lies in the Isis interfaces. Initially available interfaces include X.25, Tymnet, Tymnet/Tymcom (for non-Tymshare CPUs), Burroughs polling, Pars and other airline reservations systems, Datapac Snap. Under development are Isis interfaces for IBM SNA 3270, ADCCP, etc. Digital Equipment Corp.'s Decnet (DDCCP), Univac and Control Data Corp. protocols are also planned.

For private packet nets, the Engine is

(Continued on Page 40)

Bank Chalks Up 11% Increase In Productivity Using SNA

BALTIMORE — Equitable Trust Co. here effected an 11% increase in teller productivity and shortened average branch settlement to about 30 minutes from an average that had approached an hour or more by installing IBM's Systems Network Architecture (SNA) in place of a 60-year-old manual system.

By the early 1970s, the bank had expanded its teller-oriented services as fast as it had increased its number of branches, according to senior vice-president Robert D. Lockard.

Until 1974, teller operations utilized savings machines and an adding machine for every two tellers as the only mechanical aids. At that time, the bank was providing about 100 types of consumer services, including loan and credit card payments, utility bill payments and check cashing, Lockard said, and the number was increasing.

Bank management realized tellers needed a way to solve the problem of decreased productivity and also a method to shorten settlement time, which had increased beyond practical operation standards, Lockard said.

In the search for a new system, user orientation was the key to the final selection. The choice was IBM's SNA hardware and programming umbrella and consisted principally of 17 branch-located 3601 controllers, 125 Model 3604 display terminals and 125 Model 3610 printers.

By mid-1979 the bank expects to have 45

(Continued on Page 44)

Bell Switched Service Still Pending

NEW YORK — With AT&T apparently on the verge of introducing an all-encompassing data network, have Bell's plans for its Dataphone Switched Digital Service (DSDS) been scrapped?

Not at all, according to an AT&T spokesman. The Federal Communications Commission granted 214 approval for the switched digital service last year which gave the phone company the go-ahead to construct facilities.

DSDS actually will utilize many of the same facilities being put in place for the Dataphone Digital Service (DDS), so separate construction facilities are not required.

What still remains to be done in order for AT&T to offer DSDS? A tariff has to be filed with the commission. AT&T cannot now say when the DSDS tariff will be filed. However, this does not imply that the service is in any way being downgraded, the spokesman said.

Asked if it is possible that a new service offering might supercede DSDS, the AT&T source said only that the switched service would be available. However, when the tariff for it will be filed or when the service will be available to users has not been determined, he added.

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Channels: Maximum of 18 channels
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Multi-drop: Drop one or more channels at a number of locations
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Line: Dial or dedicated
Options: Voice-plus-data, data regeneration

$465 basic unit
$325 channel end

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Options: Auto speed detection, multi-drop

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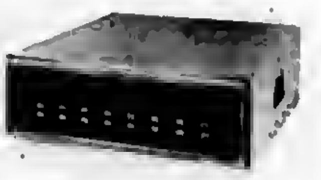

Portable Unit Prints 136 Columns

PARAMUS, N.J. — A microprocessor-based, portable terminal featuring 136-column printout has been introduced by Computer Transceiver Systems, Inc. (CTS).

Described as compatible with major mainframes, minicomputers and peripherals, the Execuport 4000 handles Ascii, APL and IBM correspondence codes and prints at 30 char./sec.

Weighing about 16 pounds, the portable terminal prints upper and lower case characters including descenders — such as "g," "j," "p" and "q" — with no reduction in character size, CTS stated. Underscoring, overscoring, subscripting and superscripting are also provided, the firm added.

The Execuport 4000 has a plotting capability with resolution of 24 vertical and 10 horizontal point/in. for graphic display of data and produces black or blue/black characters on either 8-3/4- or 14-7/8-in. white paper, a spokesman noted.

The Execuport specifies and locates a parity error by printing the erring character a quarter step above the line of output. This provides a hardcopy record of errors for program checking and analysis and requires only a small portion of data to be retransmitted after correction, CTS said.

Among other error detection and alarm features, the terminal has a "ready light" on its keyboard to indicate when a signal of sufficient strength is being received from remote equipment.

As a diagnostic aid, a sequential printout of the complete Ascii character set can be executed by depressing a special key, CTS said.

The user can specify special codes or character sets, such as chemical or mathematical symbols or foreign language character sets.

The Execuport 4000 terminal costs $3,495; first deliveries are scheduled in August from CTS at E. 66 Midland Ave., Paramus, N.J. 07652.

DEC Users Gain Modem

PORTLAND, Ore. — Nortek, Inc. has designed an auto-answer, auto-dial, low-speed modem for the Digital Equipment Corp. LSI-11 and LSI-11/2 microcomputers and the PDP-11/03 minicomputer.

The modem reportedly provides computer-controlled answering and origination of data communication functions when used in conjunction with a Bell CBS-type Data Access Arrangement (DAA). The number of data bits, parity and transmission rates of 110-, 134.5-, 300- and 600 bit/sec are software-selectable, enabling use with most available terminals, Nortek said.

The unit is priced at $650. First deliveries are scheduled for July from Nortek at 2432 N.W. Johnson St., Portland, Ore. 97210.

Process Adds Net Options

(Continued from Page 39)

priced at $60,000 to $100,000. The Isis operating system, which would allow an Engine to be used only as a switching node, costs $200/mo. The X.25 interface under Isis costs $400/mo with other interfaces priced from $250/mo to $450/mo.

Lease plans are available for the Engine with prices depending on length of lease. Isis software is available only on a monthly fee basis, and the price includes system support and all updates. When the ACT hardware and software are added on Tymnet, it will be available at tariffed rates to be filed with the Federal Communications Commission.

Tymshare, Inc. is at 20705 Valley Green Drive, Cupertino, Calif., 95014.

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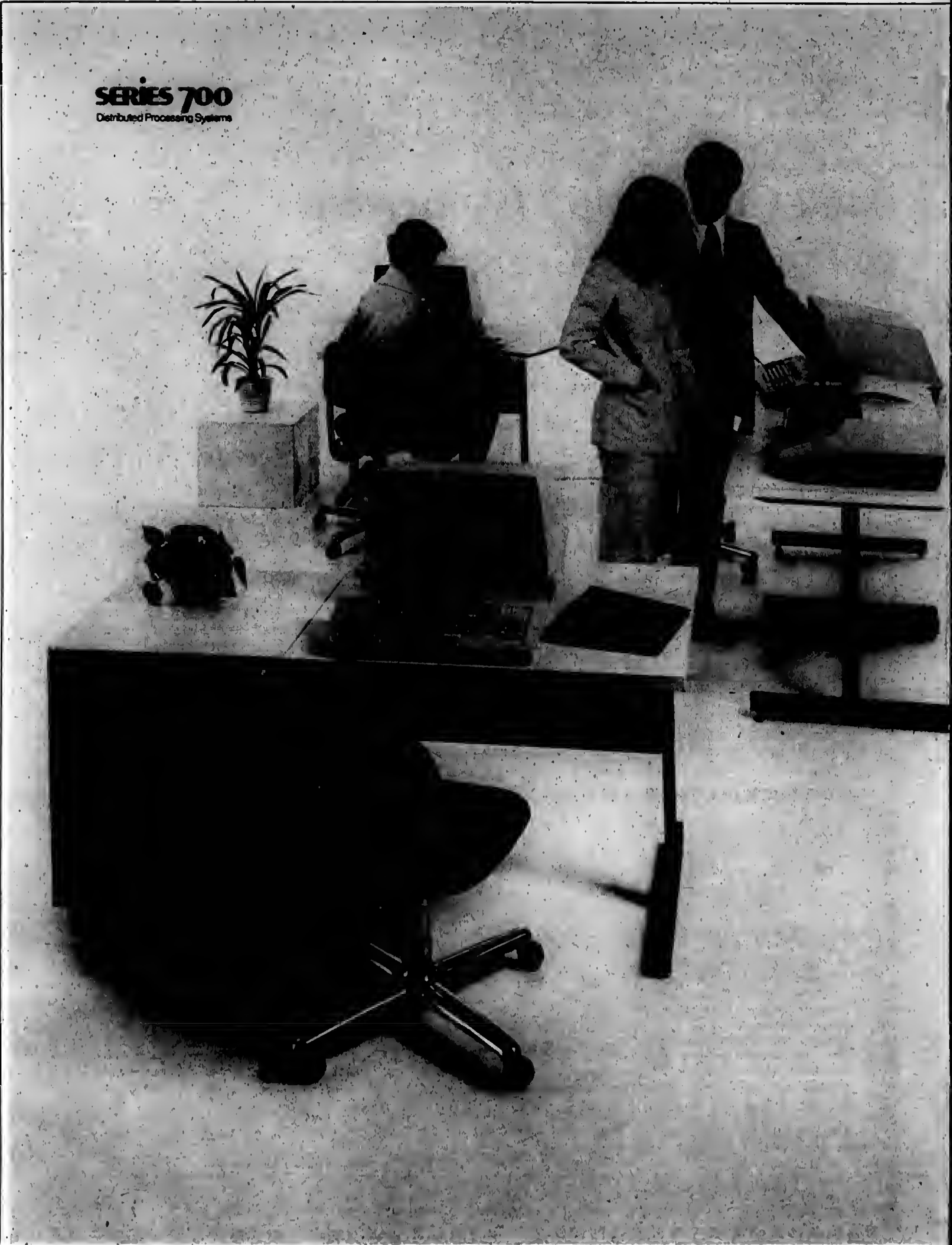

Atlantic Research Adds Remote Control Switch

ALEXANDRIA, Va. — Atlantic Research Corp. has added the RCS-100 remote control switch to its line.

The RCS-100 is a communications line-switching system designed to perform fallback switching and line routing, according to the firm. It can be controlled both manually or electronically from either local or remote locations.

The remote control switch is suited for use in any switching system that requires remote control via computer or standard telephone lines, while maintaining security through system access codes, a spokesman said.

The RCS-100 operates through a self-contained microprocessor that can be controlled by control entry through panel switches, control entry through the RP-1 remote control panel, serial data control entry from a data terminal or CPU or Touch-Tone control entry from a standard telephone equipped with Touch-Tone dialing.

Software for the microprocessor can provide switching functions for any control entry, plus alarm and status functions. System security can be maintained through the use of access and security codes controlled only by the user.

Interchangeable plug-in modules can accommodate four-, six- nine- or 25-wire RS-232C circuits. The RCS-100 was designed to handle up to 16 lines.

A 16-channel configuration sells for $4,400 from Atlantic Research at 5390 Cherokee Ave., Alexandria, Va. 22314.

Datatrol Banking System Costs Half of Competitors'

HUDSON, Mass. — Datatrol, Inc. has introduced a teller terminal system it claimed will perform traditional banking functions at half the average cost-per-terminal of competitive systems.

The FT-3244 system, with an average cost-per-terminal of $2,500, does not require a branch-level controller because each terminal has a microprocessor that enables direct communications with the host computer via telephone lines, the company said.

The terminals operate on-line, partially on-line or off-line. The complete system consists of three components — the teller's console, which permits control over each event in a transaction procedure; the printer, used to prepare receipts, validate transactions and list console events; and the personal identification number (PIN) pad, used by customers to enter their own passwords for transactions requiring identification.

Up to six terminals can communicate through one drop on a multidrop network, Datatrol said.

The system is available from Datatrol at Kane Industrial Drive, Hudson, Mass. 01749.

Uniservo 10 Gets Low-Profile Units

BLUE BELL, Pa. — A low-profile version of the Uniservo 10 magnetic tape unit has been introduced by Univac for its Universal Terminal System 700 (UTS 700).

The Uniservo 10 tape unit configuration comes in a single-density phase-encoded (PE) unit and in a dual-density PE and NRZI unit.

The low-profile Uniservo 10 system operates at 25 in./sec with a transfer rate of 40k byte/sec PE and 20k byte/sec NRZI.

The price of the PE version is $12,145; on a five-year lease including maintenance, it costs $251/mo.

The PE/NRZI unit's purchase price is $13,425; monthly rental is $277.

TI's new 774 Intelligent Terminal System gets to the source of your processing needs.

One of the facts of business growth is that the wider the reach of your operations, the greater your need for capable distributed processing.

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With the 774, your video terminals can share a common data base and provide an efficient workstation for your branch office employees. The typewriter-style keyboard provides operator ease and efficiency. And, floppy-disk drives provide economical, easily accessed storage of data and applications programs.

The 774 is the latest addition to Series 700 Distributed Processing Systems. It follows the Model 770, the industry's first intelligent terminal with a built-in thermal printer. All members of the Series 700 family speak the same language — TPL 700, so the 774 is easy to program and operate with minimal operator training.

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- All family members speak TPL 700, a high-level language specifically designed for data entry.
- Similarity of system operation minimizes retraining as system grows.

☐ 774 rapidly transmits clean data for lower communications costs.

☐ Multiple video stations share local data base.

Because the 774 Intelligent Terminal System is upward-compatible, you won't have to worry about reprogramming or retraining your operators when you upgrade your system to handle tomorrow's needs. You can expand to as many as eight video display units, four floppy-disk drives, two hard-disk drives, four character printers, or two line printers and two communications ports.

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Multiple-CRT Configuration

NCR Adds POS System for Fast-Food Shops

DAYTON, Ohio — NCR Corp. has announced a modular electronic point-of-sale (POS) system designed to provide faster service and increased control in fast-food operations.

The NCR 2160 food-service system includes low-profile, multiple CRT terminals and 2 line/sec, 40 char./line matrix printers. The terminals and printers are linked to a 15-sq-in. microprocessor-based controller, a spokesman said.

Transactions are recorded via the terminal keyboard and automatically processed by the controller. As a by-product of recording each sale, information is stored from which the system can produce a variety of management reports.

For increased efficiency, the "micro-motion" keyboard has a flat, smooth surface on which "keys" are outlined. Cashiers touch the appropriate positions on the surface to record the customer's order. The keyboard's surface is waterproof so that damage from spillage is minimized and the terminal is easier to clean, the firm said.

In addition, automatic calculation of taxes, price extensions and changes are combined with automatic price look-up, according to the firm. The cashier touches a key for an item and the system provides the price from memory. An optional printed receipt is available.

Regardless of the order in which items are entered into the terminal, the system rearranges the list so that all like items are grouped together when displayed on the visual display screen and printed, facilitating filling the order, according to the firm. Remote printers can be placed in the kitchen or other food-preparation area to list orders so that they can be prepared more quickly.

In addition to offering features that will help improve customer service, the system can be programmed to provide management control, the firm said. For example, it keeps track of sales information by terminal, salesperson, department and store, available in printed form on demand.

The 2160 system is capable of calculating perpetual inventories and product yields down to the recipe level, the spokesman said. Additional report modules available include time-and-attendance, labor-cost and other payroll information.

A typical 2160 system including four terminals, controller and a remote printer for kitchen use is priced at $15,690.

The systems will be available for customer deliveries in the third quarter.

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Bank Reports 11% Growth In Teller Output Using SNA

(Continued from Page 39)

controllers, 550 terminals and 550 printers, a spokesman said. Data speed on the equipment is 2,400 bit/sec.

The system currently runs on dual IBM 370/158s with 3M bytes of memory. By January, the system will consist of IBM 3032 and one 370/158 with an attached processor and will have 4M bytes of memory.

The system has a 3705 front-end processor. Equitable Trust uses IBM's Information Management System (IMS) application software and Vtam with SDLC protocol, according to a spokesman.

In June 1977, the system started off-line at two pilot branches and in November switched on-line. The bank now has more than 30 branches on the system. Lockard said the bank looked for a minimum 11% increase in teller productivity and sought to shorten average branch settlement to about 30 minutes from an average that had approached an hour or more.

"To date, everything indicates an achievement of our goals," Lockard said. "The pilot environment measurements adequately proved the projections that showed that once a teller became experienced with the new equipment, processing those transactions could be equal to or faster than the original projections.

"Indications are that we are going to achieve a substantial increase in productivity and that we'll have an average branch settlement time of 30 minutes across the system. Teller settlement time will probably average about 15 minutes," he said.

According to the spokesman, the installation process was plagued with problems, about which he could not be specific. "They were not typical problems at all. We were supposed to be the only ones in the country having this type of problem. They've been corrected now — that's all that matters," he said.

'Source/Use' Procedure

All transactions are divided into a "source" or "use" of funds. When the customer gives the teller the transaction — the "source" — the teller determines what to do with that money — the "use." Cash is always keyed in first and then checks. Next, the teller keys in where the money is to be distributed — to a checking or savings account deposit, for example, or to pay a gas or electric bill or an internal bill such as consumer credit. The teller no longer has to compute how much cash the customer receives, since the system does it automatically, Lockard said.

Every 10th transaction, the teller is instructed by the terminal to "press print." The teller must do this before the system can continue — and the terminal prints out the drawer cash total. Then the teller uses a cash sheet to make an actual count of cash on hand.

Should a teller leave the workstation, "interim sign-off" is performed. If anyone tries to put a transaction through in the teller's absence, the terminal will not accept it. When the teller returns and signs back in, the terminal asks for the teller's "secret number." Only when this has been given will the terminal disclose the last transaction and print the amount of drawer cash.

Audit Trail Available

Previously, tellers waited until the end of the day to know if their transactions balanced. Now, the entire audit trail is available. Totals are automatically accumulated, and at the end of the day the teller pushes a button to recall the data, Lockard said.

The printer will print out a tape of cash and checks as well as totals of all transaction types (with one copy retained in the terminal for the bank). After the tellers have settled, the system combines all the tellers' figures into group totals and produces a branch settlement sheet, eliminating the complex manual adding operation still used in most bank branches, according to Lockard.

The system was designed for minimum impact on customers. "The customer isn't really going to see too much of a change from the way we did business in the past. There may be a slightly different type of a receipt and passbooks may change some, but the bulk of our transactions are generally going to be the same as they were before," Lockard said.

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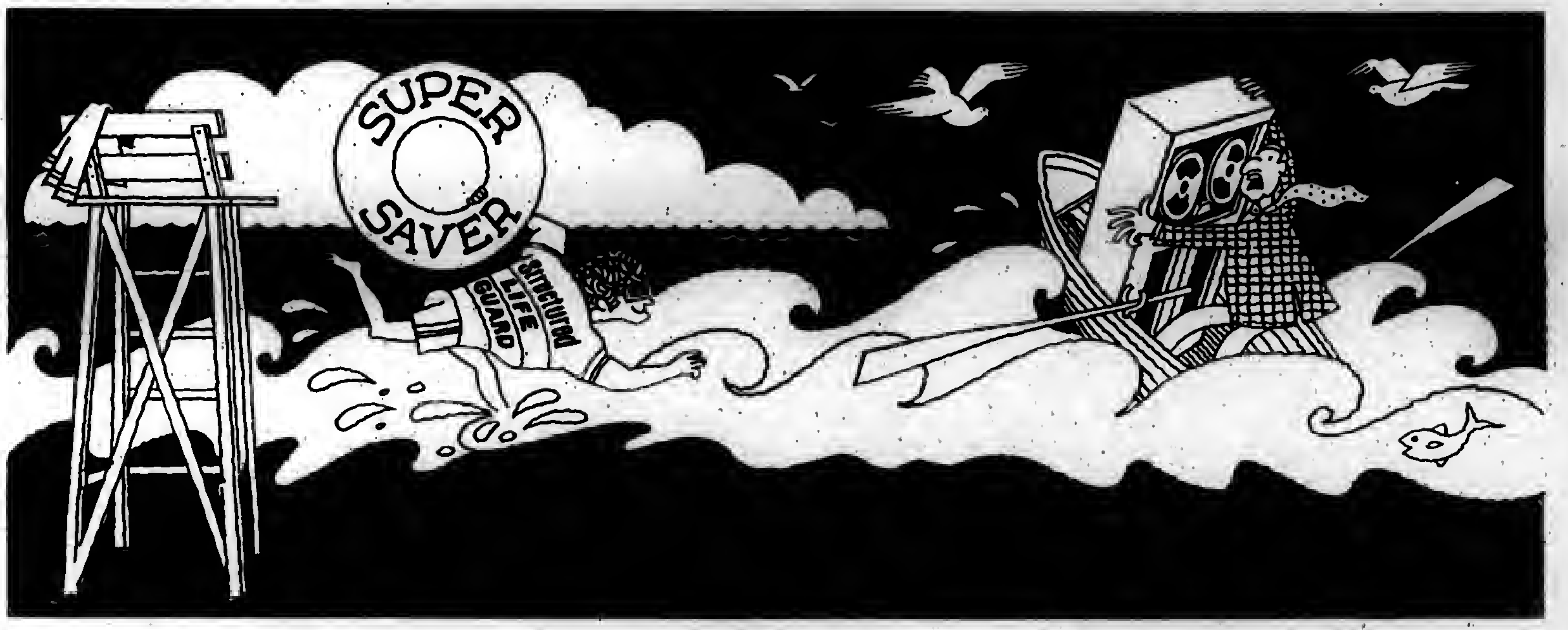

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Touch-Sensitive CRT Debuts

BLOOMINGTON, Minn. — Information Dialogues, Inc. has introduced the Model 10 microprocessor-based touch-sensitive CRT terminal designed for use by nontechnical personnel in business, education and government.

The Model 10 allows users to enter and retrieve information by touching the unit's glass faceplate. The system responds to human contact by offering new display images that provide additional explanation and associated selections, a spokesman said.

The unit has a 15-in. screen that displays up to 80 char. on each of 24 lines, the firm said. The screen has 32 "touch pads." The removable keyboard offers local/remote, character interactive/page edit and carriage return only/automatic line feed.

The unit offers a 96-char. Ascii set displayed on a 7 by 9 dot matrix format, the firm said. The Model 10 is RS-232C-interface-compatible with switch-selectable transmission rates of 110- to 19,200 bit/sec operating in full- or half-duplex mode.

Basic price for a unit, including keyboard, is $4,100 with delivery in 60 days. The firm is located at Suite 429, 2850 Metro Office Park, Bloomington, Minn. 55420.

Teleprinter Line Suits Private, Public Nets

SYRACUSE, N.Y. — Leigh Systems, Inc. has introduced a line of automatic send/receive, keyboard send/receive and receive-only teleprinters intended for use in private data transmission networks, TWX and Telex services and as computer I/O devices.

The line consists of two series. The Series 800 teleprinters generate and accept signals in an 8-level, 11-bit binary code conforming to Ascii standards, according to a company spokesman. They are compatible with most computers, he added.

Series 500 models utilize a 5-level Baudot code conforming to CCITT #2 standards. Transmission rates range to 110 bit/sec for the Series 800 and 75 bit/sec for the Series 500, according to the spokesman.

The teleprinters operate at speeds to 100 word/min. Because they incorporate Western Electric Co. patents, they are compatible with similar teleprinter terminals, according to the firm.

A variety of options is available.

In the Series 500, the ASR-32 sells for $1,156, with immediate delivery. The Series 800 ASR with manual reader is priced at $1,123 and with automatic reader is $1,191.

The firm is located at 6081 Court Street Road, Syracuse, N.Y. 13206.

Terminal Transactions

Interdatas Get Terminal Adapter

PLACENTIA, Calif. — RDV Engineering is now supplying Interdata, Inc. minicomputer users with an alternative for interfacing local RS-232C terminals. The Quad Asynchronous Local Terminal adapter (Qualta) provides four channels of serial data communications without Modem controls on a half board, the firm said.

The Qualta reportedly maintains both software and hardware compatibility with host products when used for local terminal communications and offers the following switch-selectable functions: consecutive 10-bit address field, duplex mode and 50- to 19,200 bit/sec transmission rates.

Low-power Schottky construction reduces power consumption of four channels 85% to .75, a company spokesman said.

Programmable word length, parity and stop bits allow a variety of CRT and printing terminals to be used, the firm said. Terminal status can be monitored with "data set ready" status, while all other modem status lines are unused and give no status.

Available immediately and covered by a one-year limited warranty, the Qualta costs $418.50 in quantities of 100 or more from RDV Engineering, 319 Dolores Circle, Placentia, Calif. 92670.

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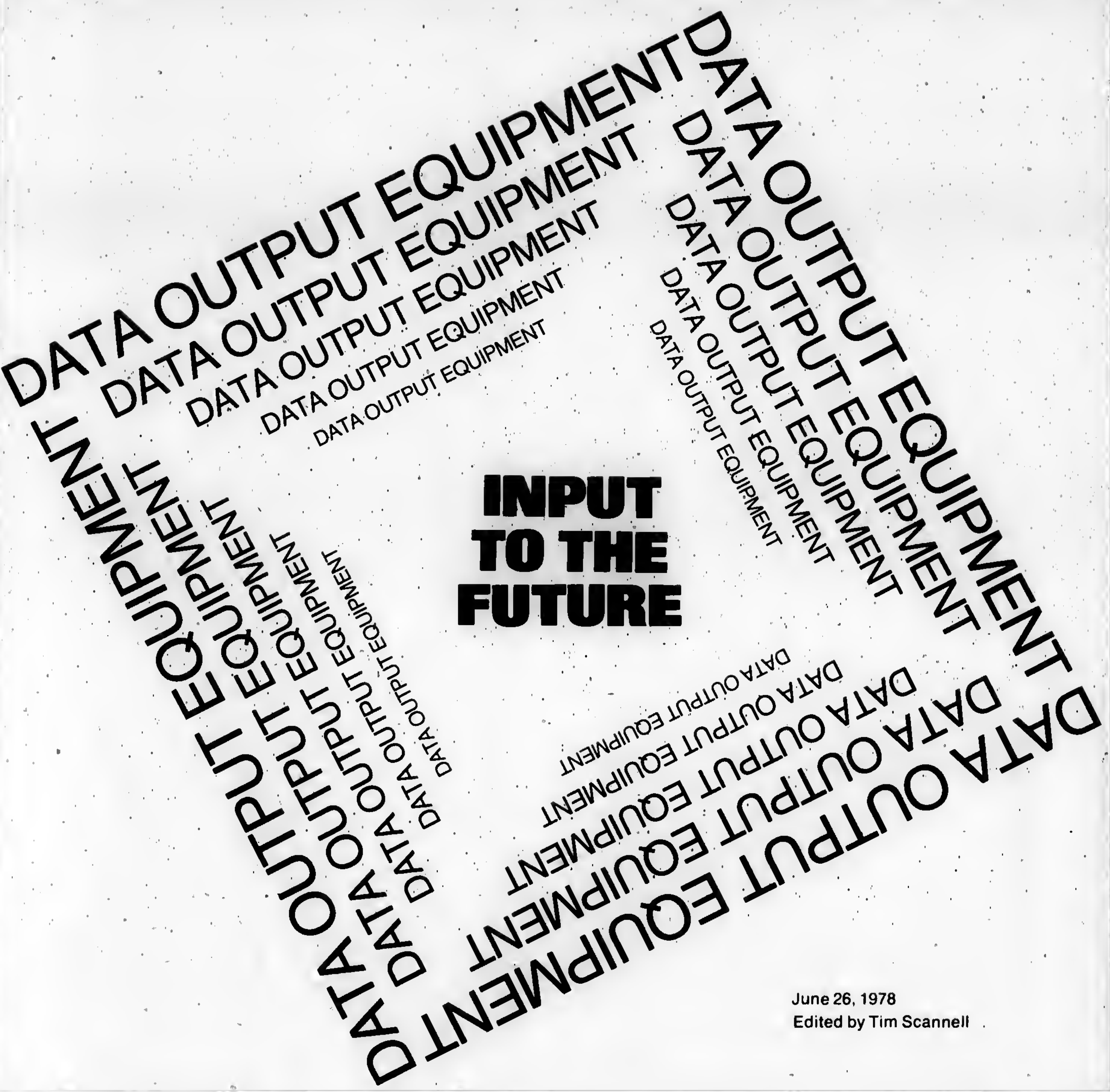

INPUT TO THE FUTURE

June 26, 1978
Edited by Tim Scannell

Justified for 100,000 Page/Mo

COM Offers Benefits to High-Volume Users

Special to CW

Computer output microfilm (COM) has four general advantages: It reduces computer printing time and its attendant costs, is faster than paper printouts for distribution and retrieval of information, is versatile and allows expansion of the information user base. These are all desirable objectives, but the advantages must be weighed against COM's disadvantages.

First of all, any system should be cost- or function-justified. If COM is used to reduce print runs on a computer, the volume of paper must be sufficiently high; as a rough rule of thumb, 100,000 printed pages per month must be potentially available for conversion to COM before a COM operation can be cost-justified.

Second, COM produces microfilm, which cannot be read without a machine — reader or reader/printer — and cannot be written on. The user will therefore have to adapt to a totally new way of handling information, and that places a burden on the system's installer and management who must educate and motivate.

This article is excerpted from Auerbach Publishers, Inc.'s Input/-Output Reports, *a three-volume monthly updated reference on all major facets of peripherals and data handling equipment.*

Production costs computed for a COM operation should include the following items: supplies (film, chemicals, spools), quality control equipment, the COM unit itself, film processor (if not a part of the COM device), labor and computer time required to output the data.

A paper-printout system's production costs, on the other hand, must include computer time, a line printer, paper, a decollator and a binder. These are the most obvious cost items. A more detailed analysis would cover such things as power, light and water consumption; software development costs; supplies, such as ribbons and/or ink for the line printer; and so on.

As a line printer replacement, COM produces and updates computer output files much faster and, assuming output of 60,000 or more pages per month, at a lower cost. Most line printers output at a speed of up to 1,200 line/min with no more than six copies per run. Faster line printers are in the offing, but they are not close to the speed of COM recorders that now produce between 18,000- and 26,000 line/min.

Mainframe Time Reduced

COM speed brings about economy that is most noticeable at the computer site — it cuts down on mainframe time. It should be noted, however, that some line printers operate off-line, so COM isn't the only alternative for reducing computer time.

However, even off-line printers use paper, and that is perhaps the biggest area in which costs can be cut with microfilm. In one recent year, the cost of paper increased by 40% to 50%, while the cost of film went up 10% to 15%.

It has been estimated, with all factors computed, that the cost of microfilming via COM is about one-fourth the cost of computer printing. Of course, the ratio varies depending on output volume.

Basically, there are two types of COM systems — on-line and off-line. A major advantage of the on-line sys-

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Smoothes Data Flow

Fiche Generator Reduces S&L's Overhead

By Brad Schultz
CW Staff

SAN DIEGO — Home Federal Savings & Loan has cut DP overhead and streamlined data flow with its microfiche generation system, according to Home Federal's DP group operations manager, George Kanoff.

Home Federal stores data pertaining to teller and interbank transactions, general ledger accounting and other financial activities on magnetic tape and then creates microfiche records of this data for on-line access by its numerous branch offices, Kanoff said.

Home Federal finds that its Datagraphix, Inc. Autocom system is simple to operate, requires little previous instruction and has made data flow much more efficient among the institution's numerous branch offices, Kanoff stated.

Prior to acquiring Autocom, the institution had relied on service bureaus to produce the microfiche, he noted, explaining that on a daily basis, accumulated magnetic tape records were picked up by a service bureau and microfiche records of the taped data were produced at the bureau's facilities.

This arrangement proved unsatisfactory, Kanoff stated, indicating that transportation of tape to the service bureau and of fiche from the bureau back to Home Federal was unreliable and the procedure's weakest link.

As a result, Home Federal decided to develop its own microfiche generation facility driven by the institution's two IBM 360/65s, he said, adding these CPUs each feature 1M byte of core and support IBM's Edos Tape Management System and Cullinane Corp.'s Integrated Data Management System.

However, the savings and loan is just now replacing one 360/65 with an Itel Corp. AS/5 Model 3, that firm's IBM 370/158 "workalike," Kanoff noted.

Choice of Output Modes

Datagraphix provided the Autocom system and a special software module enabling Home Federal to generate records from magnetic tape input in either hard copy or hard copy/-microfiche modes, he continued.

By agreement, Datagraphix automatically provides Home Federal with microfiche and duplicating film. So far this year, the institution has received 36 rolls of microfiche film and 80 rolls of duplicating film, Kanoff noted, adding that one roll of the former is consumed every 10 days by his firm.

Home Federal selected Datagraphix' Autocom after rejecting offers from Eastman Kodak Co., NCR Corp. and Qantel Corp., he said.

The company has also acquired a large stock of customized peripheral equipment: 550 Lear Siegler, Inc. terminals and a large number of Okidata Corp. printers, Kanoff said, noting that every Home Federal branch has a CRT, keyboard and printer for communication with the institution's central DP facility in San Diego.

In an average day, Home Federal generates 120 microfiche records from 37 master tapes, Kanoff stated, explaining that one master stores the equivalent of 208 pages of 11 by 14 by 3/8 in. computer output paper.

Moreover, in its quarterly fiscal report, Home Federal generated 87 master tapes on the last report and made 60 copies of each master. Microfiche stored the equivalent of more than one million output pages, he said. The 1978 year-end quarterly will entail around 120 masters, he predicted.

(Continued on Page S/4)

COM Turns Brokerage Into Publisher

By Marcia Blumenthal
CW Staff

LOS ANGELES — If computer output microfilm (COM) technology did not exist, a computer-based publishing house here may have remained a brokerage firm sharing in the ups and downs of the stock market, which over the last few years has come to resemble the medical chart of a malaria patient.

Instead, William O'Neil and Co., the 130-employee DP-based publishing house — which has all of its output on microfilm — is thriving. Sales recently hit $8.5 million.

"We print about 100,000 original pages a month through the system," according to Vance A. Griffitts, vice-president of marketing. For the past five years the system, composed of a Burroughs Corp. B6700 mainframe and an Information International, Inc. FR 80 COM graphics recorder, has produced *Datagraphs*, a 700-page book of stock charts and information compiled every week.

"We have to have tremendous speed," Griffitts explained, "because we produce 10,000 charts every Friday." A chart takes about one second for the FR 80 to produce, he noted.

Each chart provides a record of a stock's performance during the preceding week and, by using the company's data base, can be extended to show results for the past 10 years.

The graphics contain information on more than 80 fundamental and technical factors that influence the prices of stocks listed on both the New York and American exchanges.

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CRT/Printer Units Now Economically Feasible

By James Folts
Special to CW

One of the most obvious needs of the DP community is an inexpensive and quiet terminal that combines the display advantages of a CRT with the hard-copy capability of a printer, all at a reasonable cost to the user.

While users find the low cost and high speed of modern CRTs very attractive, they cannot ignore the ever-present need for hard copy. The expense of adding a printer to a CRT has caused the majority of users to purchase keyboard printer terminals, leaving them no alternative but to tolerate the noisy printers and reams of unnecessary paper.

Recently, several inexpensive thermal printer mechanisms and printers have been introduced which can present viable solutions to the problem. Printing on paper of various widths from 4 in. to 11-1/2 in., these devices can be inexpensively built into, or sold along with, CRT terminals to provide the occasional hard copy needed by CRT terminal users.

Simultaneously, they allow the user to take advantage of the CRTs' quiet speed. While many users will not find aluminum-coated or tape-width paper acceptable, the wider, 8-1/2 in. by 11-in., standard-size paper is ideal for copying the contents of CRT screens.

The problem with most of the "packaged" solutions previously introduced has been the cost of integrating CRTs and printers which were designed as independent computer peripherals.

Several manufacturers are designing printers as CRT peripherals rather than computer peripherals. Since these printers carry none of the firmware overhead inherent in freestanding, keyboard printer terminals such as the need to see the last character printed and the need to print a character at a time, a significant cost savings is realized.

Most printers of this design are able to transfer the entire contents of the CRT screen to memory, then print the page. Operators are able to resume their data entry or inquiry tasks at the CRT in as little as two seconds, eliminating the need to wait until the printer has finished copying the CRT screen's contents.

Users accustomed to dealing with printer terminals are quite concerned about the time terminal operators are required to wait. They want minimal interference by the printer with subsequent CRT operations.

Examining the basic question of time, it becomes apparent that there are two aspects: first, transferring screen data to the printer buffer and, second, printing that data. The 2-sec transfer rate of CRT peripheral-printers is practically unnoticed by the terminal operator and answers the first question; the 20 seconds required to print the page solves the second question. Printers of this type are sufficiently fast since the operator cannot prepare another screen for printing in that short a period.

The interesting aspect of these CRT/printer packages is the range of price/-performance they will make available to end users and OEMs alike. At the low end, where printers are to be combined with simple, interactive CRTs, terminal manufacturers or OEMs will be able to offer CRT/printer packages at prices less than many matrix printer/terminals without CRTs. At the same time they will be capable of outperforming the 100 char./sec teleprinters in performance, operator productivity, convenience and silence. And of course, paper costs are lower because of the units' selective printing capability. No longer must a meaningless audit trail of interactive dialogues and terminal commands be preserved only to be thrown away.

At the mid-range, when CRT/printers are combined with editing CRTs, not only does the user have the extensive editing, block transmission and forms-drawing capabilities plus the ability to depict bar graphs, but screen forms and bar graphs may be transferred directly to hard copy. Even inverse video will faithfully be reproduced as inverse printing. The user can therefore save the costs of special forms by copying them from CRT screen to printer.

In the high-price range of CRT terminals, there are already CRT/printer combinations available. But even here the page printer concept enables OEMs and users to realize the same benefits: increased operator productiivty, quiet and selective printing and lower costs.

The CRT/printer terminal concept is now an economical reality for price-sensitive applications. Advancing LSI technology has once again provided the means by which the computer industry can give the end user what he really needs — at a cost he is able to pay.

James Folts is vice-president of Perkin-Elmer Data Systems and general manager of Perkin-Elmer's Terminals Division.

Color CRTs About to Come of Age

By Charles A. Muench Jr.
Special to CW

NORCROSS, Ga. — If the '70s go down as the decade when the technology of the microcomputer was developed and refined, the '80s will surely stand out as the decade when color comes of age.

The inclusion of color is part of the logical progression of developing hardware and software that are more responsive to individual system demands. But, just as important, color represents a flexible and sophisticated new tool for individual operators.

Aside from the obvious appeal a color CRT has over one offering just black-on-white or white-on-black characters, there are also some scientifically based facts that support the benefits of color coding. One experiment, detailed in the *Journal of Applied Psychology*, involved 22 men and women with normal color vision. Each individual viewed, in sequence, a total of 180 displays in two experimental sessions.

The displays consisted of random alphanumerics, significantly "cluttered" to increase the complexity of the viewing screen. In half of the displays used, there was no color coding; the items were white on a dark background. In the other half, all the symbols in an item "were displayed in a particular color with the color code chosen to be redundant with the class designator letter," according to the journal.

Displays were shown in pairs — with and without color — and subjects were told to scan the display to find a particular item. A performance measure was then taken on the amount of time it took each individual to locate a specific item.

The results of the study showed that "color coding markedly reduced both search and counting times as well as counting errors," according to the report. There was also a sizable reduction in the number of counting errors when color was introduced to the subjects. "As compared with black and white displays, the color-coded displays resulted in an overall error reduction of 76% in the counting task," the report noted.

Color coding succeeded in increasing the discriminability among items of the various classes. "This improved separability has the effect of making the spacial distribution (patterning, clustering) of the randomly placed items more perceptible and serves to guide the eye during search and counting tasks," the report said.

Color and Shapes

In another study, which used military symbols, geometric forms and aircraft shapes as well as a variety of colors, the results confirmed the effectiveness of color for a counting task. The experiment, which appeared in a later edition of the *Journal of Applied Psychology*, indicated that "when color and shape are superimposed on a display, the color code will prove dominant in the visual separability it provides."

The experiment also showed, however, that as more colors are added to the display there is a decrease in the average discriminability "that would eventually reduce the effectiveness of the color code." In short, colors should be limited to a minimum of five and a maximum of 12, depending on viewing conditions.

Similar experiments documented a quicker man-machine interaction when color-coded alphanumerics were used as well as a reduction in the incidence of operator fatigue.

Taken alone, any one of these findings is important in its own right, but taken as a whole they become a combination of advantages that is hard to ignore as a vehicle for increasing operator efficiency. And with the advent of sophisticated low-cost color, the benefits to individual operators take on even greater significance.

On the systems development side of

(Continued on Page S/8)

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High-Volume Users Can Benefit From COM

(Continued from Page S/2)

tem is that it costs less than most off-line units because it doesn't have a tape drive, nor does it usually have the multiple size film output (16m, 35mm, 105mm) capability. Programming for this type of system must be handled through the CPU.

Off-line systems without minicomputers must also be programmed through the host computer, the instructions being recorded on magnetic tape along with the data. Some COM systems, however, provide a means for programming commands such as for calling up the correct forms flash through the unit itself.

All COM manufacturers supply at least a minimal amount of software. Basic programmed instructions accomplish the following: data is output to magnetic tape instad of to a high-speed printer, the format (page/image) is modified if necessary to fit the specific COM unit and the tape is coded so that it can trigger the proper forms flash.

As COM users have gained experience and are putting more applications on microfilm, the demand for more flexibility has been growing and is reflected in increased interest in minicomputer-driven systems. The mini can be configured with storage devices and can be programmed to do a variety of functions. The mini also frees the main computer so all it has to do is output data to magnetic tape.

The final product or output of the COM system should be given appropriate consideration in deciding on a COM unit. The surest test for COM output is examination with the naked eye. Obvious differences the user will notice in output from different systems are the character font and character sizes. Some units have only one font and one size; others, one font but in three sizes; others, multiple fonts and multiple sizes. The number of characters per font also varies from system to system. Most have a minimum of 64 characters per font while others offer as many as 128.

In a graphics system, the drawing will be generated using either a dot matrix or stroking technique. Most systems use the matrix. As the number of dots in the matrix varies, it affects the quality of the output. More dots mean clearer reading.

Indexing Critical

Finally, indexing should be treated as a critical feature in active microfilm systems. Most COM manufacturers have recognized this need and developed indexing capabilities for their COM units.

The most common type of index is simply a rectangular "blip" mark recorded under or next to each frame of film. Those blips are counted in some automated retrieval systems. Indexing data could also be routed onto magnetic tapes by the host computer in an on-line system or by a minicomputer in an off-line configuration. Indexing can, in fact, become quite refined and sophisticated, depending on how much computer time the user wants to use and how much software he wants to develop.

COM, for better or worse, is married to the computer system although user organizations still are unsure of who should manage it. That situation is likely to continue for some time.

One advantage to the COM industry is that COM, unlike computers, has usually had to pay its own way right from the beginning and most in-house systems are installed after the user has had some experience with a COM service center. So, the changes wrought when the COM unit moves in-house are, at least, less radical, disruptive and frustrating than those caused by the company's first computer.

Fiche Generator Slices Overhead

(Continued from Page S/2)

Home Federal keeps its masters in a locked vault. Kanoff pointed out that, as a financial institution, Home Federal must keep a number of diffrent record types accessible for a minimum period of time in accordance with Federal Reserve Board regulations.

Branch Independence

Each of the firm's 59 branches maintains its own microfiche reserve and is thus not dependent on the San Diego DP center for the latest information on personal accounts, he said, noting, however, that all branches are interconnected in a data network called Vision.

The technical support group handles all system maintenance throughout California, Kanoff added. Kanoff heads all of Home Federal's DP operations — its operations analysis group, which handles internal software development and the tape-to-microfiche conversion; the DP center; and the technical support group.

Kanoff's "high guess" for the Autocom operation's annual overhad, excluding the wages of operating personnel, is about $8,000. Autocom precludes the need to consume $24,000 worth of paper annually on the quarterly reporting alone, he said, noting this yields a net savings of $16,000 in that one application.

But more significantly, Home Federal cannot *print* records fast enough to meet its needs given its current volume of transactions, he said, indicating that the institution is now compelled to use the medium of microfiche in creating records.

In addition, the Autocom system eliminates the need to employ a large clerical staff for handling the records, Kanoff added.

"We have computer operators that go over to the Autocom machine, mount up the tape and virtually walk off and leave it,'" he said.

"It starts spitting out masters like crazy. Then we have a clerk-type wearing white gloves [who] takes the masters, inspects them, puts them one at a time into the autocopier, dials in the number of copies she wants and makes those," he continued.

Kanoff said the biggest problem with the Autocom process at present is collating after copying, but he predicted that "in the not-too-distant future" the collating procedure will be further mechanized, eliminating a number of slow manual stages.

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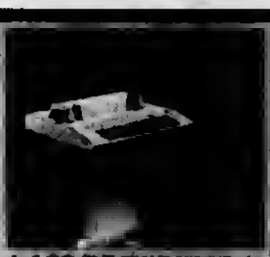
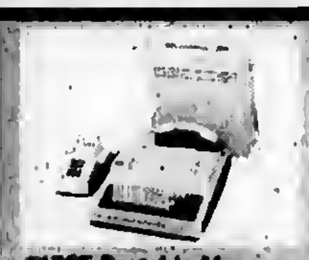

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Industry Boosts 96 Vendors

Printer Advances Promise Increased Diversity

By Kenneth C. Freund
Special to CW

The rapid pace of computer printer technology has not only kept up with computer technology but may have surpassed it in terms of diversity.

There are 96 vendors with a total of 309 printers or printer families — using about a dozen techniques ranging from 10 char./sec cylinders and balls to sophisticated 14,000 line/min laser-xerography.

Industry trends seem to indicate multifaceted movements toward consolidation of large processor sites, expansion of distributed computing and installation of independent small systems — all of which impact the computer printer market.

Centralization within a user company will result in large, general-purpose systems becoming even larger. In some instances, high-throughput printing devices will be required at the CPU site. A classical current alternative, of course, is multiple-printer installations — for example, three 600 line/min printers instead of one 1,800 line/min unit.

As the ultra-high-speed printers gain acceptance they will surely find application in central computer sites. Their cost, however, will be a limiting factor and medium- to high-speed line printers will continue to dominate with about 70% being in this category. Units operating at less than 300 line/min will make up the remainder.

Remote Printing

Computing-resource consolidation is not necessarily associated with consolidation of the printing function. And this will be one of the significant growth areas by the end of 1981. On-line data entry, via CRT terminals, will be accompanied with remote hardcopy printing at the entry site.

There is also a strong trend toward distributed processing in which computing resources are spread throughout an organization and linked through a communications network. Each satellite computer has complete printed output capability.

Distributed data entry is accomplished through the use of intelligent or nonintelligent terminals, again located at outlying points. Such terminals may be either independent or clustered devices and require printers for hardcopy output, in a manner similar to that of centralized processing with on-line entry.

As both small business and terminal-based systems become less costly, their utilization is expected to proliferate. Both of these areas are expected to be extremely strong markets for printers in the future.

This migration away from the typical computer room, while not causing great technological changes, will bring about subtle changes as printers move into the office environment. A recent survey indicated that 80% of the printers in DP rooms had no noise barrier between equipment and operator — obviously an intolerable situation in most offices.

Look for the new generation of printers to be quieter, aesthetically pleasing and compact. Europeans already express sensitivity toward noise. It will only be a matter of time before users insist on quieter machines.

Offices don't have static guards woven into their carpets (common in computer rooms) if they have carpets. One of the tough design problems now being addressed by printer manufacturers is print mechanisms that withstand reasonable levels of electrostatic discharge.

Power Consumption

Power consumption will be another sensitive area, not simply because of rising energy rates but because of equipment costs for accommodating heat. For example, incorporating high-energy magnetic materials in the printer's hammer mechanism not only reduces hammer power consumption by 60% but also eliminates the necessity of cooling the hammer bank — a dual end-user benefit.

Reliability, although intrinsic to lower heating, has in the past taken on the "numbers game" connotation with dull mean-time-between-failure (MTBF) figures that have very little meaning to anyone but reliability engineers. As printers are applied outside of metropolitan areas, reliability will take on its true meaning — part of the ownership cost.

Small systems and remote terminals are sold on their low cost and are often located many miles from the closest service center, making repairs both time-consuming and costly.

With rising labor costs, difficulty in obtaining trained technicians and a more widely dispersed customer base, systems manufacturers will look closely at MTBF figures; end users will expect their equpment to work all of the time, for practical purposes. When there is downtime, inexperienced operators will probably have to diagnose the problem and describe it over the telephone.

Thanks to the microprocessor, future printers will have more intelligence; not simply for control but to provide diagnostic routines. Distributed networks, stand-alone computers and ter-

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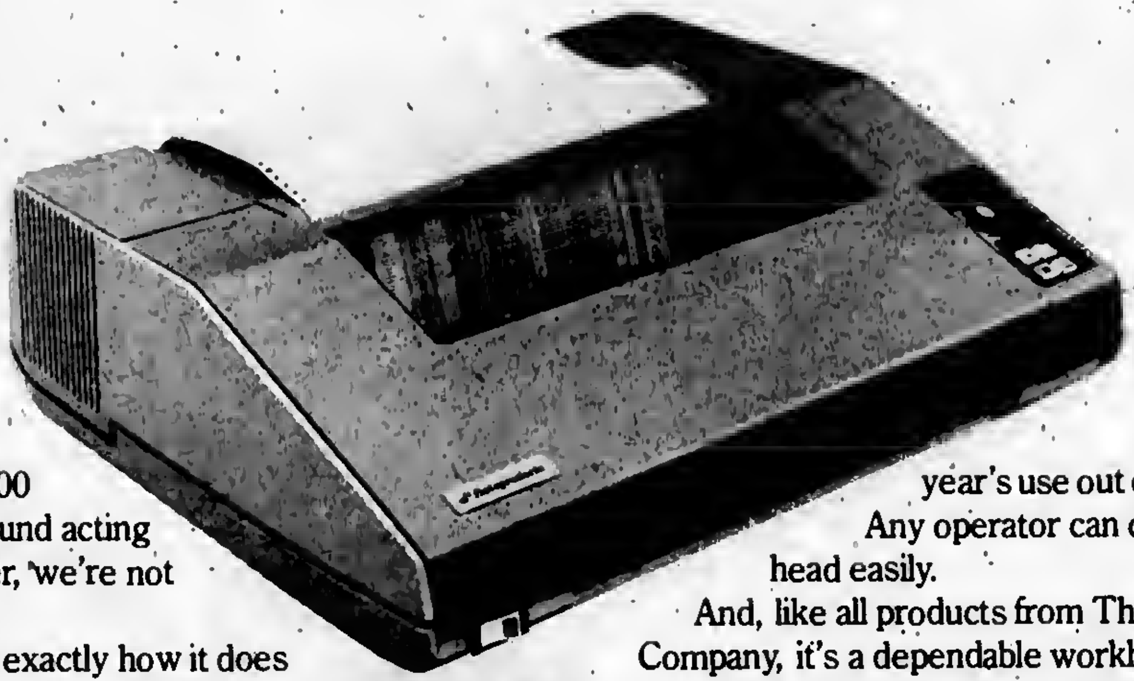
WHO DOES THIS PRINTER THINK IT'S KIDDING?



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Flatbed, Drum Plotters Differ in Advantages

Digital plotters available today can be classified by the type of plotting surface provided, the recording technique used, the method of line drawing and the method of specifying the plot. From the standpoint of the operational mechanism, perhaps the most useful classification is by the method used to mount the plotting surface on the plotter.

The two usual categories for this classification are flatbed-type plotters (in which the plotting head moves along two dimensions over a fixed plotting surface) and drum-type plotters (in which the plot is produced by a combination of the motion of the plotting head from side to side and the motion of the plotting surface backward and forward).

This article is excerpted from Auerbach Publishers, Inc.'s Input/-Output Reports, *a three-volume reference on all major facets of peripherals and data handling equipment.*

Flatbed plotters incorporate a fast plotting surface ranging in size from 30 in. by 30 in. to 5 ft. by 24 ft. The paper generally remains stationary throughout the plotting of a single graphic image. The plotting mechanism performs all the necessary movements, although automatic paper feed is available optionally for many flatbed plotters but is used only between one graphic image and the next.

Paper, or another plotting medium, is usually held to the plotter surface by a vacuum applied from below. Generally, the plotters are operated with the plotting surface horizontal, although some models have a tiltable surface and can operate with the surface in any position from horizontal to vertical.

The writing mechanism consists of a carriage and writing-tool assembly that moves along one axis of the plotting surface while the tool assembly is also free to move along the other axis. Motion in the X or Y direction or in both directions simultaneously is thus possible, enabling the plotting tool to reach any coordinate value within the plotting area. Usually the positioning mechanism for flatbed plotters consists of screw drives in the X and Y directions, which may be actuated by digital or analog signals.

Versatile, But Expensive

Flatbed plotters are generally more versatile, accurate and expensive than other types of plotters such as the drum-type, but such options as multiple-tool heads or photographic plotting attachments are frequently offered becuse the plotting head is mounted on a large moving assembly.

Drum plotters feature a movable plotting surface in conjunction with a writing carriage to provide the required two-dimensional motion. In these units, the writing element moves along one axis while rotation of the drum supplies movements along the other coordinate.

Most units employ an incremental plotting technique that produces a graph by a series of fixed incremental steps of the drum and/or carriage. Bidirectional motors are used to control motion along both the X and Y axes so that each input digital signal causes a small incremental step (.01 in. or less) of the carriage, the drum or both. A third (z-axis) input signal is used to control the raising and lowering of the pen from the surface of the paper.

Compared with flatbed plotters, drum-type plotters are compact and low in cost and offer the capability to produce single plots as long as the roll of paper. The main disadvantages are that they can only produce plots on paper with a single tool, since paper is the only medium that can be fanfolded or rolled suitably and the plotting head assembly will support only a single plotting tool.

For applications involving large amounts of paper, and where accuracy is not paramount, drum-type plotters offer an attractive solution to equipment requirements.

Film plotters produce output on photographic film but are not strictly a separate class of device since optical plotting heads are available for many table-type plotters.

Film plotters, because they use light-sensitive material, have given birth to many specialized techniques. One type of system uses a CRT projection medium to generate an image on photographic film. Another approach utilizes a laser beam deflected by a mirror to generate an image directly on film by left-to-right scans.

Advantages of the laser-type plotting technique are that plots in different shades of gray can be produced by modulating the beam, and plots as long as a roll of film (100 ft.) can be produced — something particularly important for seismic applications.

Photo Plotting's Disadvantages

A disadvantage of photographic plotting in general is the need to complete the plot and process the film before the plot can be inspected, although rapid photographic processing machinery is now available. Some vendors have developed a CRT display for use with photographic plotting systems that allows plot data to be checked visually before the plotting starts.

Electrostatic plotters, also known as nonimpact printer/plotters, are being used with increasing regularity in both

(Continued on Page S/10)

Does 35 day delivery make Centronics' line printer family the best? NO. Centronics 6000 series band printers have much more to offer than just fast delivery; 85% parts commonality and technical features like an operator-changeable print band with a choice of several character sets and microprocessor control, for example. Four models—providing superior print quality and a range of print speeds—75, 150, 300 and 600 lpm, plus design simplicity that provides exceptional reliability and makes the 6000 series a true family of low priced, fully formed character line printers.

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Special to CW

MIAMI — A manufacturing company here, active in the truss plate design industry, has managed to cope with the problem of engineering turnaround times by installing a computerized drafting system.

Monex Corp. uses the system to produce complicated drawings and designs of trusses, the frames used to support the roof or floor of a building. When builders who are bidding on construction jobs call the company for estimates, "they want to know what the truss is going to look like, what kind of lumber is going into it and, of course, what plates are needed in order to bid," Len Naurison, vice-president and director of sales, said.

Using the system, civil engineers at Monex can produce in four minutes a drawing that would normally take a draftsman three days to two weeks to complete, he said.

Monex Corp. vice-president Len Naurison and chief engineer Mehmet Ilter compare a customer's specifications with similar plans in the company's library of truss design. Ilter prepared floor and roof specs and the system completes drawing with lumber, plating, forces and span information.

When the company decided to purchase a computerized drafting system, Naurison said, the most important consideration was the plotter. "We needed a machine that could turn out the very complicated drawings we require" while at the same time retaining "the speed and reliability demanded in this business."

The company selected a California Computer Products, Inc. Model 936 plotter, which is driven by a Hewlett-Packard Co. 9640A minicomputer.

Going Strong

"We've been operating eight hours a day for four years," Naurison explained, "and we still haven't found any limitations to the systems."

Monex customers have a number of ways to obtain the truss information they require, Naurison said. Builders may call the company, using a toll-free number, and provide the operator with details about the proposed project. This information is coded and entered into the computer and, within minutes, a permanent working design is completed.

Appropriate information can be called back to the builder and the drawing can be forwarded to the customer the same or the following day — or it can be stored in the system's memory until needed.

Customers also have the option of purchasing a terminal through which they can operate the plotter system off-line or through the telephone. These customers give the necessary specifications to the firm's operator verbally, or they enter coded information directly into the system by phone.

The computer will accept the information and process it while the customer is on the line or hold the request until the machine is available. Again, the drawing can be forwarded to the builder at once or held until he is ready to build, Naurison noted.

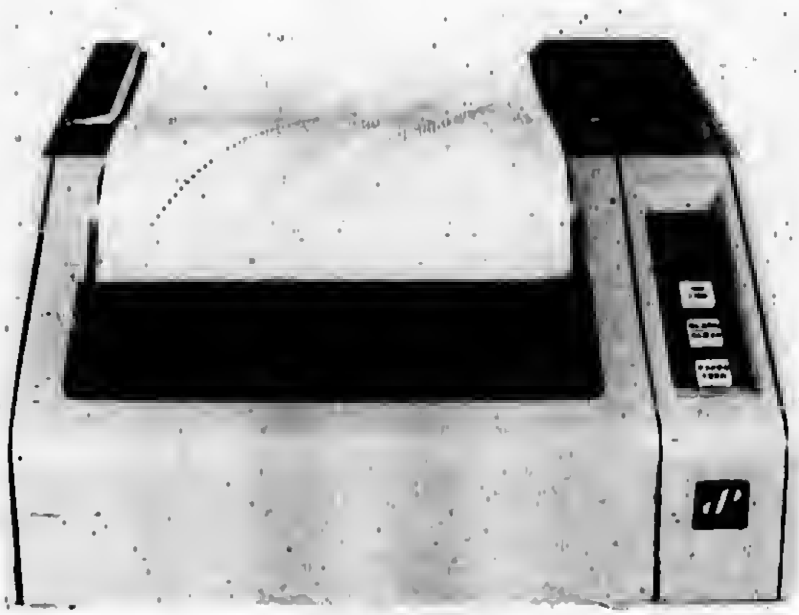
The information fed into the system by the builder includes such statistics as lumber sizes and grades, plating information and all the necessary forces and span data such as dead load, live load and bottom force, Naurison said.

Partial Specs

"Unlike drawings done by hand," he added, "we don't have to allow a margin for error. In fact, if a customer furnishes the proper load and code requirements for a particular job, we can determine final figures even if we're given partial specifications, something

(Continued on Page S/16)

Drum plotter draws floor and roof trusses based on information supplied by builders.



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COM Turns Brokerage Into Publishing Concern

(Continued from Page S/2)

The leased FR 80, a stand-alone system, is fed by a tape generated from a 1G-byte disk that stores the data base generated by the B6700. The mainframe generates that data base through a communications system that collects data from stock market sources such as the Securities and Exchange Commission and Interactive Data Corp.

Upgrade Awaited

At the present time, O'Neil is awaiting delivery of Comp 80/2, an upgrade to the FR 80 system. The user will also lease that machinery.

"The new system will do the graphics work the same way as the old system," Griffitts said, "but the upgrade will allow us to get more of a typeset, professional appearance and will provide a variety of applications not available with the older system."

For instance, Griffitts is excited about the variable-spacing capability of the Comp 80/2. Presently the user is printing in stick characters, which were designed for microfilm applications, not publishing. The variable-spacing feature will provide compaction and enhance the appearance of the output.

Multiple fonts are another feature which will improve the output's aesthethics. In addition, Griffitts noted, the latest system has a lot more available software. He summed up the upgrade by saying, "It's a lot more for the money."

In trading up, Griffitts said O'Neil did not consider products from any of Information International's competitors because, in his opinion, there is no competitive device that would do the variety of work required by the company.

Even though the Comp 80/2 has yet to be installed, Griffitts is anticipating future upgrades. In the next couple of years, he expects to add the rest of the features available with the system.

Specifically, the company is eyeing a scanner feature which can be fed images, convert them to digital form and then recall them in rescaled, rotated or otherwise modified form. Griffitts foresees the use of this feature for on-line, time-sharing applications, such as viewing real estate offerings.

Although the computer generates microfilm output, Griffitts said O'Neil has never sold one piece of microfilm. Instead, the company has developed a projection platemaker that burns printing plates directly from the 35mm film output.

Currently O'Neil has nine presses pounding out the weekly $1,000-a-copy *Datagraphs* subscribed to by 250 users. The firm also has seven other products relating to the stock market, securities and the economy which have evolved from the same data base. These range from custom reports to magazine formats used by more than 10,000 customers.

Recently, O'Neil expanded its operations to publishing parts catalogs and manuals for 40 customers including Toyota, Kawasaki, Pacific Telephone and Merrill Lynch.

The entire operation is handled on the premises.

Color CRTs To Come of Age

(Continued from Page S/3)

the coin, both color-coded alphanumerics and color graphics are playing increasingly crucial roles.

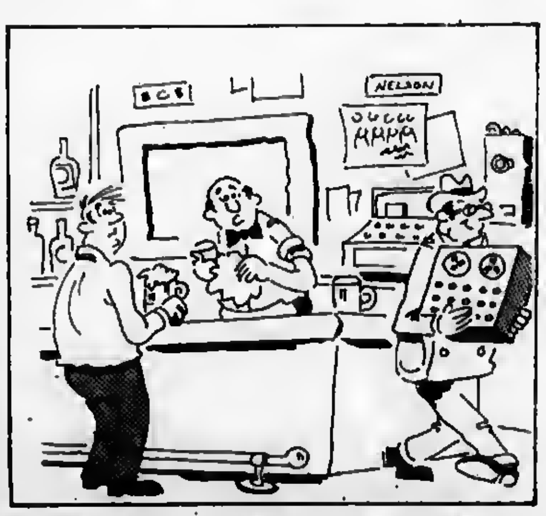
With the addition of color, businesses can develop programs that will display and color code their inventory based on quantities at hand. For instance, green might designate fully stocked items; yellow, items that need to be reordered; and blue, out-of-stock items.

Utility companies have turned to color graphics to be able to quickly locate system components, and in energy management, color graphs or charts give meaning and vitality to statistical data on how to cut a peakload or spread it out more evenly.

However, from the very beginning, educating end users as to the advantages of color has been a slow process. And for those with the foresight to see the advantages, high prices invariably became a major stumbling block. But as color comes in line with black-and-white prices, there has been a major shift in buying attitudes.

End users are realizing that if they can incorporate color terminals into the systems they are upgrading with new terminals, they will be buying more efficiency. And by the same token, if systems manufacturers can offer their customers color at a black-and-white price, they are marketing a better product.

Muench is vice-president of research and development for the Intelligent Systems Corp.



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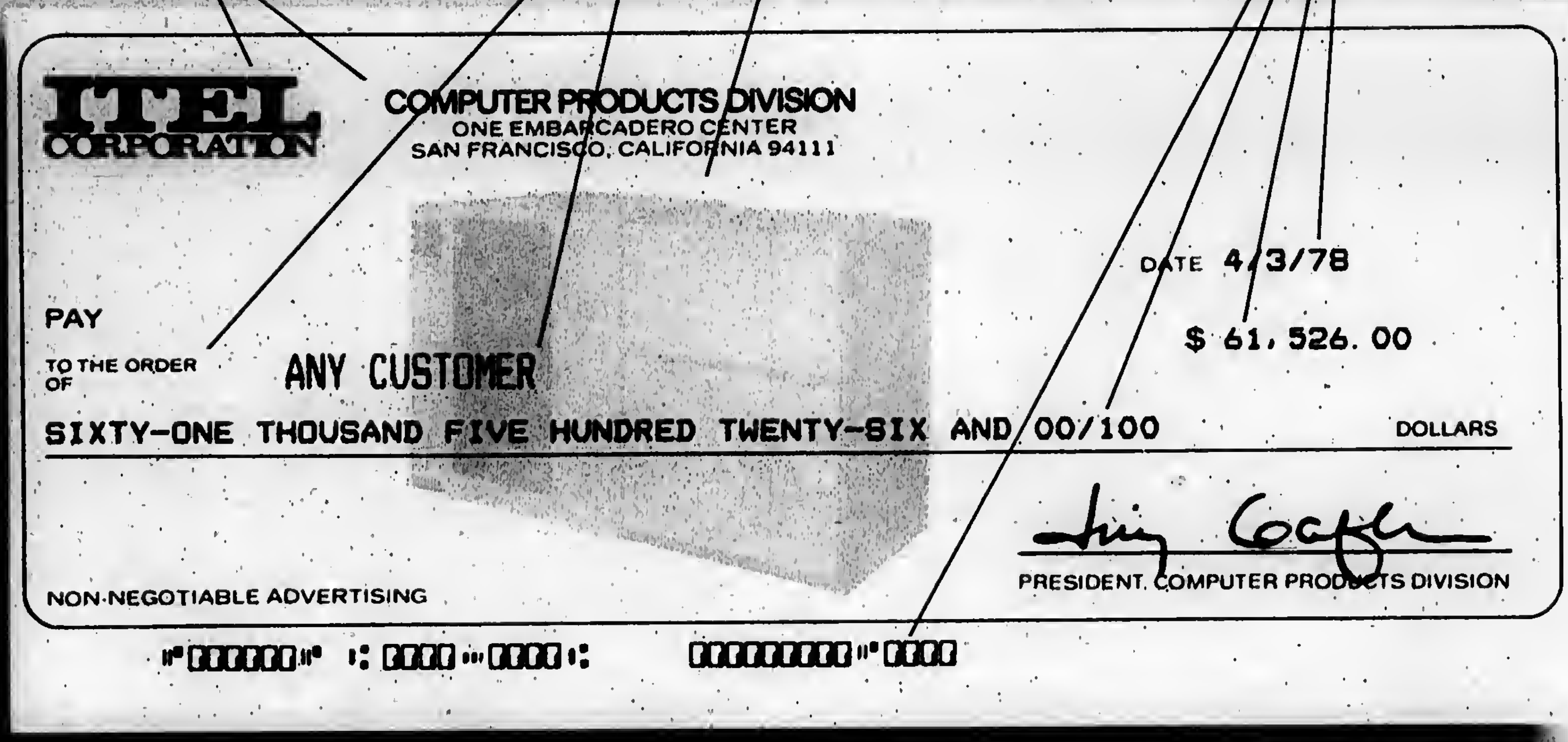

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Diversity in Store as Printer Design Advances

(Continued from Page S/5)

minal operators will perform DP operations as a secondary function. Their primary function may be management, nursing, secretarial work, material receiving or a host of other occupations.

When the print operation ceases, the operator will press a button. The printer will determine, for example, whether the printer; the CPU or the communications network is at fault. Further routines will report the problems quickly. The operator will be prompted to correct minor problems, eliminating many unnecessary service calls.

Should repairs be necessary, the operator will be able to more accurately describe the problem. When the repairman arrives, he can bring the necessary replacement parts and tools, alleviating unnecessary delays.

Despite increased reliability and intelligence, printer prices will decline over the next five years. The case of the 300 line/min line printer is a classic example. Its single-unit OEM price has dropped from $18,500 in 1962 to $7,700 in 1968 to $4,500 in 1977. The same trend is true in any speed class.

There is an average 7%/year decline in printer prices. This is not caused by price erosion but by new development. As new printers are designed and introduced, in about three-year cycles, the annual price reduction averages 7%.

Growth among the various segments of computer applications will change the printer market's complexion in many new areas while increasing shipments in more mature markets.

In the independent market, impact printers will continue to dominate with over 270,000 units compared with 150,000 nonimpact units. Form character printer deliveries will lead the impact field with 39%, followed closely by line printers with 36%. Serial matrix printers will make up the remaining percentage.

Character printers, because of their slow speed, are expected to find more applications in the word processing or office information areas — when print quality and paper handling are important qualities. They will constitute only about 20% of the dollar market, however.

Line printers will continue to be the workhorse of the computer industry with applications in general-purpose, minicomputer, small business systems and terminal areas.

By 1982, line printers will represent nearly 60% of the total independent manufacturers' dollar share of the impact market and over 44% of the total market.

Serial printers, because of their relatively wide 60 char./sec to 400 char./sec speed range, will find more applications in the minicomputer, small business machine, terminal and microprocessor system areas. The annual delivery rate in these areas is expected to double during the next five-year period, contributing about 20% to independent printer manufacturer's revenues.

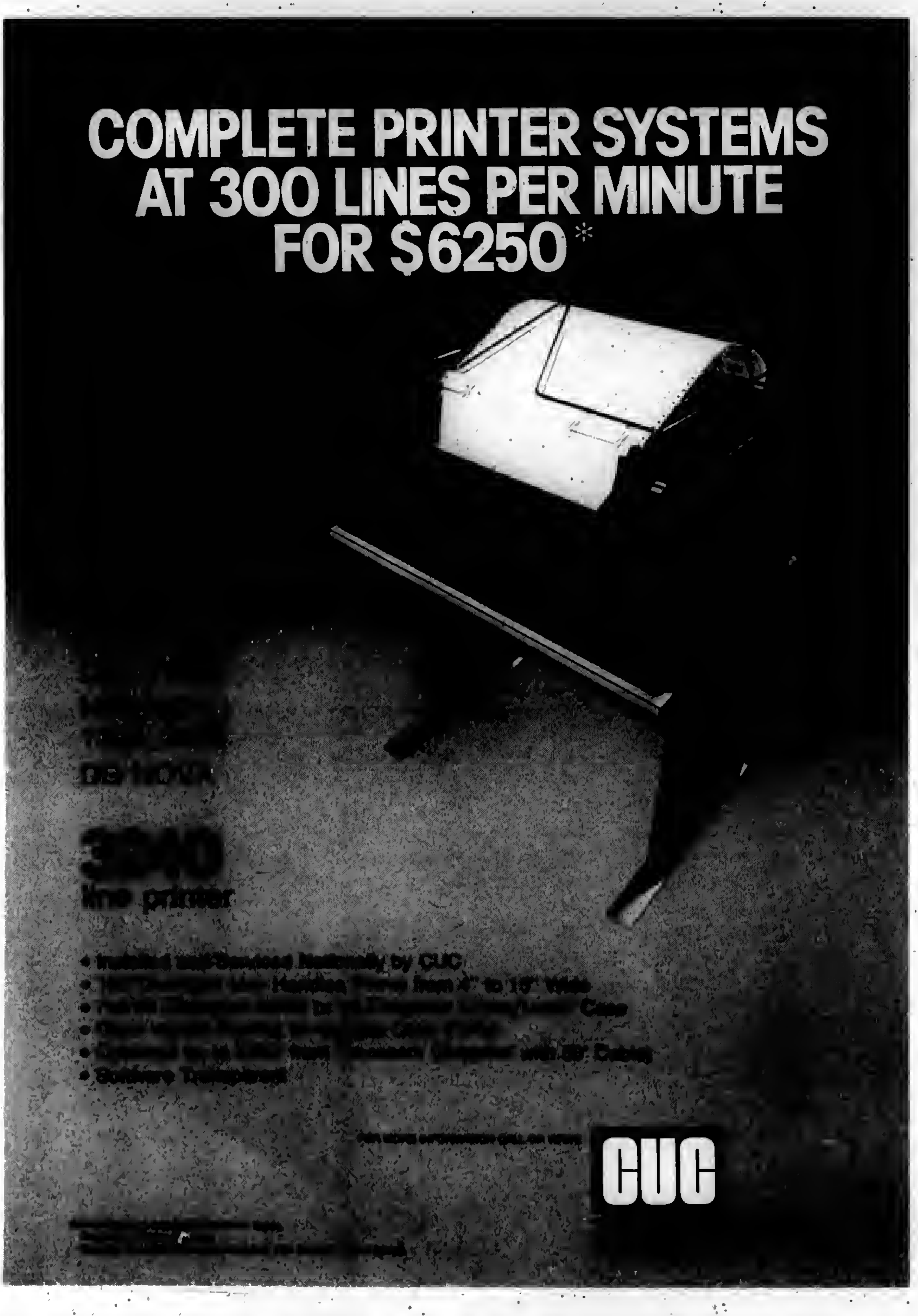
Because it is a relatively new technology, nonimpact printers (with only about 3,500 units delivered in 1976), are expected to experience the greatest growth rate during the next five years.

By 1982, the nonimpact printer is expected to be applied across the board from large-mainframe installations to highly remote terminals. The predominant use will be with minicomputers on down, principally because of the thrust of manufacturers with low-cost, general-purpose printers.

For all of their glamour, the ultrahigh-speed electrostatic, xerographic and ink-jet printers will have small impact on the overall market. The $145,000 to $310,000 price range will tend to limit the number of installations to those large systems that require extremely high output.

Impact printers will still dominate the market for most general applications, but there will be increased use of nonimpact printers for specific applications in which price/performance or convenience is superior to the other approaches.

Kenneth C. Freund is with the Business and Planning Office of Dataproducts Corp., Woodland Hills, Calif.



Plotters Differ In Advantages

(Continued from Page S/6)

scientific and business applications.

In an electrostatic plotter, the paper moves in one direction passing over a row of fixed styli spanning the width of the paper. These styli, or writing electrodes, which may be spaced at up to 200/in., create small electrostatic charges on the paper at the active styli positions. The paper is then exposed to a toner, producing a permanent image.

The prime advantage of this type of plotter is speed, especially of character generation. This is because characters are of the dot matrix-type and do not have to be drawn as is required with other types of plotters.

There are, however, two disadvantages: resolution and special programming. The resolution is not high enough for fine drawings, such as those needed in cartography or integrated circuit mask design. Special programming is required since lines and graphs are not drawn point to point as in other plotters and consequently, data must be stored and programmed to come out serially, one line at a time.

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Develop Specific Plans for COM, Users Urged

Special to CW

BOSTON — Designing an efficient computer output microfilm (COM) system requires three essential elements: purposeful planning, careful data collection and thorough follow-through, according to Robert Ocon, a marketing vice-president with U.S. Datacorp.

Addressing a group at the National Micrographics Association's convention here last month, Ocon stated that many project leaders responsible for developing a COM system for their organization err by failing to develop a "specific approach." COM systems design, Ocon stressed, is essentially a three-phase process involving planning, which encompasses the setting of specific objectives; involvement of key personnel; and finally, soliciting involvement by top management.

Saving money is probably the most common objective, in using COM, but many project leaders do not set a specific amount in hard dollars, Ocon said. The goal should be challenging enough that it will motivate people, but more importantly, gain the attention of cost-conscious senior executives who might otherwise ignore the project.

At least four groups of company personnel should be involved in COM development from the beginning. Representatives should include people from DP, systems, user and records management areas because they are the focal points of the data collection system, according to Ocon.

'Firing Up' Management

Several techniques exist to generate management enthusiasm and involvement but perhaps the most effective is the broad distribution of a letter or memo from a high-ranking company official. Such a message should point out the importance of the project, the executive's personal commitment and the need for organizationwide co-operation, Ocon explained.

After planning, the next phase is data collection, which generally includes compiling a list of all data processing reports, identifying potential COM applications, eliminating those applications that are inappropriate and preparing a special analysis of small reports and cost comparisons.

To maximize potential COM benefits, a prospective COM user should analyze all reports produced by the DP department — including reports for the DP department itself — to ascertain their suitability for COM, Ocon continued.

Some of the key information to consider, Ocon added, is the report, title, frequency, pages per run, number of copies and pages per month.

To identify prospective COM applications, extremely large reports in the thousands of pages are an obvious beginning. However, Ocon stated, a report with as few as 500 pages per run or requiring four or more copies should also be carefully considered. The key elements to analyze are whether preprinted forms are used, what distribution method is used and how the reports are handled by users.

Annotation frequency, updatability and distribution to multiple users are also major considerations as well as whether queries are made by phone; whether copies must be mailed, how much research users do, whether reports are passed along from one department to another and what record retention requirements there are for internal, legal or tax purposes, Ocon pointed out.

However, Ocon cited certain types of applications that should be eliminated from considerations.

- Applications that in themselves are turnaround documents.
- Those physically divided between individuals or divisions or in which data is confidential to some degree.
- Those with excessive annotations.
- Applications in which a hard copy has to go to the customer and only that copy is created.

Special Challenges

Small reports present some special challenges and are generally produced on a conventional printer because of the data's time requirements, Ocon said. Combining reports that are used among systems

(Continued on Page S/21)

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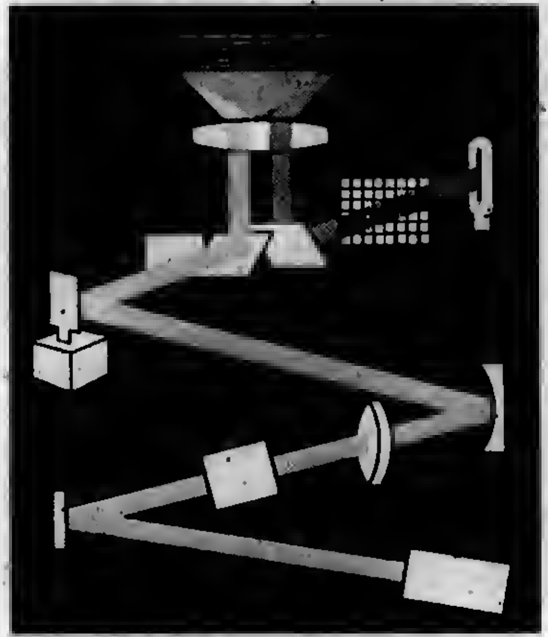
By Edward V. Ince
Special to CW

ROCHESTER, N.Y. — When used as alternatives to conventional writing instruments, conventional light sources such as tungsten filaments or arc lamps are wasteful since they emit their light spherically. When these light sources are used to illuminate the limited aperture of the usual optical system, only a small fraction of the emitted light is actually put to use.

Conventional light also contains many different wavelengths, sometimes requiring filters to control the spectral characteristics — but filters waste much of the originally available energy.

The laser, however, has many features that make it a viable alternative as a printing medium in computer output microfilm applications. First, the laser's energy is concentrated in a light beam that is relatively small to start with and which can be focused on an extremely small spot. This concentration results in a very high energy density.



Data recording is accomplished by advanced laser technology on a dry laser film.

Second, the laser is inherently highly directional so its energy is emitted in a unidirectional bundle without the need for elaborate collimating optics.

Third, the laser's energy is monochromatic, or of one wavelength. This characteristic combines with constancy of phase to define coherence. It is the quality of coherence that enables the user to manipulate the laser beam at accelerated speeds.

Basically, the user doesn't care whether information is recorded with a laser or a paint brush as long as the company's objectives are met. Along with these objectives, the user looks for both speed of output and, naturally, a low cost.

The laser, which operates via principles of deflection and modulation, was at first relatively slow because early units incorporated mechanical gadgetry, rotating mirrors and complex optical systems. Recently, however, research teams have discovered that the coherent properties of the laser make it uniquely qualified for manipulation at electronic speeds.

Many laser units today use an acousto-optic modulator which is a glass block attached to electronically driven transducers that send ultrasonic waves through the glass. When a laser beam is directed through the glass at an angle to the waves, the ultrasonic waves cause the beam to be separated, or diffracted, into a fan of nine beams that write the characters. The laser beam, in effect, becomes an electronic pencil of light, writing its data at electronic speeds.

Film choice is also an important consideration in laser printer technology. There is a definite relationship between any surface the user wants to make a mark on and the vehicle for making that mark. Generally, film responds to light much in the same way that paper responds to a pencil — if you press too hard with a pencil or use too light a stroke, the mark will be too dark with ill-defined edges or too light to read.

Similarly, too much light on film will cause overexposed, poorly defined images, while too little light produces an image too faint to be legible.

Varieties of Film

Films differ in several ways. One of the most important concerns is how much light needs to fall on the film to get an acceptably developed image.

The key to this lies in the size and the dispersion of light-sensitive materials (usually silver halide crystals) in the emulsion. The finer the grains, the less area each has to receive light and the more light it takes to make an exposure. Finer grain films offer a special advantage. If enough light is used to produce an acceptable image, finer grain films can record sharper characters than films sensitive to light.

Dry processing is also, from a user's standpoint, more desirable than traditional wet methods that require a darkroom and several chemicals. After the film is exposed, in a "dry" environment, the film image is developed in a dryheat process by passing it over a heated drum. The heat causes the recorded image to be amplified up to 1,000 times, resulting in both sharpness and clarity of the character image.

Ince is the director of product programs and photographic project coordinator for the Eastman Kodak Co.

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For Users Making Purchase Decisions

Independent Peripherals: More Than Cost Vital

Independent peripheral manufacturers are offering plug-compatible disk and tape systems at prices sometimes 10% to 15% below those of mainframe vendors.

Although cost is a crucial factor in user selection of a peripheral, there are others that should be taken into consideration.

These additional factors are discussed in the following excerpt from Auerbach Publishers, Inc.'s Input/Output Reports, *a three-volume reference on all facets of peripherals and data-handling equipment. The reference guide is updated monthly.*

Special to CW

Lower cost, equal and somewhat improved performance and flexible lease terms are the major incentives when considering conversion to plug-compatible replacements. Major factors to be considered, in addition to any price advantages, are the vendor's ability to support the installation, the equipment's design features and performance and the type of maintenance service provided.

Since IBM has the largest share of the marketplace, most vendors design their plug-compatibles as IBM replacements. The first step, for users of IBM equipment, is to reevaluate their current installations and determine whether a simple conversion or a more substantial upgrade is needed.

Some users prefer to maintain a single-vendor installation. They remember the pitfalls that used to develop in multivendor installations. These users want to avoid the quibbling among vendors' customer engineers because their efforts to fix the blame for malfunctioning equipment can be tiresome and costly.

In the plug-compatible disk sector, however, these problems generally don't occur because independents and IBM's customer engineers usually don't disagree, particularly if the user receives his original disk system from IBM. In that case, IBM customer engineers will install the equipment and ensure that all hardware and software bugs are eliminated, simplifying the user's job of converting to a plug-compatible disk system.

Vendor Reputations

With increasing frequency, DP personnel are selecting their equipment on the basis of vendor reputation. The ingredients that determine a vendor's reputation are hard to define. In fact, two equally perceptive users may strongly disagree about the qualities of a specific vendor or his products.

However, there are factors that help a user to determine a vendor's stability and responsiveness to his customers' needs.

A user can gauge the past performance of a vendor by checking the length of time the firm has been in business. Presumably, an established firm has been providing satisfactory products to its customers and will probably remain in business and continue to provide service, maintenance and product upgrading.

However, a new product can have bugs even if introduced by an established vendor, so the user should know exactly when the product was first delivered.

As part of the investigation of a firm, the user should find out the location of the sales office, since a local vendor is more apt to provide better service. Since the vendor is not necessarily the manufacturer, the user would do well to investigate this point.

Also, a significant OEM market can be a plus factor in favor of the vendor. OEM business expands a manufacturer's production volume; lowers his costs and can improve his profitability via a more positive cash flow.

The electrical environment and facilities of the user's site are important considerations when choosing plug-compatible devices. Unless special circuitry and shielding are provided, electrical signals can be degraded when traveling

(Continued on Page S/18)

Bye, Bye

CRT Terminal. Together, they do a lot more than a

In fact, at $1795, it's like buying a top-quality printer and getting a terrific little CRT free.

And what a CRT! The Model 1100 displays 80 characters per line in an easy-to-read, 9 x 12 matrix and communicates at up to 9600 baud. Compare that to DECwriter III's puny 1200 baud.

Then when your results are ready, touch the PRINT key and the Pussycat printer lays down a whole screenful of characters in only 20 seconds. But, best of all, the CRT is ready for use again in 2 seconds or less. So the operator can go right back to work.

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Clean. Quiet. Inexpensive. The Pussycat Printer and the Model 1100 CRT from Perkin-Elmer. Compared to a DECwriter III, they do more and cost less.

Mini, Printer Help Launch Publishing Venture

Special to CW

SAN FRANCISCO — A graduate student here used a minicomputer and a data communications terminal/printer to not only help him complete his Master's thesis but also form a fledgling publishing company as a result of his research.

Bruce M. Spence, manager of sales support for *Standard and Poors'* Fixed Incomes Systems, Inc. and a recent graduate of New York's Pace University, decided to alter the traditional process of preparing a Master's thesis, opting to forgo the reams and reams of note-taking and long hours at the typewriter. He streamlined the process of collecting a large volume of data, then took his thesis a step further, turning the project into a valuable resouree book and at the same time establishing a company to publish his work.

Spence's book, *The Inside Source*, contains information on 26 contemporary, business-related fields. This includes everything from accounting, advertising and marketing to global economic development, international trade, transportation and urban development, Spence said. The book is actually an annotated bibliography of free publications on business, economics and management available from private and governmental sources.

Spence used a Hewlett-Packard Co. 3000 computer system, located in California, linked via the Telenet Communications Corp. network to a Diablo Systems, Inc. Model 1620 Hyterm terminal/printer stationed in New York. He then created a complete data base software system that enabled him to perform much of the research required for the book's compilation.

Spence, along with friends Joseph P. Adams Jr. and Peter deLucca, formed Quad International Corp. to market the book, and the group used the terminal/minicomputer arrangement to computerize the company's mailing lists, inventory control and accounting systems.

The terminal/printer and a modem were purchased by Quad International for approximately $3,500. According to Spence, "Diablo was terrific. Its representatives treated us with the same courtesy and helpfulness as they would treate any of their much larger customers.

"The Hyterm was central to the project. We not only used it as an I/O terminal, allowing us to access the computer system in California, but also made full use of its high-quality printing capabilities," he said.

"In fact, rather than spending $10,000 on typesetting, pasteup and camera reduction, we were able to use the Diablo 1620 to completely prepare the camera-ready copy from which *The Inside Source* was printed — some 500 pages of material."

The Hyterm is a microprocessor-driven data communications terminal that uses the Diablo Hytype II serial printer. The terminal features a variety of interchangeable daisy print wheels in different type fonts and is capable of letter-quality printing output at 45 char./sec.

"The Hyterm kept our total publishing cost for a first run of 1,000 copies of *The Inide Source* down to $14,000," Spence said. "By avoiding costly and time-consuming typesetting charges, we estimate that we saved roughly $6,500. Probably more important, in terms of cost, was the amount of man-hours and clerical expense saved by using the terminal to prepare personalized letters necessary both in the compilation and marketing stages of the project."

Working evenings and weekends for a year and a half, Spence, Adams and deLucca combed libraries and sent out more than 600 letters, printed on the terminal, to po-

(Continued on Page S/21)

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'Very Rarely' Go Down

Disk Replacements Please Programming Firm

By Howard A. Karten
CW Staff

NEW YORK — How do you attach a 3330 disk to your IBM 360 when IBM doesn't supply the necessary software? Mike Parrella, president of Decision Strategy Services Corp. (DSS) here, turned to Itel Corp. to do the job and, after using the Itel 3330 replacement for 18 months, is pleased with the result.

Parrella's company does contract programming for other businesses, concentrating exclusively on on-line applications. In addition, the firm operates a 370/145 which runs several on-line systems for clients. The applications on the system include order entry, accounts receivable, data collection and data query.

Best Deal

When Parrella acquired his 360/50, he wanted to run 3330 disks with it. In addition, he knew he would eventually be converting to a 370. "I looked at Itel and other vendors, and Itel's cost and abilities seemed most competitive," Parrella said. "I had heard many good things about Itel hardware and software, and I wasn't disapponted."

Discussing the performance of the Itel disks, Parrella commented that he had some minor problems with the disk control unit at first, "... but once [Itel] got it straightened out, the units performed very well. It's very rare for a disk to go down now."

He also feels Itel support is excellent. "They respond immediately when I put in a call," he said.

DSS specializes in developing on-line systems for clients and pays for its 370 by running some of these on that system. Most of these applications run under a software package developed by DSS called Terminal Applications Processing System, or Taps.

The company's equipment complement presently includes the 145 with 256K bytes of IBM memory and 768K bytes of Itel memory, Itel 3420-compatible tapes, two 1403 printers, an IBM 2540 card reader and a Memorex Corp. 1270, which emulates an IBM 2701. The company runs Release 34 of DOS/VS, using a 3270 as a console.

The equipment presently operates 24 hours a day, seven days a week, and runs five partitions. Parrella is planning to increase this to seven in the near future.

DSS is pleased enough with Itel's performance to be considering installing an Itel AS/4 to replace its 145. "We're practically an Itel shop now," Parrella note.

Parrella spoke enthusiastically about Itel's service. "I'm a very small guy, relative to the rest of the world, and when I have a problem, the Itel people are all over me. They follow my business, and as it grows they offer migration paths and suggestions to increase my machine capabilities.

"My salesman always keeps an eye on me to make sure my equipment meets my business needs. Itel is much more receptive than most other companies as far as the little guy goes."

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MOORE BUSINESS FORMS, INC.

Plotter Speeds Job Turnaround For Builders

(Continued from Page S/7)

that would be very difficult for an engineer to do.

"Traditionally, a truss design took several weeks and involved a number of people so there was a greater opportunity for error. A salesman would go to the construction site, take down the job specifications and mail them to the truss designer," Naurison explained. "Then an engineer would design the roof or floor truss using code books and calculators. The finished drawings and specifications would be returned to the builder weeks later."

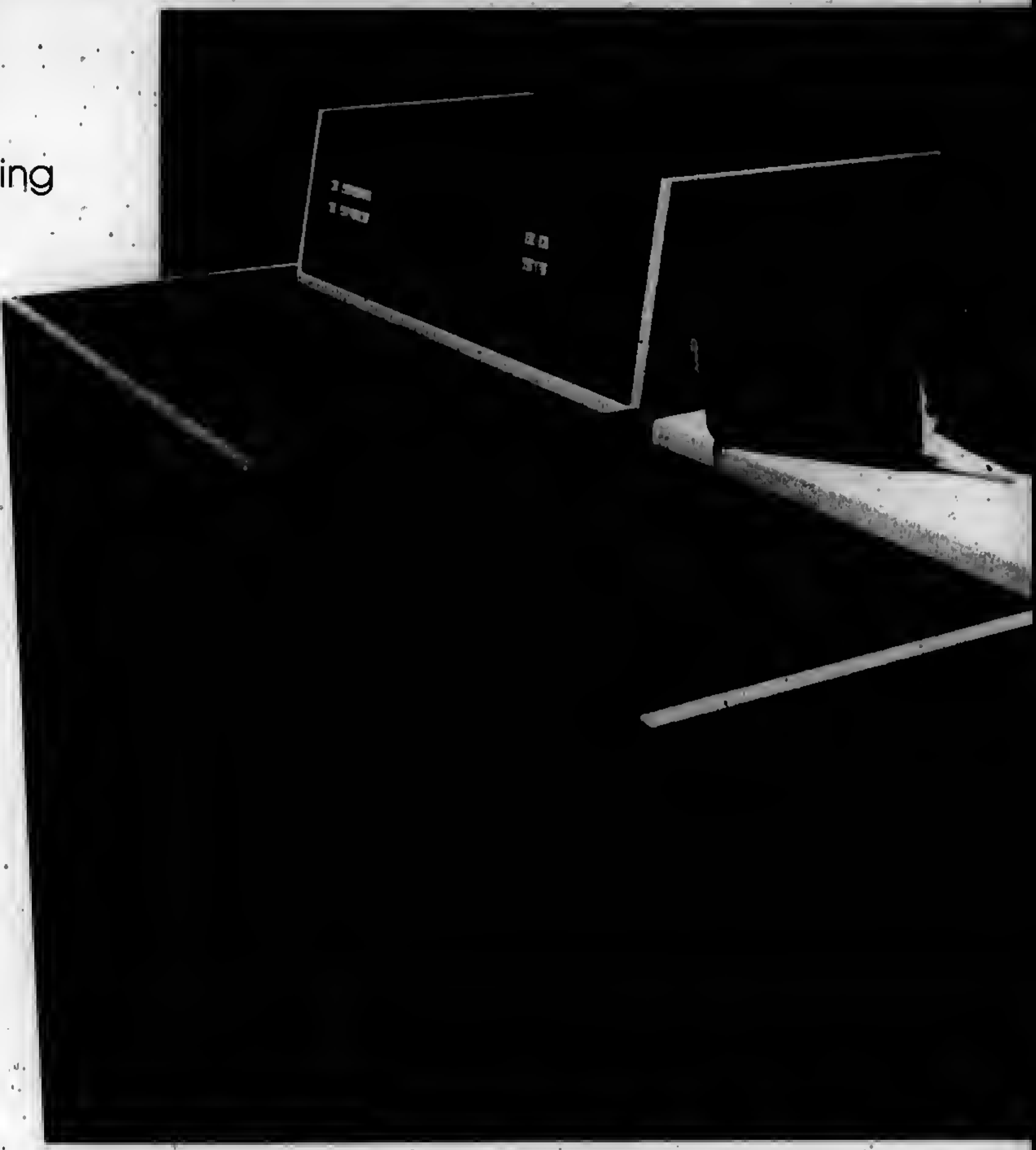
No On-Site Visits

With the computer-based system, the on-site visit is eliminated and engineering and drafting can be done in minutes. In addition, much of the time-consuming research is avoided since the computer has most of the information stored in memory. "Our engineers simply feed in certain criteria and the computer analyzes the available data to arrive at an answer," Naurison said.

In addition, the system has provided cost benefits for customers. "We are able to determine the most efficient and economical use of materials, thus eliminating waste," he stated. "And the speed with which we can do the drawings and the volume of designs we handle, together with the lower costs for our truss plates (manufactured in large quantities) mean major savings for our customers."

Naurison believes that many of his customers are persuaded to do business with him because of the plotter itself. "When a prospective customer comes in, the first thing I show him is our plotter. These people are professional, and they're astounded when they see that machine operating. I've never seen a prospect come in here who hasn't been sold once he's seen the plotter."

With the Kodak laser printer, film is cheaper than paper.



Consider the operating cost of the Kodak laser printer versus the operating cost of a paper-impact printer.

Consider, for example, the cost of generating a 1000-page, 3-copy report.

Three-part stock paper costs about $22.30* per 1000 pages. But you can put the same report on microfiche for around $1.50.

So, from the standpoint of materials alone, paper is about 15 times more expensive than microfilm.

Time and labor costs are important factors, too. Especially in a DP department. Which is why you should know that it would take almost 50 minutes to decollate, burst, bind and package a 1000-page report. It would take only 9 minutes to print, duplicate and package the same report on just 4 microfiche.

A Kodak laser printer can save you money in other ways, too. With a paper printer, you'd have to load at least 12 boxes of paper to print the equivalent of one cartridge of 16-mm film. Compared with fiche, the margin of difference is even wider. You'd need 31 boxes of paper to print the equivalent of one fiche cartridge.

In fact, when you add up the savings in materials and labor, you'll find that printing with a Kodak Komstar laser printer is about 87% cheaper overall than printing with a paper-impact printer.

87% cheaper.

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Kodak Komstar microimage processors.
The printers that print without paper.

*Prices vary with geographic location and grade of paper purchased.

Independent Peripherals: Cost Not Only Factor

(Continued from Page S/14)

through extended lengths of cables.

For this reason, IBM requires contiguous portions of floor space for all components in its direct-access storage facility (DASF) disk systems. Some independents don't follow IBM's policy in this regard because its cabling restrictions also prevent customers from using the various nooks and crannies that might otherwise be filled with an individual drive module or a controller.

Special operating and maintenance hardware features should also be considered by the user. Does the equipment include both operator and maintenance panels? Where are they located? What special switches and indicator lights are provided to aid the user in operating the system and the customer engineers in maintaining it?

By definition, plug-compatible replacements should be the logical equivalents of their original counterparts. Still, it's a good idea to check whether there will be a need to modify existing hardware or software before installing and operating the equipment.

For instance, some dual-density packs can organize data somewhat differently from single-density packs; minor software modifications may therefore be required.

Also, some dual-density disks require modifications to the IBM OS and DOS operating systems and others necessitate careful data organization to prevent performance degradation. Generally, the vendor is responsible for any required system modifications.

Independents offer a wide range of performance characteristics related to the disk drive's mechanical motion. Differences are generally found in such features as moving-head repositioning time, effective data transfer rate and disk start/stop time.

Whether these performance variations will impact a user's operation depends on the system type and level of activity. For example, if the installation is operating at full capacity, then increased data transfer rates can improve system throughput.

Although the same bit density and rotational speeds give the same peak transfer rate, reduced access times result in more data actually transferred to the CPU in a given time period. Start/stop times can become significant for installations where disk packs are frequently changed.

If a substantial amount of disk usage involves random file access applications, drives with shorter moving-head repositioning times can handle files more efficiently.

Most plug-compatible manufacturers offer a variety of pricing arrangements. The optimum price can vary, but it reflects a balanced mixture of lease duration, maintenance and overtime terms and cost.

Short-Term Leases

Short-term leases benefit users who decide to cancel in favor of more technologically advanced or less expensive equipment, because there is no penalty. Short-term leases can also be advantageous for users who want to operate a plug-compatible vendor's equipment on a trial basis.

On the other hand, short-term leases are usually more expensive, and the user is subject to more frequent price changes if he renews his lease during each short-term interval.

Long-term leases involve small monthly payments but extended commitments on the part of the user. The user is protected against price increases, but also prevented from taking advantage of any price decreases.

Maintenance is usually included in the lease price, but maintenance hours vary and the price changes accordingly. The customer generally pays higher maintenance fees for service outside the normal five-day, 40-hour working week and, unfortunately, the normal working week is "prime time" for most computer installations.

This results in a trade-off decision: Should the user pay for on-call maintenance during hours that won't interrupt the installation's activity, or should the user pay a smaller maintenance fee and risk system downtime during the most productive hours?

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Now, notice the 640-character FIFO buffer. It channels data so

Despite Variety of Devices

Ultimate Hard Copy Solution Not Yet Offered

By Tim Scannell
CW Staff

BOSTON — Although there are a variety of digital hard-copy devices available to the user — electrostatic, thermal, ink-jet, xerographic, film and conventional impact printers and pen plotters, none appear to be the ultimate solution for all applications, according to Alan Dawes, a representative of the Versatec Co.

"In order to satisfy the varied needs for hard-copy devices, two techniques have been developed," Dawes said at a recent conference here. The first is "a concept of image dissection" and the second is "the writing technique itself, of which there are several."

Image dissection, Dawes explained, is the process used by both nonimpact and some impact devices to achieve a "versatility of display. The image to be displayed, such as letters or graphics, is dissected into a number of common elements" called dots.

These dots are selectively positioned "in a fashion similar to a television display, where the scanning beam is turned on and off, producing the desired image when the eye integrates the detail," Dawes said.

Resolution, although previously a problem with earlier devices, now "approaches the look of a typewritten page" with displays as dense as 200-to 300 dot/in., Dawes added.

In the area of writing techniques, one particular process — electrostatic writing — is believed to hold "extraordinary promise" because of its inherent simplicity, Dawes said.

Electrostatic writing devices employ a conductive paper coated with a dielectric film a few microns thick. "Its major function is to retain an electric charge," Dawes explained.

The paper is passed between a conductive stylus and an electrode that charges the surface of the paper. Then, "using a recording head which contains an array of embedded nibs, and addressing those nibs in the appropriate manner, one can selectively deposit charged dots on the surface of the dielectrically coated paper," he said.

The electrostatic disturbance remains invisible until toner, a developing solution composed of a suspension of carbon particles, is applied to the paper's surface. "The black (carbon) particles migrate to the charged areas, where they are deposited and permanently fixed as the paper dries," Dawes said.

The advantage of using electrostatic-type printers or plotters over devices that employ another printing technique is that these machines, because of their method of image dissection, can display any kind of graphic and alphanumeric information.

"This has become very useful where different languages have to be written by the same machine and where dense black areas, plus fine-line graphics, are required," Dawes pointed out.

Thermal printers also use treated paper, but their resolution is usually limited to less than 100 dot/in. "Total versatility of display is possible by exploiting image dissection and imaging with one writing element," Dawes said.

Because the heads of the printer can be positioned across the page, this type of machine is ideal for use as a "low-cost, 100 char./sec serial printer."

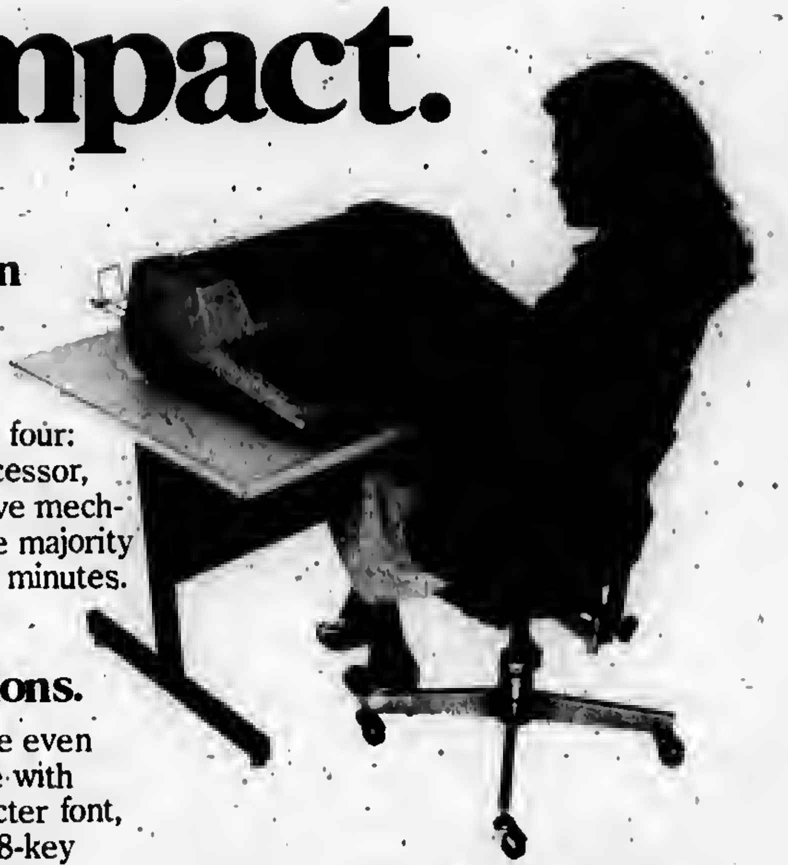
Ink-Jet Printing

"The most important benefit of ink-jet types of printing devices is their ability to write on any substrate — from letterhead bond to carpets," although "reliability at a reasonable cost has yet to be proven," Dawes stated.

Synchronous systems print characters by "selecting ink droplets from a continuous stream" at about 100,000 droplet/sec, but asynchronous machines are considerably slower (approximately 20,000 droplet/sec) because the imaging is produced by a "drops-on-demand" system.

High speeds are possible with multiple ink-jet heads,

(Continued on Page S/21)



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Printer Allows Flexibility in Traveler Badges

Special to CW

DAYTON, Ohio — Name badges are a small but important ingredient of travel incentive programs various companies offer their employees.

A firm here, recognizing the need for a viable yet economical means of individual identification, developed a computerized name badge printing system based on a label preparation system (LPS) offered by the Standard Register Co.

Badges are included in each traveler's information packet.

The E.F. MacDonald Co. administers incentive programs for more than 3,000 companies throughout the country. This involves making all the necessary arrangements and providing the materials for more than 250,000 people who have received travel as a reward for outstanding achievements in selling, production and other areas, a spokesman said. Unfortunately, the name badge has been a "nagging headache" for the firm.

Typewriter Limitations

First of all, the company was limited to what a typewriter could do — print in one type size that was usually too small for the badge's purpose. At the same time, company officials were looking for a badge that would adhere to any fabric without doing damage and that would last a reasonable length of time, the spokesman stated.

In most cases, the company prepared six badges for each person participating in an incentive travel program. The badges formerly came on sheets and were imprinted with colorful information identifying the company and the trip's locale. A typist produced the badges by typing information on a master typewriter while a slave typewriter would generate five more automatically.

Several Production Steps

The computerized badge printing operation, however, is actually composed of several production steps which begin when a customer sends in a list of people scheduled to take a trip.

The lists of people are first keypunched, processed by an IBM 370/145 and input to a data base containing all the necessary information about the trip and the trip's destination. This information consists of a list of functions to attend, currency data, information about passports (if needed) and so on, as well as the details needed to produce the name badges, the spokesman continued.

The complete "pretrip" information is then accessed from the data base, along with the individual's personal data, and output to magnetic tape. The tape is then used, the spokesman said, to prepare a deck of cards — one for each person on the trip list. The punched cards serve as the source for the LPS name badge printing operation.

Card Reader

The deck of cards is placed in a 200 card/min reader, which transfers the information to a Standard Register badge printer. The printer is loaded with one-part continuous forms consisting of blank labels mounted three-wide on a carrier sheet, the firm noted. When only one badge per name is required, the company uses a one-wide format, although this is infrequent, the spokesman added.

Card reader (at top) feeds information from tab cards to printer, which produces pressure-sensitive labels on continuous forms.

The system is not only fast but it provides a great deal of flexibility in imprinting badges, the spokesman stated. The system has, for example, two basic formats, each having four lines of type. The difference is that the first line of one format has .4-in. type and on the second format the first line is .2 in.

Within the two formats, there are also six location styles consisting of name, home city and state and other variable items which can be entered on the first three lines. The last line, if used, is for an item that is constant, such as a short phrase describing the trip's theme.

In addition to the type size variety and layout style, the spokesman said, the system also allows the inclusion of nicknames, if desired. This was not possible with the typewriter operation.

After the badges are imprinted with the information, the continuous form is separated into sheets and sent out to have decorative material such as company logo and name, trip location and so on, imprinted on each one, the spokesman pointed out.

While cost was not the determining factor in the company's decision to change procedures, it has realized savings, the spokesman claimed. More importantly, the readability problem has been solved for all concerned.

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Mini, Printer Help Grad Move Into Publishing

(Continued from Page S/15)

tential information sources thoughout the country. Once they had gathered their data, the fed it into the computer system for processing, indexing and cross-referencing. The collated bibliographical entries were printed out on the terminal and the printout sent to an outside print shop for production and binding of the book.

Marketing Aid

As part of its marketing effort, Quad also used the terminal/printer to produce more than 500 press releases and personalized cover letters to announce the publication of its book. According to Spence, "Because the Hyterm can handle up to 12 different forms lengths, we were also able to save a lot of time and trouble by storing our mailing lists on the computer system, then writing a simple program to print out the appropriate envelopes on the terminal.

"In one weekend, we printed more than 300 cover letters and envelopes. And the print quality was so good that each one looked as if it had been individually typed by a secretary," he said.

Since the book's publication in late 1977, Quad has distributed more than 600 of the original 1,000 copies produced. "If there is a continuing demand," Spence explained, "we are confident of being able to bring out subsequent, annually updated versions of the bibliography . . . utilizing the printer and the minicomputer."

Quad International, which began as a graduate school research project, is currently undertaking a new task — a major readership demographic study for a leading national magazine.

"We'll be surveying more than 35,000 individuals scattered around the country. "Quad is designing the computer data base and software systems to handle the questionnaires and to process the responses to them into coherent, useful media market profiles," Spence explained.

"Again, the terminal/printer will be used to prepare all our forms for mailing and to print out the ultimate report. And for a $3,500 investment in hardware, Quad is getting an awful lot," he said.

Specifics Needed for COM

(Continued from Page S/12)

personnel can help limit excess material and if that is not possible, certain software will permit multiple reports to be placed on a single fiche.

Compare Economics

In order to satisfy the main objective of cutting costs, project leaders should compare all the economics of their old system and the proposed microfiche system. An application worksheet that incorporates not only paper, but print time, storage and paper handling costs is a necessity if the complete cost picture is to be seen, Ocon stated.

After selecting the appropriate applications, users should select the right microform, choose proper reduction ratios, decide on indexing needs, develop a conversion timetable and, of course, train users.

There is little question that microfiche, as opposed to 16mm and 35mm film, is best suited for DP reports because of its ability to be retreived quickly, its reasonably small size and the possibilities for visible indexing, Ocon observed.

In the area of reduction ratios, the higher the better, Ocon said. While 24X fiche contains 80 pages of data, a 72X reduction permits up to 690 pages of data plus indexing to be stored on a single 4-in. by 6-in. piece of film.

Explore Software

Software that offers indexing flexibility and thereby enhances the use of the applications and increases efficiency should be carefully explored, Ocon noted. Eye-readable indexes should only use enough characters to permit fiche and column selection, and report titles should be meaningful to everyone in the corporation — not just the DP department.

Conversion schedules should be specified in advance and followed, Ocon declared. All too often, he stated, a few applications are converted and then the conversion schedule begins to slip. This results in wasted effort and, more important, wasted time, he emphasized.

Finally, a great deal of emphasis should be placed on user training. Without proper training, Ocon explained, all the time spent looking at applications and collecting data is lost if a clerk does not know how to use the film or where to store it.

Ultimate Solution Not Yet Offered

(Continued from Page S/19)

although such devices "are expensive and of uncertain reliability," Dawes said. However, ink-jet systems can produce color characters and continuous tone images by modulating the droplet size.

Electrophotographic systems dissect the images and reconstruct them in a digital dot matrix form, Dawes said. These machines "have the potential to merge graphics with text . . . and their graphics capability is oriented toward forms creation and special characters.

"Conceptually," these types of printers "could reproduce highly versatile graphics," he added.

Photoplotter's Benefits

Photoplotters, which utilize film, tend to be expensive and serve specialized applications such as data logging and seismic plotting. "Their advantage is speed and an ability to create variable-width, dense black areas," Dawes said. "Film is also used extensively for capturing digital images from CRT displays."

Impact printers "offer a means to create plots for the occasional graphics user unable to justify the cost of a plotting system," Dawes said. "Many simple business graphs, bar charts, scatter diagrams and so on can be produced on low-speed daisywheel printers."

Finally, pen plotters, although very slow, "are highly accurate and can write on a variety of substrates."

In the long run, the machines that will be most accepted by users will be those that are simple to operate and "most versatile in rendering information visible," Dawes observed.

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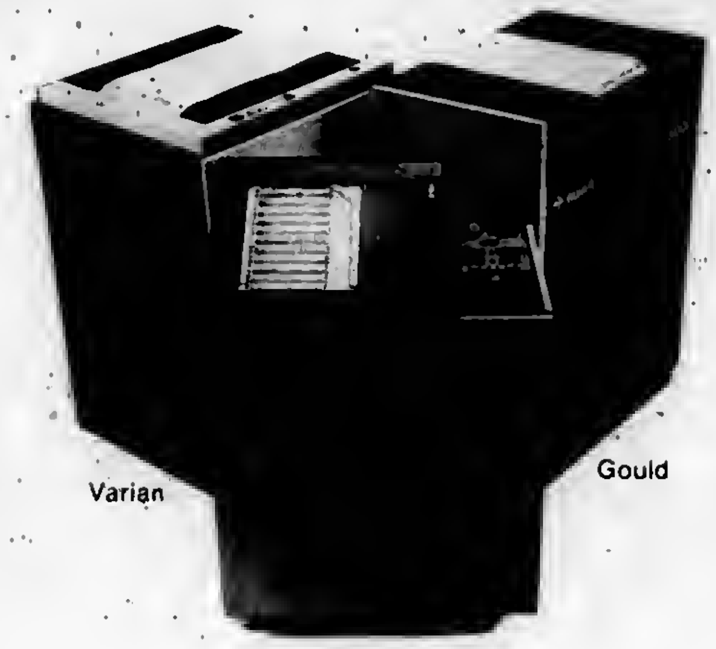

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No Agreement on Definition

No Real DDP Systems Seen Being Sold

By Howard Karten
CW Staff

ANAHEIM, Calif. — No vendor is presently selling true distributed data processing (DDP) hardware and software.

That is one of the startling conclusions reached by a group of panelists at the recent National Computer Conference here.

Defining DDP as "a collection of processing elements, interconnected both logically and physically with decentralized, systemwide control of resources for cooperative execution of application programs," Dick Eckhouse of Digital Equipment Corp.'s Research and Development Group said he sees four key answers to the question "Why DDP?": reliability, extendability, conformability/adaptability and applications performance.

In his jocular presentation, Eckhouse discussed several concepts and pieces of hardware which he said are "not DDP." Among these, he said, are multiprocessing, computer networking, intelligent terminals and satellite processors.

There is little or no agreement on the meaning of DDP, he added, but there are nevertheless some key DDP questions to be asked. Among these are how the data is distributed and how error handling is performed.

An additional, important issue, he said, is the question of "how we can use the inaccurate or missing information to perform optimal resource allocation." This question, in turn, points to some research directions in DDP, such as synchronization, availability and load balancing.

Drawing a distinction between the uses of data processing in the past and in the future, David J. Farber, professor of electrical engineering at the University of Delaware and chairman of the panel, said, "The older notion of economies of scale of larger systems is just not a factor of modern economic life" with computers.

"In the 1950s and '60s, with centralized DP operations, the organizations had to adapt to the needs of the computer, which produced a great strain in organizations. Distributed systems put power back in the hands of those who need and use it," Farber said.

Although this view seemed to be somewhat conjectural, given the agreement among panelists that no true DDP hardware is currently being sold, Farber nevertheless went on to caution that much higher reliability and availability of equipment is needed than currently exists before DDP can be embraced as a panacea.

Cautioning attendees that technological issues are merely one aspect of distributed systems, Farber suggested that social impact statements on such systems be required before they are installed, as environmental impact statements are now required for construction projects.

Adding to the heavily academic flavor of the panel, E. Douglas Jensen of the Honeywell Systems and Research Center of Minneapolis said he knows of "no publicly announced software" that meets his definition of a distributed system — that is, a system in which the software as well as the hardware is distributed.

Seven-Color Xerographic Printer Works on Both Originals, Input

NEW YORK — A color xerographic printer capable of producing graphics from either original material or digital input has been introduced by Xerox Corp.

The Xerox 6500 can reproduce material in seven colors at a rate of 192 document/hour, company officials said.

Presently only one device — the Ramtek Corp. Model 6200A terminal — is capable of being interfaced to the 6500, the Xerox spokesmen said, but Ramtek is currently working on interfaces for its other color graphics terminals.

Two other vendors, Aydin Corp. of Ft. Washington, Pa., and Chromatics Corp. of Atlanta, Ga., are also developing interfaces, they added.

Company officials said many companies had expressed interest at the recent National Computer Conference in interfacing the 6500 directly to a mainframe, but they know of no one actually planning to produce such an interface. The unit is clearly intended to compete in some fashion with the color plotters now available, however, since it is said to be TTL- or DTL-compatible, with synchronous operation of 400 scan/sec and an image resolution of 100 point/in.

The colors available with the unit — cyan, magenta, yellow, red, green, blue and black — can be printed on either plain bond paper or suitable transparency material using a laser-recording process on a raster-type image, one spokeswoman said. The maximum dimensions for conventional photocopy are 8.5- by 13.75 in., she added, while maximum dimensions for digital input are 6.4- by 13.75 in.

The printer is priced at $25,000, with first deliveries scheduled for August. No leasing plans will be offered; Xerox said from 280 Park Ave., New York, N.Y. 10017.

Voice Synthesis System Updated

TROY, Mich. — The Votrax Division of Federal Screw Works is offering an updated version of its Model VS-6 vocal synthesis system that reportedly features improved voice quality.

The Votrax VS-6.4 has a first-in/first-out (Fifo) buffer and comes with either a serial or a parallel interface, according to a spokesman. It interfaces with any computer, requiring a speed of 300 bit/sec in Ascii (with serial interface) or 150 bit/sec (parallel) to generate continuous-sounding speech.

The system produces human-sounding speech by combining phonemes, which are used as the basic elements of speech. The phonemes, combined in response to digital information presented to the unit, are integrated with inflections to produce an unlimited vocabulary, the spokesman explained.

The Votrax VS-6.4, which meets RS-232 standards, sells for $5,955. Users of VS-6 can upgrade to a VS-6.4 for $1,500, the company said from 500 Stephenson Highway, Troy, Mich. 48084.

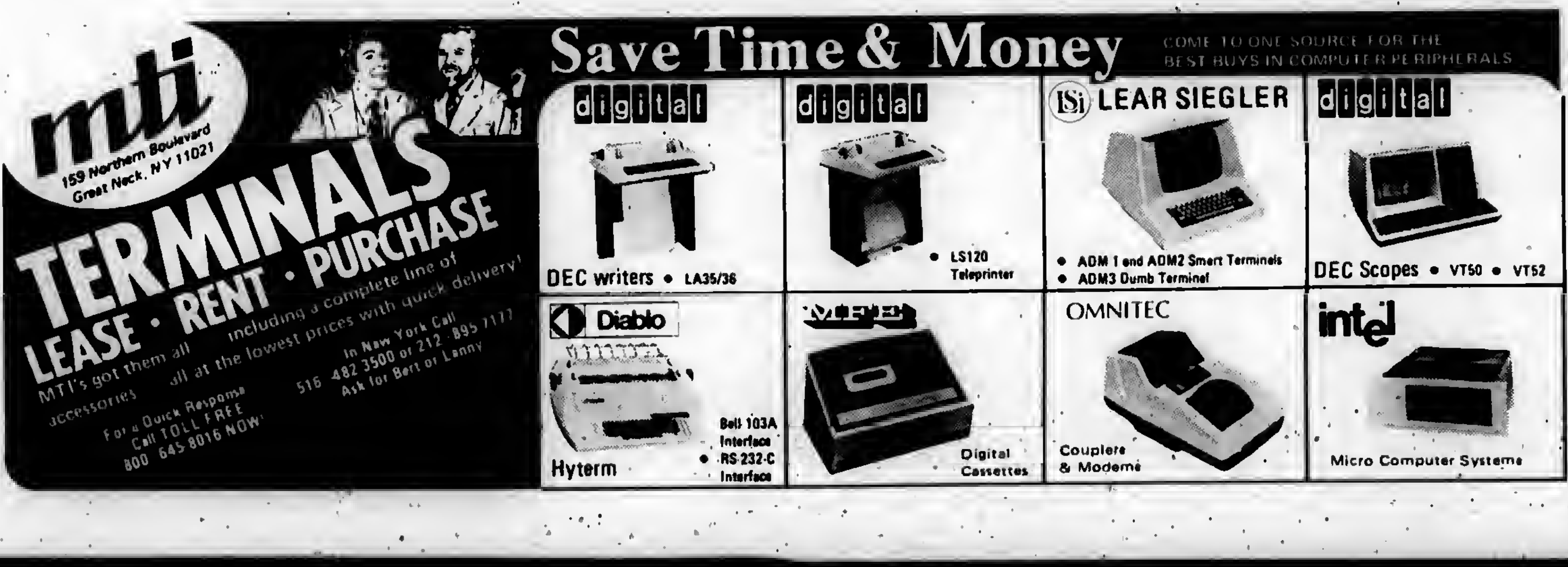
Printer Runs at 900 Line/Min

MALDEN, Mass. — Data Printer Corp. has introduced a 900 line/min printer featuring 8080A microprocessor control and single-line memory buffering.

The Model 1290 has 132 print positions with 10 position/in., a paper slew rate of 20 in./sec and motorized tractor control for forms handling, according to a spokesman. A vacuum cleaner system, paper puller system and electronic vertical format unit are available as options.

Vertical forms control for the unit is 8-channel, with 1 in. paper tape, and includes automatic single- or double-line spacing. Line feed of 0 to 63 lines under program control is also standard.

The Model 1290, which uses the company's Chaintran method of printing, is available for $13,700 from Data Printer at 59 Middlesex St., Malden, Mass. 02148.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Tilbury likes the Data General software compatibility—from small NOVA systems to the large ECLIPSE—because it lowers his development costs.

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Data 100 Extends Options For Disk-Based Data Entry

MINNETONKA, Minn. — Data 100 Corp. has announced a disk-based system for data entry users that the company said bridges the price/performance gap between disk and diskette-based systems.

The system, called the Model 77-107, comes with 32K bytes of storage and features a control unit with 2.5M bytes of disk storage, one or two CRT keystations with typewriter- or keypunch-style keyboards and synchronous communications up to 9,600 bit/sec.

Optional peripheral equipment for the system includes printers ranging in speed from 62- to 1,250 line/min, card readers ranging in speed from 150- to 1,000 card/min and 9-track, 800- or 1,600 bit/in. magnetic tape drives.

Data 100's Keybatch software package has been updated to include concurrent IBM 2780, 3780 and Hasp communications capabilities, the company said. In addition, a 3780 emulator is offered with the system that reportedly supports auto-answer abilities for unattended operations.

The Model 77-107 with one CRT, the communications software, a 62 line/-min printer and 2.5M bytes of storage leases for $679/mo on a one-year lease including maintenance: it sells for $23,286.

Data 100 is at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

High-Speed Core Memory Comes on One Planar Card

WOODLAND HILLS, Calif. — A 128K-word by 18-bit core memory for minicomputer and mid-scale computer applications requiring a large storage capacity and high speed has been announced by Dataproducts Corp.

The memory module, which the company is calling the Maxi-Store, is said to feature a 750 nsec cycle time and 325 nsec access time. It is expandable to 1M word by 18 bits.

The Maxi-Store uses a three-wire, three-dimensional organization on a self-sufficient planar card containing address and data registers and timing and control logic, he added. It requires only +5 Vdc and +15 Vdc for operation, he noted.

A 19-in. chassis 10.5 in. high can house up to four of the modules, power supply and an extra slot for either a self-test card or a customer interface card. The power supply for the unit is contained in the chassis the spokesman said, and optional chassis wiring permits either a 36-bit double-word configuration or daisychaining to connect two chassis (eight cards) for the 1M-word configuration.

Prices for the Maxi-Store begin at about $36,800 for a 1M-word module, the spokesman said from 6219 Desoto Ave., Woodland Hills, Calif. 91364.

Band Printers Offered to OEMs

LEXINGTON, Mass. — NEC Information Systems, Inc. has introduced a series of 300- and 600 line/min band printers for OEM users that feature microprocessor control and extensive use of LSI circuits.

The printers, designated the L300, the L600 and the L250G, are said to have typical throughput rates of 300-, 600- and 300 line/min, respectively. In addition to its normal 300 line/min. operation, the L250G offers a 15 char./in.compressed print capability and 720 point/sq-in. graphics capabilities.

The steel-print band units feature 136 print positions, operator-selectable forms lengths from one to 99 lines, operator-selectable single- or double-line feed and a test print switch.

Electronic vertical formatting control, an audible operator alarm and a slew rate of 15 in./sec are also featured.

An original and up to five copies can be produced on paper ranging from 6- to 18 in. in width, using a choice of font styles in Ascii character sets of 48-, 64-, 96- and 128 characters.

Interfaces available on the units are said to offer compatibility with Centronics Data Computer Corp. and Dataproducts Corp. equipment, as well as RS-232C equipment.

OEM prices are approximately $3,200 for the L300, $4,200 for the L600 and $3,400 for the L250G. The firm, at the U.S. subsidiary of Japan's Nippon Electric Co., is located at 5 Militia Drive, Lexington, Mass. 02173.

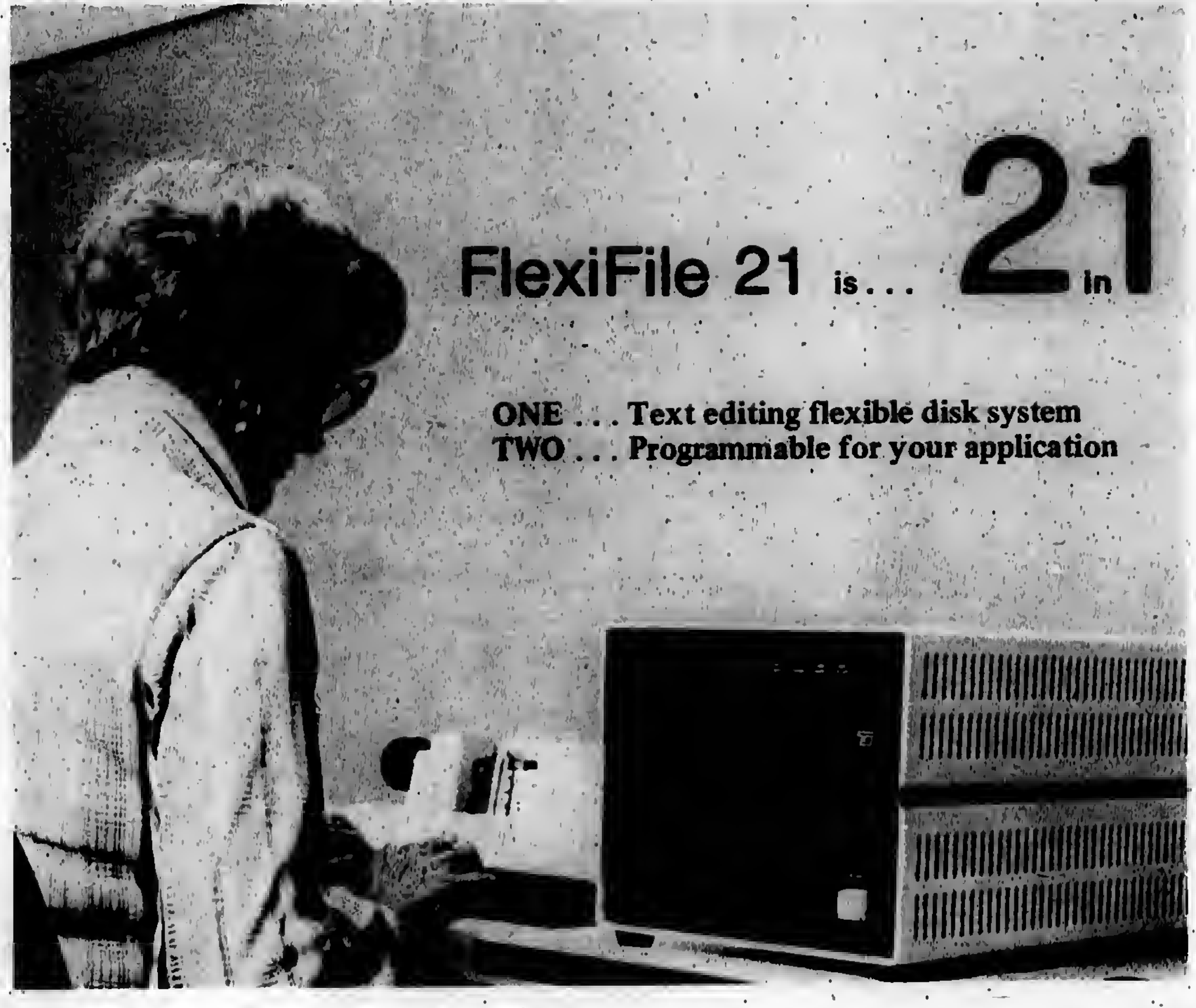
Tape Accommodates 6,250 Bit/In. Drives

SANTA CLARA, Calif. — Memorex Corp. has introduced a high-density magnetic tape designed particularly for 6,250 bit/in. tape drives.

The tape, which the company is calling Cubic HD, comes on the company's Superreel computer tape reel. The one-piece, I-beam hub reel handles the operating stresses encountered in 6,250 bit/in. drives, according to a spokesman.

The chief reasons for tape failure on high-density drives are edge damage and tension stress, the spokesman said, claiming the Cubic HD overcomes these problems.

A sealed, 2,400-foot reel costs $24.50. Memorex is headquartered at San Tomas & Central Expressway, Santa, Clara, Calif. 95052.



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Interactive Graphics Unit Runs With 360, 370

BOSTON — A two- or three-dimensional interactive graphics unit plug-compatible with IBM 360/370 channels and available in black and white or color has been introduced by Adage, Inc.

The Model 4370 graphics peripheral consists of a channel control unit, display control unit and 21-in. CRT. Each channel control unit is reportedly capable of supporting four display control units, each of which can support as many as four CRTs.

The device incorporates an Advanced Micro Devices, Inc. AMD 2901 microprocessor and read-only memory control storage and has a transfer rate of 3M bit/sec, or 1.5M bit/sec if the CRTs are remotely connected to the display unit by dual coaxial cables. Cable runs of up to three miles are supported, the company said.

System Features

Features of the system include hardware windowing, 128:1 zoom, depth cuing and the ability to connect other support devices including a joystick, trackballs or digital data tablet. In addition, a four-color (red, orange, green, yellow) CRT unit and a hardware circle/arc generator are offered as options, Adage said.

Hardware and firmware in the graphics unit are used to process channel protocol, error checking and data/command buffering, a company official said, adding that the device reduces the burden on the host 360/370 by performing all image manipulation and interrupt handling normally required for interaction with two- or three-dimensional images.

A Model 4370 with four CRTs costs $134,000, according to the company, while a 16-CRT version is available for $472,000.

Four color beam penetration CRTs are also available for an additional $18,000 per CRT, and the three-dimensional hardware windowing feature, part of the display control unit, sells for $7,500. Initial deliveries are scheduled for the first quarter of 1979, the firm said from 1079 Commonwealth Ave., Boston, Mass. 02215.

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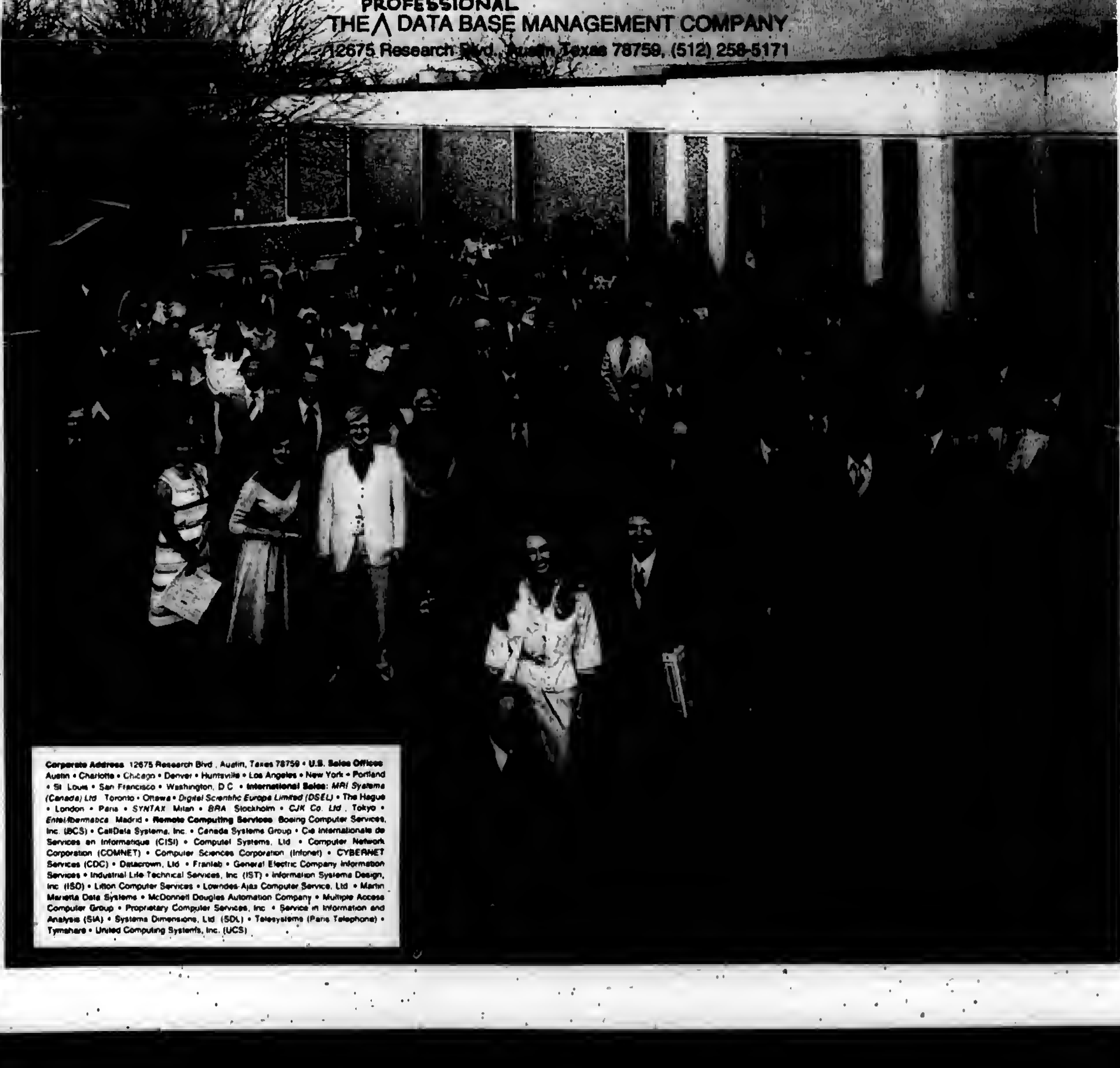

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Mini Bits

Course for First-Timers Teaches Computing ABCs

WOODLAND HILLS, Calif. — First-time users of small business systems can reportedly prepare for their introduction to computing by taking a self-instruction course from Info 3.

Entitled *"Computer Concepts for Small Business,"* the course tells DP novices how to process various types of data, how to evaluate and select hardware and software and how to implement a successful installation, according to Info 3 officials.

It also presents the requisites of sound business computer applications and covers systems operation including critical management concerns like security and personnel staffing decisions, they said.

Instructional materials include more than two hours of audiocassette tapes and a workbook with more than 200 pages. Through July 15, the course costs $95; thereafter it is priced at $140.

In addition, a chart outlining course objectives is available from Info 3 at Suite 193, 21242 Ventura Blvd., Woodland Hills, Calif. 91364.

Off Your Chest

Many users and industry officials have worthwhile things to say to their colleagues but are seldom heard because they lack an appropriate forum.

If you're one of those individuals, here's your chance to get those important opinions off your chest and out into the world where they can do some good. *Computerworld* is now seeking reader contributions for its August "Special Report on Minicomputers and Small Business Systems."

Maybe you're a user who found an ingenious small systems solution to a crucial business problem or who has an unusual installation experience to relate.

Or perhaps you're a company official with industry tips or prognostications that users should know about.

If you have something interesting to say on the subject of minis or small business sytems, CW wants to hear from you — and so do nearly 90,000 CW readers.

Contributions should be four to eight double-spaced, typewritten pages long and should be submitted no later than than July 20 to Jeffry Beeler, *Computerworld*, 797 Washington St., Newton Mass. 02160.

Randal Data Systems Link 240

Randal Link 200 Additions Boast 60% More Power

By Jeffry Beeler
CW Staff

TORRANCE, Calif. — Two additions to Randal Data Systems, Inc.'s Link 200 series of cartridge disk-based business systems provide mass storage units 60% faster than those previously available with the 200 family, according to a Randal spokesman.

Both the Link 240 and Link 250 use hard disk systems that rotate at 2,400 rev/min and transfer 537k byte/sec, he said. The earlier members of the Link 200 line, by contrast, incorporate 1,500 rev/min disk units that transfer 336k bytes/sec.

Randal credited the increased disk system speed with giving the link 240 60% greater throughput than the Link 206 system it replaces. The Link 250, in turn, provides twice the processing power of the 240, at least in preliminary benchmark tests, the spokesman said.

Randal compared the 240 and 250 in performance to the Digital Equipment Corp. PDP-11/34 and to some of the small business systems from Basic/Four Corp., Qantel Corp. and Wang Laboratories, Inc.

Both additions to the Link 200 series are reportedly hardware- and software-compatible with the Link 500 family at the

(Continued on Page 54)

Several Systems Later, User Cuts Hardware Costs With Mini

By Jeffry Beeler
CW Staff

BOSTON — Spending for in-house DP hardware has dropped from $8,200/mo to $2,700/mo at Hub Mail Advertising Service, Inc. here since the direct mail firm installed its latest DP system.

Hub Mail officials also credited the small business system with helping management isolate the source of earnings losses and evaluate the sales representatives' productivity.

Achieving these benefits, however, didn't come easily for the firm, which maintains mailing lists and performs related functions like creative mail marketing and inquiry fulfillment for 750 customers including nonprofit organizations, manufacturers, retailers and service firms. Before settling on its current system, Hub Mail experimented with a succession of computing alternatives ranging from time-sharing to large in-house systems, none of which completely satisfied its DP needs.

Since installing its latest system, Hub Mail has automated most of its standard accounting functions as well as a program for evaluating sales leads, according to the company's president, Wally Bernheimer. The firm is considering automating several other applications, including a data collection system that could allow Hub Mail to dispense with employee time sheets, Bernheimer said.

Hub Mail first became a DP equipment user in 1964 when the U.S. Postal Service's introduction of Zip Codes forced the company to revamp and reorder all its mailing lists. To accomplish this feat, it acquired an

(Continued on Page 56)

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TI Cuts Prices

HOUSTON – Texas Instruments, Inc. has cut memory costs for its 990 minicomputer and microcomputer line. All parity memory modules for the firm's 990/10 minis now cost 10% less than before, while prices of 990/10 error-correcting memory have dropped an average of 26%, according to a spokesman.

For example, a 64K-byte error-correcting memory that formerly sold for $3,936 now costs $2,880.

For the company's 990/4 microcomputers, memory prices have dipped an average 15%, with larger modules showing the greatest reduction. Prices of 40K-byte parity memories, for example, have shrunk from $1,600 to $1,240, while the cost of 8K-byte modules has fallen from $400 to $368.

Also Gains Dual-Port Option

Ampex Core Add-On Now Fits Eclipses

EL SEGUNDO, Calif. – Ampex Corp.'s Megastore 1223 can now operate with Data General Corp. Eclipse minicomputers as well as with the CPU manufacturer's Nova line, according to an Ampex official.

The auxiliary core memory unit has undergone enhancements that make it compatible with Eclipses equipped with the Model 4019 controller and DG's Real-Time Disk Operating System, the spokesman said.

The Model 1223 also comes with a dual-port option that for the first time allows the unit to operate with two Novas or Eclipses, he added.

Equipped with a built-in controller, the core memory unit stores 512K to 4M bytes and transfers a 512K-byte block of data in 1.8 msec, Ampex said.

The dual-port option, meanwhile, reportedly minimizes user waiting time by alternately transferring data a word at a time through its two ports.

A 1M-byte Megastore 1223 costs $21,430, with the dual-port option an additional $1,300. Both are available from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

Additions to Link 200 Line Boast 60% More Throughput

(Continued from Page 53)

upper end of Randal's business systems line.

The 240 and 250 differ from each other, primarily in main memory and operating system, the spokesman explained. While the 240 incorporates a single-partition memory and uses a time-sharing operating system, the 250 provides a memory with up to 10 partitions and uses a Randal Time-Sharing Operating System II (RTOS II), a partitioned package previously available only to Link 500 users.

In a minimum configuration, the 240 reserves 7K bytes of its 32K-byte main memory for user programs, the Randal source said. As the hardware is upgraded, more and more of the operating system becomes resident in memory; by the time the CPU achieves its full capacity of 64K bytes, the operating software resides completely in main storage, he explained.

As a result, users of larger 240 configurations do not have to access their disk to retreive a portion of their operating systems, the official added.

In a 48K- or 64K-byte configuration, the 240 reportedly reserves 15K bytes of its main memory as applications space and supports as many as 16 time-sharing users. However, for heavy data entry applications involving 4,800- or 9,600 bit/sec CRT terminals, the practical number of users supported simultaneously by the system is five, the spokesman said.

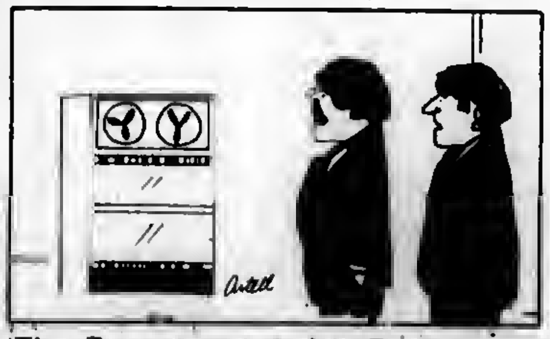
Like the 240, the 250 theoretically accommodates up to 16 users, but because of the partitioned memory and RTOS II software, its practical limit is said to be 10 users.

Identical in hardware to the earlier Link 200s except for its faster disk system, the 240 in its minimum configuration incorporates a 32K-byte CPU, a 10M-byte disk unit with a 5M-byte fixed platter and a 5M-byte removable platter, a CRT terminal and an 80-column, 110 char./sec printer.

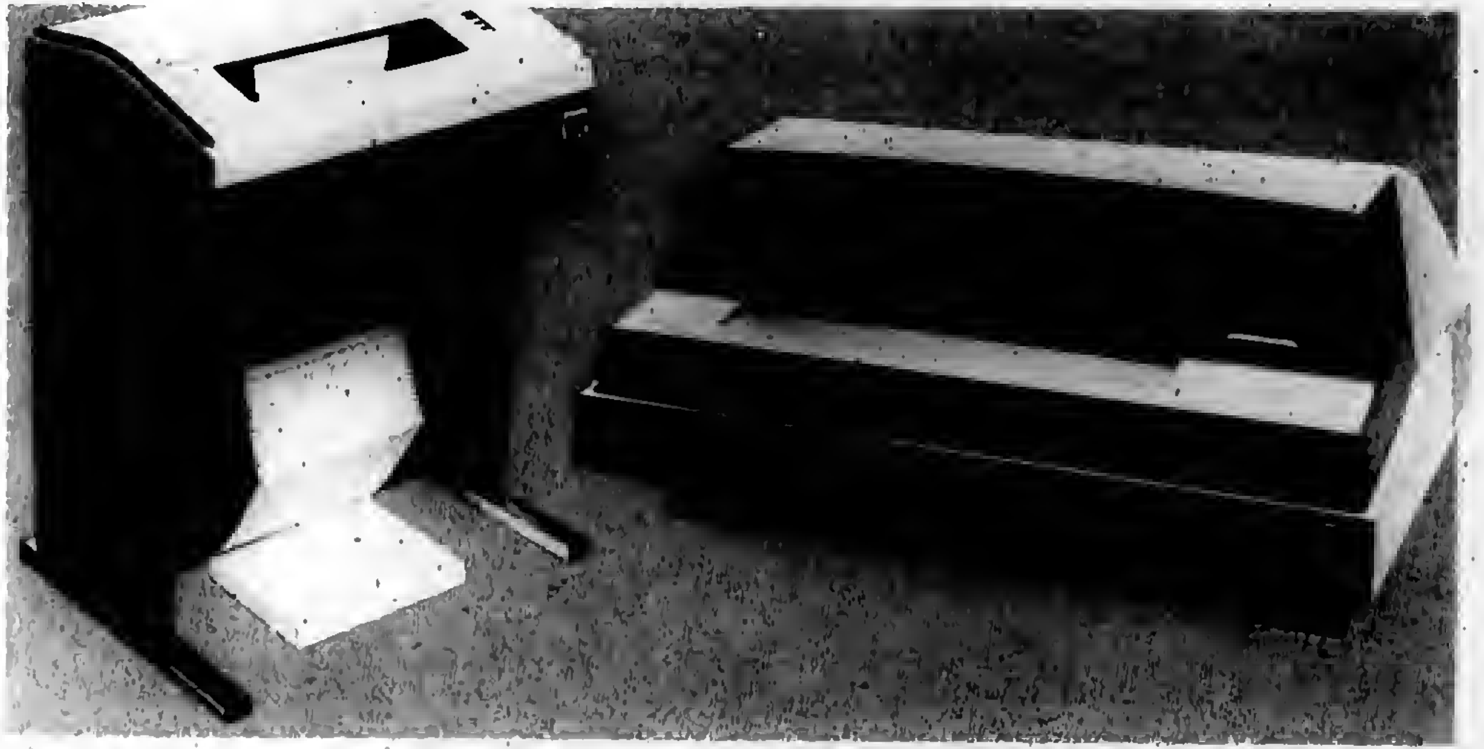
A maximum configuration consists of a 64K-byte minicomputer, four 10M-byte disk systems, 16 CRT terminals and a 300 line/min printer.

A minimum 250 configuration incorporates a 64K-byte CPU, three CRT terminals, a 10M-byte disk unit, 110 char./sec printer and battery backup. A maximum configuration provides a 128K-byte mini, four 10M-byte disk units, 16 CRT terminals, a 300 line/min printer and battery backup.

The minimum 240 system costs $22,900 compared with $29,900 for the minimum 250. Both are available from Randal at 365 Maple Ave., Torrance, Calif. 90503.



'The Programmers Are Really Worried. They Claim the Computer Has Been Reading Self-Help Books.'



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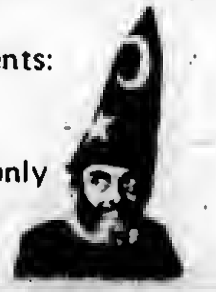


System Tracks 8,000 Parts

Mini Helps Machine Supplier Double Its Size

BERLIN, Conn. — Polymer Machinery Corp. has doubled its size in the three years since it acquired a minicomputer, and vice-president and general manager Joseph Holthoff believes the system played a major part in that growth.

"I think a lot of companies restrict their growth potential by not using computer power," he said.

Polymer ~~markets~~ and services its own line of particle-reduction equipment as well as German-made Arburg injection molding machines, which fabricate precision-made plastic instruments and equipment parts.

Because customers expect first-class service when one of their machines breaks down, Polymer has programmed its 192K-byte Honeywell Information Sytems, Inc. Level 62 minicomputer to track more than 8,000 parts for the Arburgs and the granulator machinery.

Delicate Parts Balance

"Spare parts in our inventory tie up company money," according to Dick Smith, Polymer's vice-president of finance. On the other hand, "if a customer needs a spare part and we don't have it in stock, he may quickly become a former customer," Smith added.

One of the company's main concerns, therefore, is to avoid both overstocking and understocking its inventory.

To make matters worse, Polymer typically must endure a three-month delivery lead time when ordering Arburg parts from their source in Germany.

In addition to the minicomputer itself, the company's inventory management system incorporates a 96-column card reader, a communications controller, four communications lines, two receive-only printers, a 400 line/min line printer and 10 HIS 7700R CRT terminals. With this configuration, Polymer currently runs 220 programs plus the HIS Inventory Management System software package.

Before it acquired its present system, the firm managed its inventory with an IBM System 3/10, which was eventually replaced for "financial reasons," Polymer's DP manager Bob Clark explained.

Handling Orders

When customers order an Arburg part over the telephone, order-entry personnel check their computer-stored inventory listings with one of the CRT terminals to ascertain whether the desired commodity is in stock. The resulting display gives the operators a brief description of the item in question and tells them in which aisle, row and bin it is stored.

If the part is available, it is automatically subtracted from Polymer's inventory listing, and the 400 line/min printer generates a combination picking slip/shipping document.

Near the loading dock, a shipping clerk retrieves the customer's data file with another 7700 CRT terminal. Information on the screen indicates what method of shipment or which courier the customer prefers and lists billing information. When the part is picked up by a shipping firm, data such as the weight of the parcel, time and date of pickup, and name of the transport company is entered into the data base through the display terminal.

This information has helped Polymer track down lost packages, Holthoff said. Because the company stores the rate schedules of all major couriers plus those of the U.S. Postal Service in its mini, the system produces all invoices in batch mode at night for mailing the next day.

Predicts Order Trends

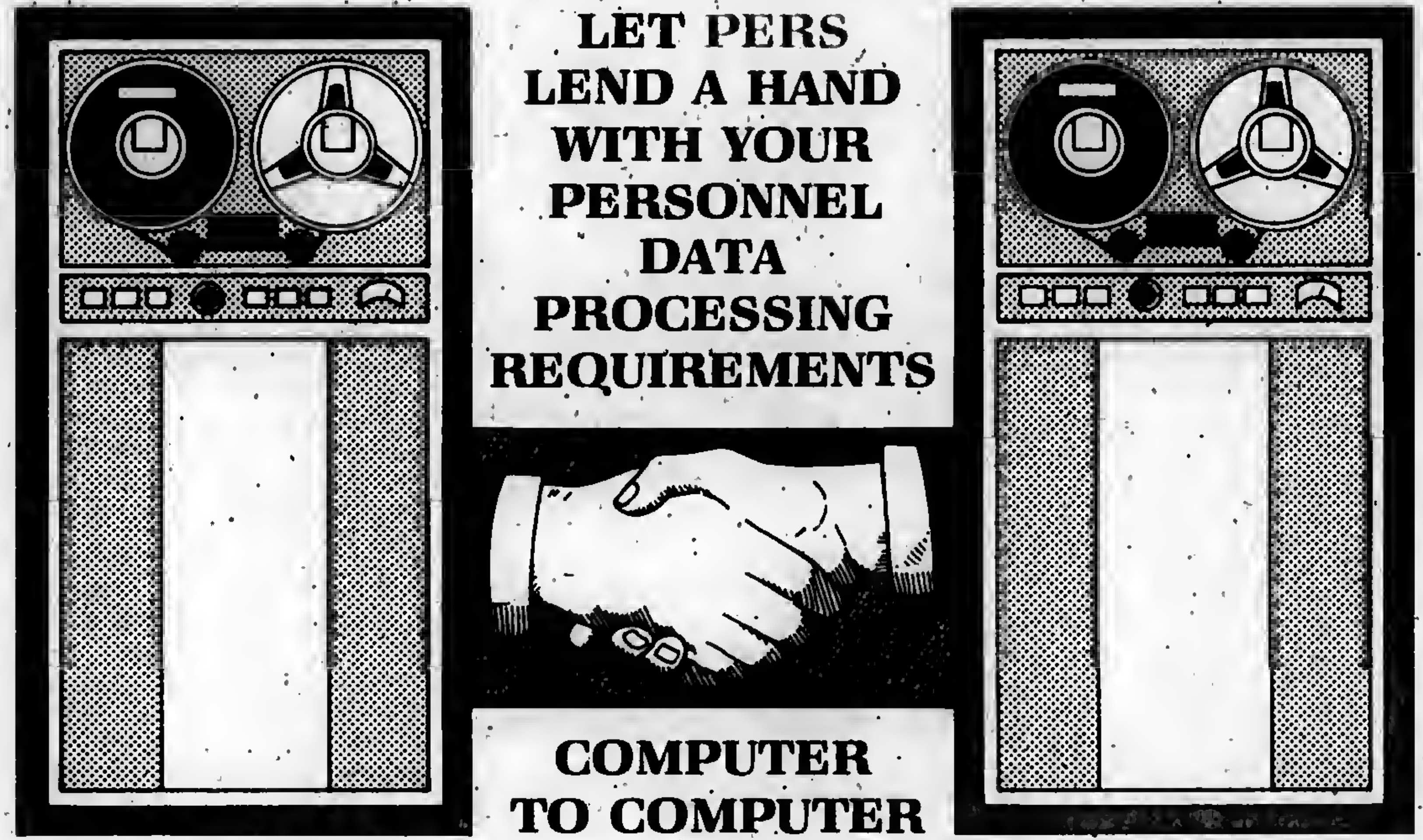
In addition to controlling spare parts inventory, the Level 62 helps the firm predict short-, and long-term order trends.

Since its founding 15 years ago, Polymer has placed more than 5,000 Arburgs across the U.S. Although each machine arrives from Lossburg, Germany, as a "standard model," Polymer's customers can order as many as 50 options, each requiring 50 to 100 parts.

"The Level 62 helps us forecast the number of Arburgs we will sell, which options our customers will select and which parts we will need on hand at various times to be able to install the requested options," Clark said. "It takes us as long as six months to order and receive an Arburg from Germany. When a customer decides on an Arburg, he doesn't want to wait that long. So our short- and long-range forecasts for parts as well as Arburgs have to be accurate."

Polymer's back-order control system helps ensure the company will not forget to fill a single order, Clark said. As incoming parts are unpacked at the receiving dock, they are immediately added to the computerized inventory listing through the same loading-dock CRT terminal that records outgoing shipments. When a back-ordered part is entered into the computerized data base, the printer in the order entry department produces packing documents and subtracts the item from inventory.

In addition, the system operates a customer credit analysis program that Clark developed to help company officials find out why credits are issued.



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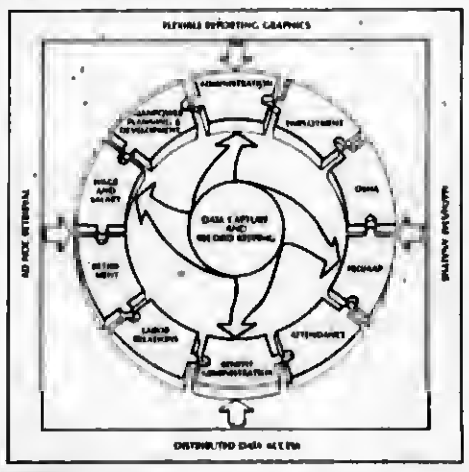

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Micro-Based Printers Unveiled

MOUNT LAUREL, N.J. — Program-controlled font selection and stored program diagnostics are reportedly among the features of four microprocessor-based line printers from Okidata Corp.

The Slim-Line series consists of 160- and 300 line/min models that print 7 by 7 characters plus 125- and 250 line/min models that output 5 by 7 or 9 by 7 characters.

All four printers provide 12 user-selectable font styles including lower case, double height and double width plus double height and width, a spokesman noted. During self-test, they also provide users with installation records by printing a coded header that lists machine options and revisions, he added.

In addition, the products are said to come with parallel interfaces for Centronics Data Computer Corp. and Dataproducts Corp. printers as well as with an RS-232 interface that accommodates seven switch-selectable protocols, seven switch-selectable speeds, auto-start and a choice of buffers.

Deliveries of the 250- and 300 line/min units, which measure 23 in. wide by 22 in. deep and 10 in. high, will begin this fall; deliveries of the 125- and 160 line/min models, which measure 8.5 in. high, will start during the summer.

In OEM quantities, prices for the units start at $2,500, Okidata said from 111 Gaither Drive, Mount Laurel, N.J. 08054.

User Finds Mini Affordable After Trying Several Options

(Continued from Page 53)

IBM 360/20, becoming the first direct mail firm in New England to install a computer system, Bernheimer claimed.

With the newly installed hardware, the company soon automated its mailing lists, payroll, job-cost accounting and accounts payable, while continuing to manually perform accounts receivable, general ledger and sales analysis.

Soon, however, the IBM equipment gave way to a Honeywell Information Systems, Inc. 120 with five tape drive systems and an off-line printer. Rental for the HIS system totalled $11,000/mo at a time when the company's annual revenues barely reached $4 million, Bernheimer recalled.

Although Hub Mail used the HIS system for five years, "we kept losing money on the list maintenance aspect of the business, partially because of the seasonal nature of direct mail activity," the company president explained. "The summer months are usually slow, while the November-December holiday season taxes our capacity."

Service Bureau Tryout

Concluding that their company needed a large system only a few months of the year, Bernheimer and his associates in 1973 delegated the list maintenance function to a service bureau. With one of their major applications no longer on-line, Hub Mail officials decided to replace their relatively large HIS system with a minicomputer to which they planned to assign their remaining commercial and accounting functions.

Eventually, they also planned to add accounts receivable and sales analyses to the prospective system, while continuing to do general ledger and profit analysis manually, Bernheimer said.

After examining several minicomputer options, Hub Mail finally chose to perform its commercial applications with a Singer Co. System Ten, at the time one of the few minicomputer-based systems that could support interactive CRT terminals. Two years after signing the Singer lease, however, support for the system deteriorated, Bernheimer said, and Hub Mail once again had to reassess its DP options.

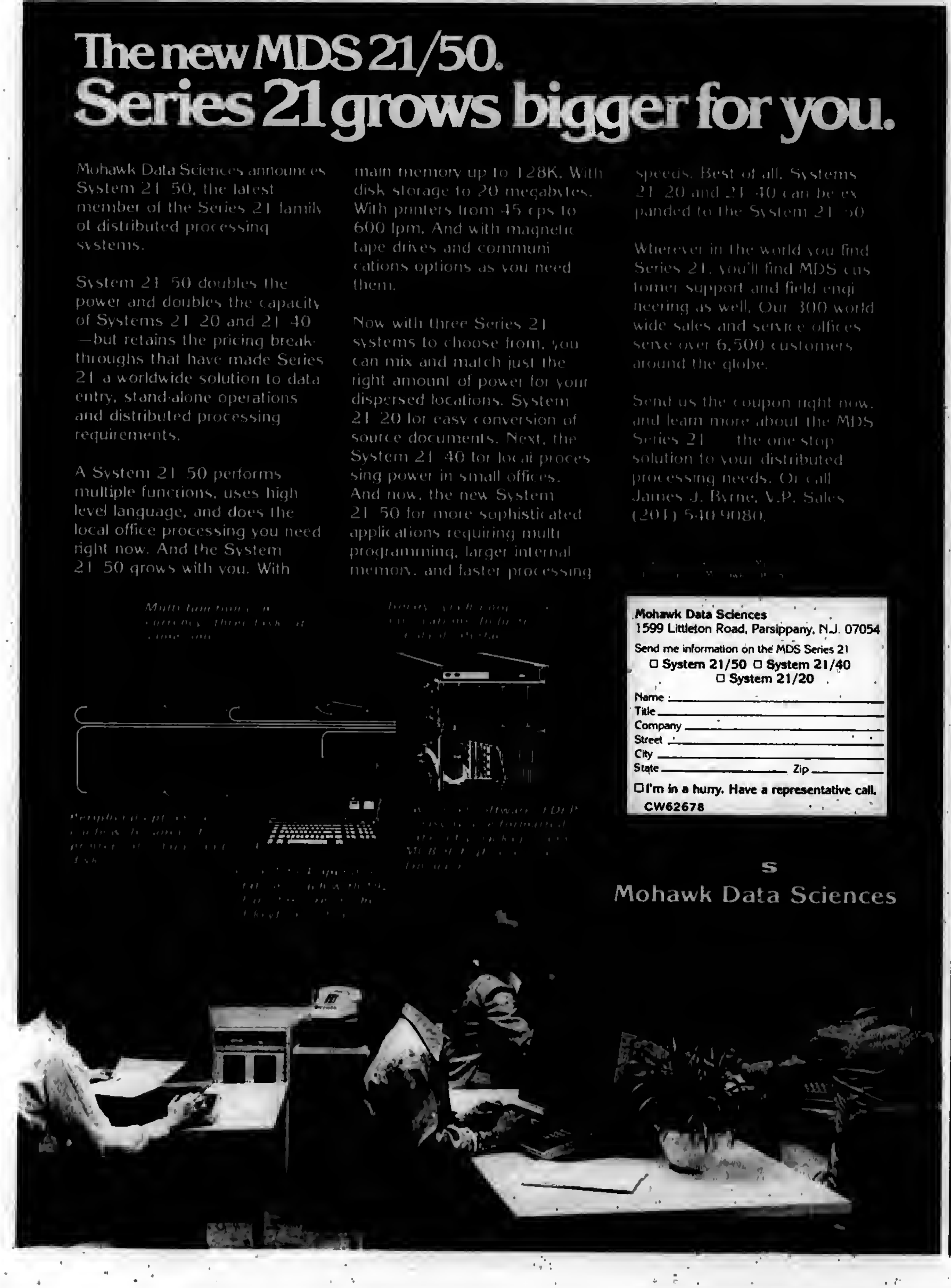
Company officials first evaluated hardware from Digital Equipment Corp., Data General Corp. (DG), Nixdorf Computer, Inc. and Burroughs Corp. They then narrowed the field of candidates to DEC and DG before selecting the latter's 128K-byte Eclipse minicomputer with an 800 bit/in. tape drive system, 96M yte disk system, four CRT terminals, teletypewriter console and 300 line/min printer.

A systems house oversaw Hub Mail's hardware conversion and wrote its program development software, which included extended Basic and DG's Mapped Real-time Disk Operating System.

Hub Mail picked the DG system over rival hardware partly because of the availability of an industrial marketing applications package developed for Eclipse systems by a West Coast firm. Dubbed the Inquiry Handling and Analysis system, the package performs sales lead evaluations, Bernheimer explained.

"We have a lot of competitors in the New England area that offer an inquiry-handling service," he said, "but none of them saves the data and uses it for follow-up information such as cost-per-qualified lead, development of qualified prospect lists, media analysis and other marketing information."

In addition to providing follow-up analyses of inquiries, the system performs all Hub Mail's accounting functions, including those that were formerly done manually, Bernheimer said. These functions include payroll, accounts receivable and payable, general ledger and job-cost accounting.



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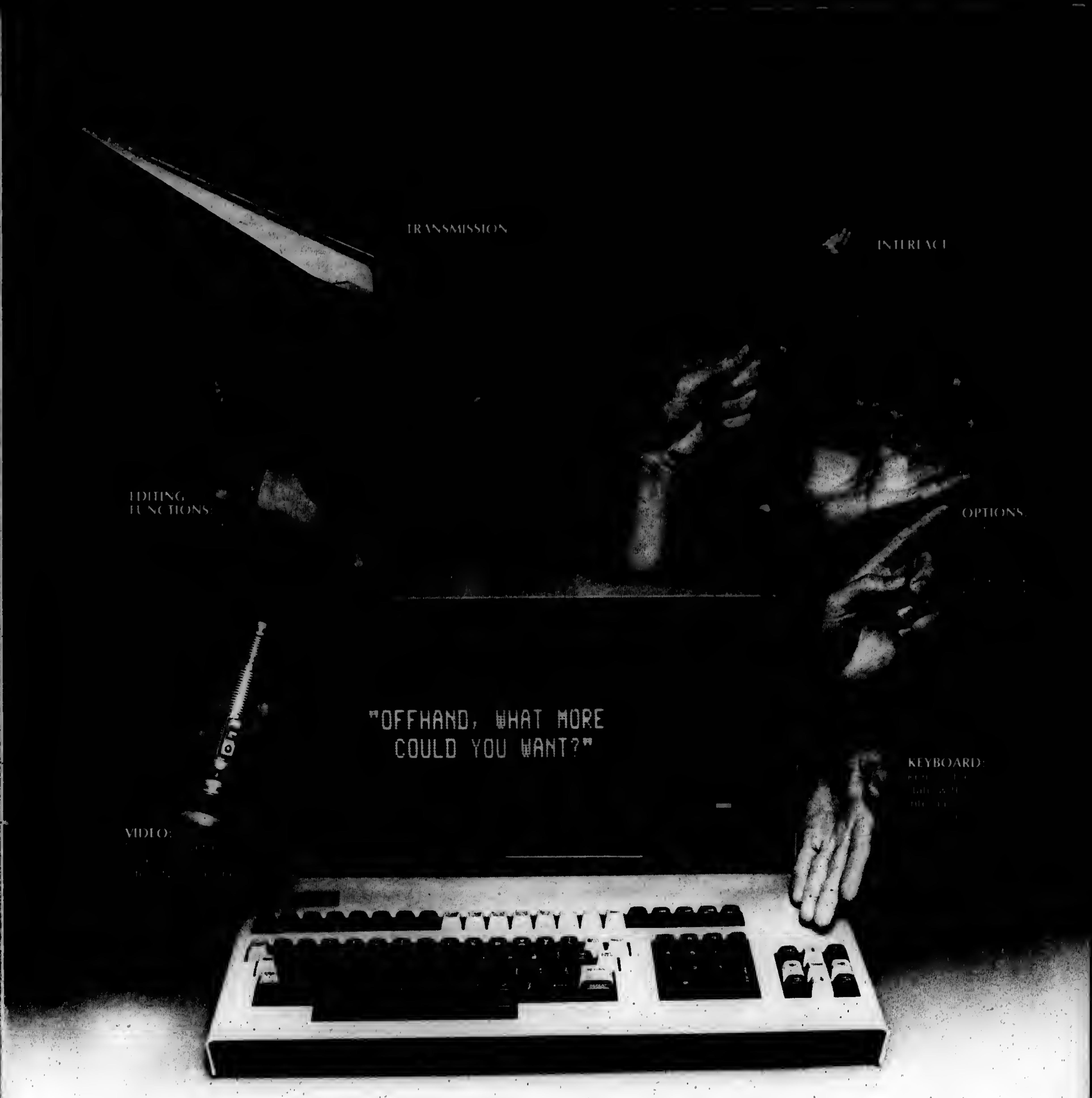

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More information on the I-400 is quickly within your grasp. Call Infoton toll-free at (800) 225-3337 or 225-3338. Ask for Barbara Worth. Or write Barbara Worth at Infoton, Second Avenue, Burlington, MA 01803.

Prepared by Chickering/Howell, Los Angeles.

Infoton 400

Mini Provides Firm Support for Floor Maker

MAPLE SHADE, N.J. — An industrial flooring manufacturer here is using a Microdata Corp. Reality system for its sales support and reportedly liked the equipment enough to become part owner of a local Microdata dealership.

Stonhard, Inc. which markets a line of 20 products through 85 salesmen in 10 regions, previously used an IBM System/3 to run its accounting programs. The company decided in 1974 to automate its sales support, but found a batch-oriented System/3 could not support on-line terminals.

After evaluating several alternative small business systems, Stonhard chose a Microdata system, although the firm continues to use the System/3 for accounting purposes.

Stonhard's salesmen in the field each day used the phone or the mail to send in their call reports and requests for quotations.

The information is then keyed into the system to form a combined customers-and-prospects data base that contains more than 100,000 records.

Various attributes in the records allow data to be retrieved in a number of different ways. Based on request for quotations, the company generates proposals. When the proposals are signed and returned by the customer, orders for materials are written.

Once a job is completed, a salesman sends in a completion report, and the system prepares an invoice and updates the salesman's commission record.

The Stonhard system consists of the Reality with 64K bytes of memory, a 40M-byte disk drive unit, a 600 line/-min printer, two Diablo systems, Inc. printers and 16 on-line Lear Siegler, Inc. terminals.

The 16 CRT terminals are used by clerks in the sales support department to enter call reports and by the four sales coordinators to retrieve data and help agents in the field solve sales problems, Stonhard spokesmen said.

In addition, each of the regional sales managers has a portable teleprinter to access the system from their homes.

The system allows Stonhard to produce a sales analysis at any time and by various attributes including sales region, type of customer, salesman, date or volume of previous sale, company officials explained.

With the system, salesmen have reportedly boosted their sales because they can receive up-to-date information on customers and territory. The system also periodically reminds salesmen to follow up sales prospects and helps regional managers pinpoint the most promising of these potential customers, Stonhard said.

When a large corporation is building a new plant, for example, the company can find out whether Stonhard has approached that corporation before and then solicit the potential customer's business. Managers can also review each salesman's performance any time during the week using one of the portable terminals, the officials noted.

Customized Correspondence

Customer correspondence can reportedly be customized according to the company's specifications.One result of this capability is that direct mail returns have increased by 33% since the system's installation.

Another result is that while the company's business has doubled, its sales support staff has remained the same size, the firm reported.

The company also plans to use the system for inventory of raw materials as well as for finished products, the records of which are already automated by the system.

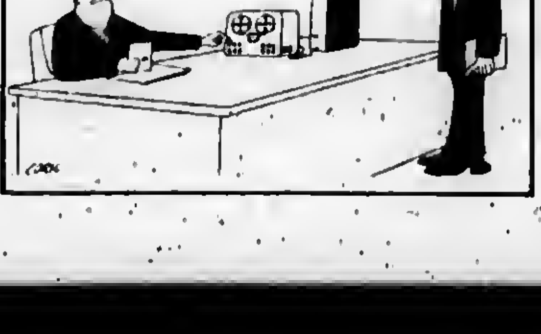
The CPU cost approximately $110,000, and the printers and CRTs cost about $80,000, according to the company. Amortized over five years, the monthly price totals approximately $3,000 plus maintenance. The Reality system, which incorporates almost 20 terminals, therefore costs nearly the same as the System/3.

An additional advantage with the current system is that all data entry is done by clerical personnel who needed only a few hours of training to learn how to operate the equipment, spokesmen explained. Management personnel use the system as well — the company's controller functions as DP manager.

Stonhard's full-time DP staff consists of two members — the coordinator, a former clerk who helps solve operator problems; and a programmer.

One of the most important reasons for the success of a system is corporate commitment, according to the firm, which evaluated its configuration not in terms of dollars, but as a tool that would allow salesmen to do jobs which were previously impossible, officials here said.

Stonhard's case history was taken from Management Information Corp.'s publication, How Small Businesses Use Computers. The publication is a 40-page collection of applications case histories and can be purchased for $15 from the firm at 140 Barclay Center, Cherry Hill, N.J. 08034.



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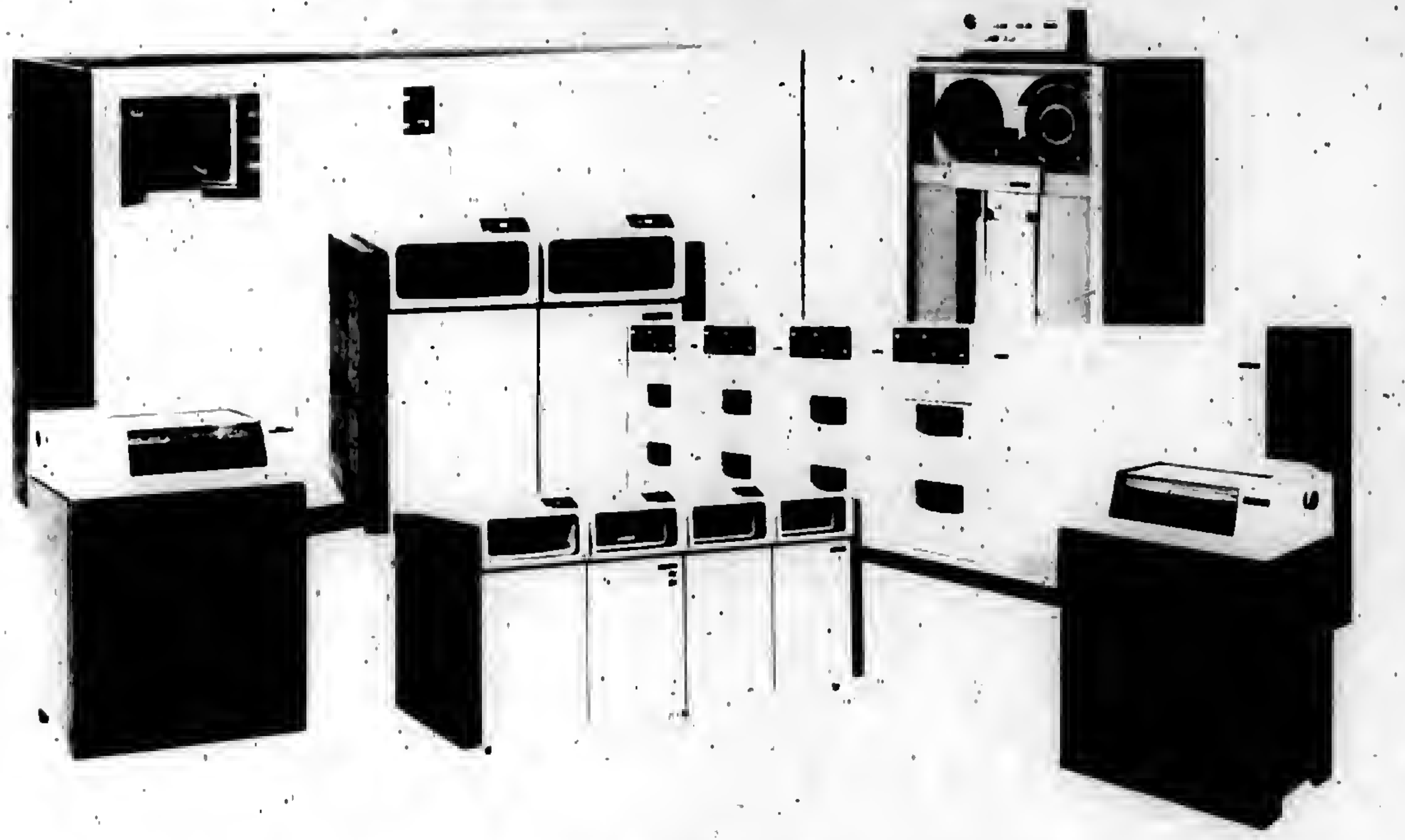

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Extends Microsystem Line

Futuredata Aids 6802, 8085 Development

LOS ANGELES — Futuredata Computer Corp. has extended its line of Microsystem microprocessor development systems to support users of the Motorola Semiconductor Products, Inc. 6802 and the Intel 8085.

The Microsystems, which currently support the 8080, 6800 and Z80 microprocessors, offer hardware and software capabilities. Hardware development is backed by Microemulator in-circuit emulator and debug packages; software tools include monitors, debuggers, editors, assemblers, utilities, relocatable macro assemblers, linkage editors and Basic compilers, according to a spokesman.

Range of Systems

The user can select a range of disk- and tape-based Microsystems for the 6802 and the 8085 according to the level of performance needed, Futuredata said. Each system includes the MPU with up to 64K of memory; a high-speed, 960-character CRT with Ascii keyboard; dual floppy disk or cassette tape unit; operating system software; and documentation.

System features include two RS-232 serial ports, an 8-bit parallel TTL I/O port, real-time clock, programmable read-only memory (Prom) bootstrap and memory write-protect under software control.

The Microsystem/31 Model 6802 and Microsystem/31 Model 8085 with the Microdisk/3 dual 8-in. double-density floppy disk unit and 16K memory cost $7,975 each.

The Microsystem/32 Model 6802 and Model 8085, each of which includes the Microdisk/4 dual 8-in. double-sided, double-density floppy disk unit and 16K memory, cost $8,975. The Microsystem/15 Model 6802 and Model 8085 systems each include 32K bytes of random-access memory (RAM) and the firm's Quickrun, a co-resident assembly and interactive debugger system, with monitor/debugging, editor and assembler in memory and source and object code. Each is priced at $4,975.

The optional Microemulator costs $1,250; Basic compiler and resident disk operating system packages are available separately at $300 each. Additional 16K RAM modules start at $650.

Futuredata is located at 11205 S. La Cienega Blvd., Los Angeles, Calif. 90045.

Futuredata Microsystem Development System

California Managers Report

Crime Wave Hitting Retail Shops

By Tim Scannell
CW Staff

Computer stores and hobbyist marketplaces in southern California are finding themselves the target of thieves who concentrate on small, expensive items such as boards and microcomputer memories.

Selling computers and computer parts, according to one area manager is no longer "the nice, friendly business it used to be."

"We had quite a few problems with thefts in January and February," Allan Porter, president of Mission Control, recalled. Located on Wilshire Blvd. in Los Angeles, the store has apparently been the one hit hardest by the new wave of criminality.

"The thieves took a total of four boards out of two different computer systems," Porter said. "In one instance, they walked in and asked the salesman to take the cover off the machine, which he obligingly did.

"They then distracted him for a moment and he turned his back. In that short period of time, they walked off with two of the boards."

The criminals appear to be "fairly technical," Porter said; "a little familiar with computers in general. They knew, for instance, that one machine had an S-100 bus and they also knew that the machine used part of the motherboard for the serial and parallel I/O ports."

The thieves had the salesman remove the comptuer's cover under the pretense of wanting "to see what [the motherboard] looked like."

Selective Thieves

The robbers are proving to be very selective. "There are lots of parts in the machine, some of them more expensive than the ones they took. They knew just what they wanted and stole just particular boards," Porter noted.

Police classified the thefts as burglaries rather than as shoplifting because of the selectivity that was involved. "First of all, we had to explain to them just what a board was and the cost of the missing piece," Porter said. "It turns out that if someone comes in with the intent to steal and steals a particular item, then it's classified as a burglary. If they come in and just see something lying around and they pick it up, that's shoplifting."

"We really didn't understand the difference until we talked with our insurance man. All we knew was that we were out a couple of thousand dollars," he added.

Insurance policies usually cover burglaries, but will not cover shoplifting, he said.

"Several stores in the Los Angeles area have experienced similar problems, Porter observed. One store that had been open for less than a week had an entire mainframe stolen.

(Continued on Page 60)

Micro Chips

Master I/O Board Works With S-100

CHICAGO — An S-100 bus-compatible I/O board, introduced by Space Time Productions, is said to contain enough read-only memory (ROM), random-access memory (RAM) and I/O to replace boards containing real-time clocks, frequency/period counters, programmable read-only memory (Prom)/Ram and parallel serial I/O.

The Master I/O Board contains 1K of RAM and 3K of ROM, as well as two 8255-type chips that can be programmed as I/O, interfacing and bidirectional ports; one 8253 chip that incorporates three 16-bit counter/timers; and one 8251-type peripheral chip that can be programmed for various clock division ratios, Space Time said.

The bare board is priced at $47.50 while the complete unit, assembled and tested, costs $369. Documentation including schematics, a parts list, parts layout and operations manual is also available from the company at 2053 N. Sheffield, Chicago, Ill. 60614.

Word-Processing Program Supports Pet Micro Users

BROOKFIELD, Conn. — Connecticut Microcomputer Corp. has unveiled a word-processing program for users of Commodore Business Machines, Inc.'s Pet microcomputer, RS-232-type printers and the firm's printer adapter.

The program permits the composing and printing of such materials as letters, flyers, manuscripts, advertisements and articles, according to a spokesman. Script directives include line length, left margin, centering and skip.

Edit commands allow the user to insert, delete and move lines, change strings, save data on cassette, move data up and down, print and type, he added.

The word-processor program costs $29.50 from Connecticut Microcomputer at 150 Pocono Road, Brookfield, Conn. 06804.

Prototyping Circuit Board Accommodates 70 DIPs

SYLMAR, Calif. — A prototyping circuit board from Vector Electronic Co., Inc., said to be bus- and shape-compatible with Altair and Imsai microcomputer boards, holds up to 70 14-pin or 16-pin dual in-line packages (DIP) or any combination of DIP sockets with .3-, .4-, .6- or .9-in. lead spacing.

Called the Any-DIP plugboard, the Model 8804 has 100 card-edge contacts on .125-in. centers to accommodate an S-100 bus organization, the firm said.

Two 100-hole rows of individual .1-in. spaced pads across the top of the board permit additional input/output via ribbon wire assemblies, a spokesman noted.

The 8804 plugboards are priced at $21.95 each in quantities of one to four; $19.76 each in quantities from five to 24; and $17.56 each in quantities over 25.

Vector Electronic is at 12460 Gladstone Ave., Sylmar, Calif. 91342.

Users of 6800-Type MPUs Offered Industrial Basic

LAFAYETTE, Ind. — A Basic interpreter for Motorolo 6800-type MPUs was designed by Wintek Corp. for process control and monitoring functions associated with industrial applications.

Dubbed the Wintek 4K Basic, the interpreter resides in random-access memory (RAM) or programmable read-only memory (Prom) and features control of interrupts, direct memory read and write, Assembly language subroutines and a flexible I/O, the firm claimed.

The unit retains many of the advantages of an interactive, high-level language and incorporates control structures such as IF ... THEN ... ELSE and ON ... GOTO/ON ... GOSUB, a spokesman added.

Unattended Operation

The interpreter immediately enters the "Run" mode when the Basic program is stored in Prom. This reportedly allows for unattended operation in dedicated applications.

The Wintek 4K Basic is available on cassette for $95 or in Prom or a read-only memory (ROM) module for $299.

The source listing, priced at $95, and an OEM license, for $2,000, are also offered by the firm at 902 N. 9th St., Lafayette, Ind. 47904.

DP Retailers in California Beset by Wave of Thievery

(Continued from Page 59)

"The individuals acted very interested in the computer and then asked the salesman to go into the backroom for a piece of literature which, it turned out, he didn't have," Porter said. "When he came back out, they had walked off with the machine."

"It doesn't happen every day and the thieves usually concentrate on new and high-priced items," according to Greg Puckett, marketing manager for Jade Computer Products in Lawndale, Calif. Jade recently lost a 32K memory board and a CRT controller to burglars.

"We've never been hit by a team," Puckett said, "just individuals." At the time "we only had two people at the counter and it was very easy for them to be distracted just by general goings-on in the store."

Reasons for Increase

This type of crime has increased for various reasons, according to several managers. "There's an increase in the number of users," Porter said, "and most of the boards were hobbyist-oriented."

There has also been an increase in the number of publications that carry requests for used equipment. "People probably see an ad in one of these magazines or newsletters, make a deal for that board and then walk into a store" to steal it, Porter conjectured.

"Before, it was a fairly restrictive type of people we were dealing with," Puckett commented. "More people coming through your doors increases the probability of there being more and more bad people among your clientele."

A spokesman for the Sunshine Computer Co., in Carson, Calif., however, offered a more definitive reason why there is currently an increase in computer store thefts. "There are people out there that I consider to be bums and they don't want to pay like everyone else does," he claimed. Those people choose instead to steal "whatever they can get their hands on."

Two stores, Byte Shop of Santa Barbara and Tech-Mart in La Jolla, Calif., hinted that perhaps the problem lies in the type of clientele that a particular business attracts. "We've had no problem at all," the Byte Shope spokesman said. "We sell primarily business systems and we have businessmen that come in here — we don't carry hobbyist equipment at all."

Tech-Mart deals in whole systems rather than over-the-counter parts, a spokesman for that firm stated, "so our deliveries are under contracts for the most part."

A number of stores have taken several precautionary measures to guard against future burglaries. Mission Control secures all boards to the computer's chassis by using a stainless steel cable and clamps so the boards can't be removed, Porter stated.

A recently instituted policy also forbids employees to remove covers under any circumstances. "We watch people more carefully and are particularly suspicious of anyone that wants to see the inside of a machine," Porter said.

So far, he added, the tighter security measures have not hurt sales. "A hobbyist knows what the inside looks like," he pointed out, "and a businessman doesn't care."

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Adapso Report Predicts

Services to Grow 17%/ Year Through '82

By Marcia Blumenthal
CW Staff

NEW YORK — The computer services industry is expected to continue growing at an annual rate of 17% through 1982, with revenues predicted to climb from $6.9 billion in 1977 to about $16 billion by 1982.

These and other statistics from the annual industry report were presented during the fifth annual press and financial analysts conference held here recently by the Association of Data Processing Service Organizations, Inc. (Adapso).

In addition, computer service industry experts analyzed the opportunities and threats resulting from such trends as minicomputer proliferation, IBM "revenue-gobbling" strategies and a possible recession.

Peter Cunningham, president of Input, the market research firm which prepared the report for Adapso, said that processing services accounted for $5.2 billion of the annual computer services revenue in 1977, with professional services following with $1 billion and software products with $700 million. The overall pretax industry profit for the year was 11.3%.

Software Fastest

Although the industry is growing at about 17% annually, Cunningham noted that software products were the fastest growing sector of the services industry and could take off even more rapidly than projected, particularly if IBM unbundled its operating system software.

John Imlay, president of Management Science America, Inc., said that operating systems are the most profitable and fastest growing segment of the software sector.

As evidence of software's profitability, Imlay pointed to the entrance of some of the "Big Eight" accounting firms into the software business and IBM's announcement of a personnel application package.

Like software, the international market, particularly in Western Europe, is growing quickly. Cunningham said revenues from the international market increased 49% from last year.

Encroachments by Minis

Although the software and international segments were predicted to grow faster than the service industry as a whole, the financial analysts were deeply concerned about users of processing services moving to in-house minicomputers.

Cunningham responded that 80% of the processors completing the survey admitted to being vulnerable to the influence of minicomputers, with most companies estimating about 30% of their business could be threatened.

However, Cunningham said that smaller companies perceived the threat as more imminent than larger companies did. In fact, the survey indicated that general business applications, particularly accounting, which is the mainstay of many smaller processing firms, would be the hardest hit by a user switching to an in-house mini.

However, as a means of parrying the minicomputer's thrust, Richard L. Crandall, president of Adapso and also president of Comshare, Inc., suggested that the processing firms could turn a threat into an opportunity.

There are apparently two camps in this growing battle. One group of processing firms will install minis at user sites; 60% of the firms surveyed said they would resort to this tactic either this year or next year. The other group will wait it out and see what happens.

Another threat comes from IBM, the panelists agreed. But, upon probing by the financial analysts during the question-and-answer session, the industry representatives did not see IBM as a major threat to the current base of business.

The inroads IBM could make into the current customer base of the service industry would not be great enough to satisfy the revenue-gobbling needs of the giant. IBM, according to Crandall, would most likely go after the giant-sized new markets such as electronic funds transfer, electronic mail and the $40 billion printing industry.

Effects of Recession

Another major concern of the financial analysts was the impact of a recession on the services industry. While not glossing over the effects of a recession, Crandall indicated that some sectors of the service industry are more immune to a recession than others. Processing will continue to be done as long as a company has business, he noted.

Besides the danger of a recession, Crandall pointed to some warning signals for the industry to monitor. In particular, Crandall mentioned that staff costs in the industry are rising because of the demand for people with a wide range of expertise, and these people are paid consultant's rates.

Time Seen Ripe to Start New Technology Firm

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — "Now is the best time since 1969 to start a new technology company," according to venture capitalist Brent T. Rider.

However, Rider's optimism was qualified with a caveat — "To obtain funding, you must have a company, not an idea," the president of Union Venture Corp. of Los Angeles warned.

Rider and other venture capital financiers and founders of high-technology companies also stressed that a well-organized management team is as important as new technology when seeking funding in today's venture capital market.

Speaking at a session at the National Computer Conference here recently, panelists emphasized the need to size up the marketplace and consider the retaliatory strategies of competitors before launching a product with new technology.

Most importantly, they cautioned that the new product must have two to four times the advantage of existing products in order to survive in the marketplace.

Rider, a 10-year venture capital veteran, recalled that 10 years ago a company could be funded on an idea accompanied by an inventor. But today a new company must have a solid management team seasoned in marketing, finance, engineering and production.

Furthermore, he stated, the product must have a completed prototype before venture capitalists will bite. "Venture capitalists will not fund pure research," Rider said emphatically.

Attractive Areas

In assessing opportunities for venture capital, Rider said that investors are currently interested in new companies involved with peripherals, microcomputers and packaged systems.

Companies starting new businesses are expected to show black ink much earlier than they

(Continued on Page 62)

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IBM Series/1 Shipments Seen Peaking in 1980

ANAHEIM, Calif. — The biggest year for shipments of the IBM Series/1 minicomputer is probably two years away, according to a man who makes plug-compatible peripherals for IBM's first entry into the world of minicomputers.

Louis B. Horwitz, president of Datum, Inc., said Series/1 shipments will be good this year and next, but he expects the best year for such shipments to come in 1980.

IBM will place at least 25,000 of the units, he said, but added that the firm would probably ship 50,000 even though the first year of shipments has not been up to IBM's expectations.

IBM's shipments were below corporate expectations basically because the firm did not realize it was playing in a new marketplace in which it takes the customer some time to evaluate new products.

For the first year, Series/1 systems have been going out in evaluation quantities, Horwitz said, and now the production orders are coming in and the Series/1 is "popping up all over."

But because IBM is not offering a full range of peripheral equipment for the Series/1, the firm has left a larger market for independents such as Datum, he indicated, adding that some IBM salesmen are recommending Datum tape for the Series/1 rather than lose the order to a mini maker who offers a full line of peripherals.

In 'Good Shape'

Datum, which offers a complete line of Series/1 peripherals, is in particuarly good shape, Horwitz indicated, because he "doesn't believe IBM will move into tape," which is Datum's strong point.

"IBM will ignore tape because of its disk orientation," he said.

Today the Datum business is a "nice mix" of systems houses and software companies that are moving into the Series/1 marketplace, he said, adding that these types of firms will probably make up the bulk of the Series/1 marketplace over the long run, even though IBM is now selling some of the systems to its traditional Fortune 500 type of customer.

The entry of Control Data Corp. into the peripherals market for the Series/1 will only serve to give the marketplace visibility, he said, and while CDC will provide more competition, its entry is really a plus.

In addition, the plug-compatible manufacturer's president indicated that there would be a great deal of turmoil in the marketplace for the next few years, particularly in the disk arena as that technology changes rapidly.

In another area, Horwitz indicated that there will be some trouble ahead for the microcomputer marketplace, since there are so many undercapitalized entrepreneurs in the business today and users are offered some questionable products such as audio tape cassettes for digital storage.

Present Status

Datum, he said, has gone through some troubles and is now a "viable company" for its size ($18 million in revenues last year).

Presently, peripheral products make up 65% of the firm's business, he said, and the firm is growing at between 35% and 40% per year on a revenue basis.

At the same time, it is making enough of a profit to be able to invest more than $1 million yearly in R&D, which amounts to about 6% of total sales, he said.

The stock now sells for approximately $4 per share, he added, indicating that when it gets to around $6 per share it might be used to mount some acquisition campaigns.

Seeks Mini Growth

The firm basically wants to grow in the minicomputer peripherals area, Horwitz indicated, expanding its product line in the electromechanical peripherals field, first in tape and then in disk.

Around 80% of Datum's peripherals business is in tape today, he said, adding that the firm is staying away from the floppy disk market because the margins are slim even though the interface is "easy."

While the firm is primarily a peripherals supplier, Horwtiz indicated that it might consider software packages for the Series/1 in the next few years in order to expand its position as a supplier to that marketplace.

Overall, Datum should be a $35 million company in the "next couple of years," he said, adding that it needs to get to that size in order to be able to withstand any downturns in the economy.

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Time Ripe for Beginning Technology Firms: Panel

(Continued from Page 61)

were in the past, he noted.

A bright ray in the venture capital market, Rider explained, is the Steiger Bill now in Congress. If passed, it will result in reduced taxes on capital gains. Entrepreneurs will benefit from the bill's passage, Rider predicted, because more investment will be spurred not only from venture capitalists but also from all sectors of the investing community seeking new companies.

It now looks as though the bill has a good chance of passage because the Administration has eased off on its earlier opposition stance, Rider said.

Factors to Analyze

Leonard Mautner, a partner in the venture capital firm of Goodman and Mautner, Inc. of Los Angeles, agreed with Rider that a well-organized management team is an important consideration in evaluating new companies for possible funding.

In addition, Mautner decides whether to invest in companies with new technology by analyzing the marketplace, the product and the business plan of the company.

Mautner also assesses whether the people starting the venture have the entrepreneurial willingness to make a commitment to hard work. If the commitment isn't there, Mautner advised would-be entrepeneurs to "lie down and wait until the feeling passes."

Destroying Competition

Representing the other side of the dollar were Robert H.F. Lloyd, president of Conver Corp. of Cupertino, Calif., and Renn Zaphiropoulos, founder of Versatec Corp.

Lloyd presented a scenario showing how an established company would engage in price cutting to destroy a new competitor.

First, the established company with a mature but profitable product will lop a little off its already healthy profit margin, hoping to stifle the newcomer.

New technology, Lloyd explained, is more vulnerable to attack if prices of the existing technology are dropping.

Further Trimming

After the first price chop, the company may decide to trim more fat by eliminating R&D and market research for the mature "dead" technology. In some cases, companies may cut prices even to the point of losing money for a particular product line for a certain period of time, relying on other company products to make up the loss.

This last-ditch effort, Lloyd claimed, is designed to drive the new company out of the marketplace. If the established company is successful in driving out the technologically superior product of the new company, the mature product will rebound and continue making money for the established firm.

"Your new product," Lloyd warned, "has to have two to four times the advantage over existing technology to outlast price reductions of competitors."

Versatec's Renn added to Lloyd's remarks, summing up the challenge as follows: "If the benefits to customers are not attractive with respect to price, most likely your business will fail."

Government's Role Crucial

Japan's 10-Year Effort in DP 'Extraordinary'

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — In the early 1960s, the Japanese government undertook extraordinary measures to close the 10-year technology gap that existed between the U.S. and Japan, according to Osamu Ishii of the Electrotechnical Laboratory in Tokyo.

In fact, with its sponsorship of the National Research and Development Program and the Super High-Performance Computer Development Project, the Japanese government has been largely responsible for making Japan today second only to the U.S. in the number of computers installed, Ishii said at a National Computer Conference session here recently.

Based on the technology developed under government sponsorship, he said, the major Japanese computer manufacturers all introduced third-generation computers for commercial applications by the end of the '60s.

Another major milestone for the Japanese computer industry, also promoted by the government, was the reorganization of the six domestic computer manufacturers into three groups, with each group developing a new computer series.

The Fujitsu-Hitachi group developed the M series; the Nippon Electric Co.-Toshiba group, the Acos series; and the Mitsubishi-Oki group the Cosmo series. Ishii indicated that each of the groups had completed all models of its series by the spring of 1977.

Ishii also noted that unlike the U.S. industry, the Japanese computer industry was started by telecommunications equipment manufacturers as opposed to business equipment manufacturers. In addition, the Japanese were able to bypass vacuum tube systems, moving directly into solid-state computers.

Today the Japanese have built large-scale integration and packaging technology, IBM compatibility, virtual storage, multiprocessing capabilities into their latest generation computers, Ishii said.

The three new series roughly correspond to the performance scale offered by the IBM 370. Originally, the cost/performance of these series surpassed that of the IBM 370. However, Ishii said that when IBM cut the price of the 370 and announced the Series 30 processors in 1977, the situation changed.

Future technology advances stressed by the Japanese, according to Ishii, are systems architecture and very large-scale integration (VLSI). In addition, the Japanese are attempting to overcome input/output difficulties connected with "Kanji" — the ideographic portion of the Japanese language.

The systems architecture effort is geared to reducing system overhead caused by huge amounts of supervisor processing for multiprocessing control and high-level language statements.

The VLSI project, Ishii explained, is under the support and guidance of the Ministry of International Trade and Industry. Production and process techniques for submicron patterns using electron-beam, X-ray and conventional photo-lithography are being developed, Ishii said. Between 1976 and 1979 the government expects to invest more than $233 million in this project.

Japanese Language Poses Problems Involving I/O

ANAHEIM, Calif. — One of the difficulties Japanese computer manufacturers are trying to overcome is developing input/output devices to handle "Kanji," the ideographic portion of the Japanese language, according to Osamu Ishii of the Electrotechnical Laboratory in Tokyo.

The Japanese language is usually written in a mixture of Kanji and "Kani" (phonetic) characters. There are only 48 phonetic characters. However, the Japanese commonly use 2,000 to 3,000 Kanji characters and often use as many as 10,000 of these ideographs, Ishii explained at a recent National Computer Conference session here.

Because the Japanese language is not adaptable to a purely phonetic writing system, Kanji is an essential means of communication. Most computer systems in Japan today are not powerful enough to handle Kanji because of the lack of suitable input/output devices.

Input is a more difficult problem than output, Ishii noted, because of man-machine interaction. A Kanji typewriter has many keys because of the number of character sets.

Designer Explores Impetus Behind Development of 370

By Howard A. Karten
CW Staff

ANAHEIM, Calif. — The motivation for developing the IBM 370 came mainly from two sources, according to IBM computer architect Andris Padegs: the experience with 360 architecture and the rapidly declining cost of technology in the late 1960s and early '70s.

During a recent National Computer Conference session here, Padegs, who is said to be one of the few designers still at IBM who was involved in the design and architecture of the 360, described four critical constraints in the design of the 370:

First, any valid 360 application program had to run, unmodified and successfully, on the 370.

Second, the 370 had to be able to run 360 operating systems. It also had to be able to operate 360 I/O devices and, finally, it had to preserve open-endedness and design generality to keep the way clear for follow-on products.

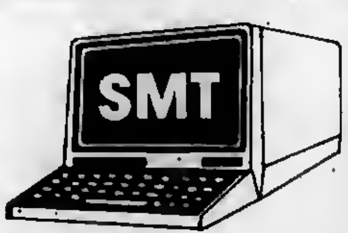
Within these constraints, Padegs added, the 370 design had four objectives: to improve reliability, availability and serviceability; to boost the precision and predictability of the system; to enhance the performance of application programs; and to provide additional functions for operating systems.

One key to achieving these goals, the designer said, was frugality and control in allocating resources on the 370. Thus, requests for additional basic assembler instructions, for example, were appraised using what IBM calls a "figure of merit."

Defined as the relationship between the change in value to the change in cost, this figure was one of the keys in deciding whether or not to add a new instruction. Other considerations were also applied to requests by IBMers for changes, such as the effect of the changes on CPU size, expected usage estimates for new instructions and the expected ease of integrating the new instructions.

Acknowledging that there were in fact some incompatibilities, Padegs told the large audience that these were limited to programs operating in privileged mode, so did not affect typical application programs.

Four main incompatibilities between the two systems were found, according to Padegs. These were the use of the Ascii-8 bit in the program status word; the addition of a new operation code for halting an I/O device; the addition of a new function called command retry, used in an I/O channel; and the fact that removing power from the system caused a clearing of storage.



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PCC Chief Sees Billion-Dollar Personal Marts

By Marcia Blumenthal
CW Staff

ANAHEIM, Calif. — The home computer and the very small business system (VSBS) markets will become the billion-dollar sectors of the personal computer market — the VSBS now and the home market in the late 1980s — Ryal R. Poppa, president and chief executive officer of Pertec Computer Corp. (PCC), predicted recently.

Speaking at a special personal computing luncheon at the National Computer Conference here, Poppa said that in the last six months, significant trends have developed in the personal computer market. Poppa especially pointed to the clarification of market segments which in turn portend an industry shakeout and to the growth of what he called a "Kelly Girl" programming and systems design approach.

Because there is so much confusion surrounding the term "personal computer," Poppa defined personal computers as "work enhancement tools, not major capital goods that have to be maximized in utilization."

Drawing an analogy, the PCC chief likened the personal computer to the office telephone 50 or 60 years ago. "It was very typical to have one telephone stand in the middle of the office for everyone's use. You would wait your turn to use the common telephone, as it was not personal. Small computers are going to become personal in nature — we'll have one for each person."

Four-Sector Market

Poppa divided the market into four major sectors: hobby, home, personal computing and VSBS. Summarizing the hobbyist sector, he said wryly, "A hobbyist is happiest when his machine is not working."

Defining the hobbyist market as composed primarily of people who build from kits, Poppa indicated that market is approaching saturation and said PCC will ship its last kit this month.

By explaining that if the computer is used as a work enhancement tool, it is a business system, Poppa essentially eliminated the personal computing sector. "Personal computing will be a relatively small market segment because most computers today have some form of business payoff," he added.

Concentrating on the other two sectors — home and VSBS — Poppa entertained the predominantly male luncheon audience with a tape recording of a computer supposedly talking to an affluent suburban housewife and advising her of the critical tasks for the week — tennis matches and hair appointments among them.

Cost is the major limitation on the home system now, Poppa said. However, he added, a second, potentially more constraining factor is that building codes and related insurance law "do not contemplate the type of transducers or electromechanical actuators wired into the home that will permit a home to be run by computer."

The home computer market will not be developed by firms like PCC or Apple Computer, Inc., Poppa said. "Rather, these markets will be developed by the Honeywells, the Westinghouses, the Nutones and perhaps even IBM," the PCC president predicted.

The VSBS is the major market now, Poppa claimed, noting that it will grow substantially during the 1980s. He divided that market into three sectors.

The "stand-alone," independent small business with an annual volume of less than $3 million is the hottest sector right now, he said.

A third sector, the departments of large businesses, is similar to the second segment and one Poppa sees developing rapidly because of its proximity to the main computer center.

Turning to the trends in the marketplace, Poppa forecast a shakeout in small companies that entered the microcomputer field. By the early 1980s, he predicted, "we will be down to less than 50 firms of any substance."

The maturing of the computer store, with the most successful ones becoming local business equipment stores oriented to the office of the future, was also cited by Poppa as a significant trend.

The computer store will further contribute to the shakeout among the small independents, Poppa contended, because they will begin to limit their inventory to two or three manufacturers, thereby shrinking the total market size for the smaller companies.

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Center Hosted NCC '78 Visitors From Abroad

ANAHEIM, Calif. — Reading name tags without appearing obvious seemed to be a favorite pastime at the recent National Computer Conference here.

Some readers spotted attendees wearing name tags with official-looking blue ribbons displaying the words "International Visitor" who took in the exhibits and ate hot dogs, just like the rest of the more than 57,000 NCC '78 visitors.

The central meeting place for these foreign visitors was the International Center, a large, softly lit room off a quiet corridor of the Anaheim Convention Center.

Harry Costa and Anton Post, two Dutch visitors relaxing at the center, work for CSR, a remote computing services firm in Amsterdam. They were at NCC looking at minicomputers to replace a mainframe.

Costa and Post complained that NCC; unlike the Hannover Fair in Germany, was very congested — too many people and exhibits in a small place. They were amazed, however, to find the exhibitors so helpful and easygoing in the midst of such a frantic atmosphere.

Too many lectures with too little descriptive information was another drawback, Post said. The Dutch visitors also said they thought it was rude when people walked in and out of sessions.

In another corner of the center, Yoshihisa Ito, a Japanese journalist, socialized and discussed business with other foreign visitors. Ito, a writer with *Information Industries' and Market News*, a Tokyo daily, was escorting a group of 33 people representing various sectors of the Japanese computer industry.

Although Ito's group spoke little English, he said it was here primarily to visit the Personal Computing Festival. Earlier, through arrangements made by the staff of the International Center, the Japanese visitors were given a special tour of California Computer Products, Inc.

Calcomp has two or three Japanese engineers, Ito said, which made the tour highly enjoyable for his group.

This is the first year the American Federation of Information Processing Societies (Afips) has sponsored the International Center. It was previously run by the U.S. Department of Commerce, but Dr. Jean Paul Jacob, the center's director, said that for various reasons the government declined to sponsor the center this year.

Although it was difficult to obtain space for the hospitality center, the courtesy was necessary because Americans are always treated well at conferences abroad, according to Jacob, who is on the staff of both IBM's Research Division and the University of California at Berkeley.

Registration 'First Aid'

The most important function of the center, according to Jacob, is "providing first aid for registration pains." More than 200 foreign visitors waited in line for as long as 3-1/2 hours only to discover that their preregistration hadn't come through. Jacob hopes Afips will have special registration for these attendees next year.

Aside from smoothing over registration pains, Jacob and his seven staff assistants were busy providing assistance with translations, lost passports, hotel reservations and instructions on how to use the telephones.

Jacob commented that foreign visitors had various reasons for attending NCC. "Some visitors were looking around to see what the competition is doing, some were here to get as much technical information as possible short of unscrewing the back off the machinery and some were users making buying decisions."

Approximately 1,800 foreigners from 41 countries visited NCC this year, Jacob estimated, adding that nearly half of them registered with the center.

Among the visitors was a group of 10 scientists and engineers from Peking. The "unofficial" group was organized by a business consultant, Jacob stated.

The largest foreign contingent registered with the center was a group of more than 300 from Japan, Jacob reported.

Other well-represented areas were Canada (42), West Germany (48), Scandinavia (60) and Latin America (95). Visitors came from as far away as Australia, Kuwait, Malaysia and Nigeria, Jacob said.

Jacob did receive some negative feedback from visitors. Some felt the conference was too large, and a few Europeans expressed a distaste for the use of sexy female models to demonstrate products.

On the positive side, the visitors told Jacob they had never dreamed they could see so much in so little time under one roof.

Technical Overview of Control Data's Multifunction Terminal

Basic hardware comprises a keyboard-display, one or two flexible disk drives and a matrix printer. Software includes an operating monitor, peripheral drivers, system job functions, system utilities, file manager, a forms language and BASIC.

Keyboard display. 2000 characters on 25 lines with 80 characters per line. Each character is generated from random-access refresh memory as a modified 7 x 9 dot matrix. Detachable keyboard.

Flexible Disk Subsystem. Consists of one or two drives that use standard single-side, double-density disks. Capacity is 0.5 Mbyte formatted storage per disk, 1.0 Mbyte total.

Matrix Printer. The optional printer accepts single or multipart paper, prints bidirectionally up to 132 characters per line at 70 lpm. Compressed print option.

Controller. A microprocessor-based controller in the display unit includes: ROM; up to 64 Kbytes of RAM; communications controller; peripheral controllers and keyboard display controller.

Forms Language. An extensive, operator-programmable forms language. Operator "coaching" appears on the CRT screen.

BASIC Language. Business-oriented, with features like: 14 digits precision; sequential, indexed and index-linked file I/O; character strings of up to 255 bytes; variable identifiers of up to 6 characters.

Communications. The terminal communicates with a host processor using Binary Synchronous (BSC) communication protocol. The system provides for auto answer and auto disconnect to allow the system to be polled while unattended. Speeds of 1200, 2000, 2400, 4800, 7200 and 9600 bits per second are supported. Protocol-compatible with the IBM 2770, 3770 or 3780. EIA RS-232-C Interface.

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Scientists From China Took in Show's Sights

ANAHEIM, Calif. — A group of 10 Chinese scientists and engineers from Peking visited the National Computer Conference here recently during a leg of their month-long U.S. visit.

The privately escorted visit was organized by Arne deKeizer, a New York-based business consultant who said he has had a long-time interest in commercial and cultural exchanges with China.

DeKeizer reported that the privately organized visit was sponsored by the Chinese Electronics Society for the purpose of allowing the scientists from the various Chinese institutes to gain an overview of the American computer industry.

Private Group

As a private group, the Chinese were not available for an interview, he said. DeKeizer did not comment on the extent of U.S. government approval necessary to arrange the trip.

He did say, however, that he worked closely with the U.S. State Department and that the trip "was in the works a while."

The group will visit several computer manufacturers, deKeizer reported, but he did not indicate precisely what the Chinese scientists were interested in seeing.

DeKeizer noted that the general policy of both nations is to build relationships between the two countries with the expectation of increased opportunities for general technological exchanges.

Acquisitions

The Summagraphics Corp. has agreed in principle to acquire the computer graphics product line of The Bendix Corp.

Itel Corp. has agreed to acquire Delta Resources, Inc. of New York City for 300,000 shares of Itel common stock.

Comshare, Inc. has acquired the business and certain assets and liabilities of Valuation Systems Corp. (VSC), of Rolling Meadows, Ill., for an undisclosed amount of cash and notes payable. VSC is a consulting firm which specializes in services for replacement cost and current value measurement.

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CA Targeting End Users With Packaged Protos CPUs

ANAHEIM, Calif. — For the first time, Computer Automation, Inc. is selling directly to the end-user market with the introduction of its Protos general-purpose computer, Mike Saccomano, product manager for packaged sytsems for CA's Naked Mini Division noted here recently.

This is the first general-purpose, packaged, bundled system the firm has sold, according to George White, manager of special project development.

CA will only market the 128K megamini in more than single quantities to large users such as Dow Chemical Co. "We are aiming for the volume end-user market," White explained.

In particular, White said Protos is especially suited for multiprocessing, multiuser capability, with no environmental constraints.

The lack of a field service organization has been a major constraint in entering the end-user sector, Saccomano stated. Although the Naked Mini Division will offer limited field service for the product, the firm expects only a minimal demand for service because Protos will be purchased by sophisticated users who, in many cases, will be able to isolate and repair problems on their own.

CA expects to ship the $100,000 Protos by the first of the year and, according to Saccomano, is aiming for sales of about 200 systems per year.

DEC Designates Distributor

BOSTON — Digital Equipment Corp. has designated Hamilton/Avnet, an electronics distributor in the U.S. and Canada, as its first authorized stocking distributor for DEC's LSI-11 microcomputer products, effective July 3.

Hamilton/Avnet will stock more than $1 million worth of LSI-11 microcomputer modules and development systems. Demonstration equipment will be provided at each of its 36 stocking locations to give customers the opportunity to gain hands-on familiarity.

"As computer systems and their components become smaller and less expensive," Hamilton/Avnet president Tony Hamilton noted, "customers expect the same kind of off-the-shelf delivery that characterizes electronic components distribution."

Asked whether DEC will sell other products through stocking distributors, Ted Johnson, DEC vice-president of sales and service, replied that the company will do whatever makes sense to provide its customers with the best possible service.

Contracts

Informatics, Inc. has received a five-year, $3.1 million contract from the U.S. Environmental Protection Agency for the design, implementation and operation of a computer-based information system to support the Office of Toxic Substances in carrying out the Toxic Substances Control Act.

Raytheon Data Systems has been awarded a contract valued at $1.6 million from the U.S. Customs Service to install PTS-100 terminals in offices at major ports of entry throughout the U.S.

Recognition Equipment, Inc. has received a contract for six Trace credit card processing systems, with a purchase value of approximately $5 million, from Analytical Computer Services, Inc.

Univac has been awarded $4.98 million contract for a number of systems to form the Network Control Center Data System. This system will be used to control and monitor the worldwide communications network of the National Aeronautics and Space Administration.

Computer Science Corp. has received two follow-on contracts for systems engineering services from the U.S. Army Missile Research and Development Command at Huntsville, Ala. The estimated value of the three-year and one-year task ordering contracts totals more than $4 million.

Bell Telephone Laboratories has signed a $7.3 million contract with Honeywell Information Systems, Inc. for the purchase of two large-scale computer systems and for upgrading of existing equipment.

Computer Sciences Corp.'s Infonet service will provide International Harvester Co. with time-sharing and related services throughout the U.S., Canada and Europe under a three-year contract valued at $3 million.

The Pertec Division of Pertec Computer Corp. has been awarded a renewal contract by Compucorp, Los Angeles, for FD400 floppy disk drives to be used in the Compucorp Model 450 small business computer system and the Model 491 disk controller. The two-year contract is valued at $200,000.

Valley Fidelity Bank and Trust Co. of Knoxville, Tenn. has signed an agreement with EFT Data Services, Inc. that will enable the bank to offer area retail merchants check verification/-guarantee and credit card authorization services.

Rivtow Straits Ltd. has entered into an agreement with the Canadian Data Processing Corp. for services to be provided on Canadian's Data's IBM 360/40 and soon-to-be-installed Digital Equipment Corp. PDP-11/70 system. The PDP-11/70 is valued at more than $250,000.

Canada Systems Group has been awarded a three-year agreement for DP report preparation by Collection Control (Central) Ltd. of Toronto.

The Harris Corp. has awarded a $2 million subcontract to Canstar Communications, a division of Canada Wire and Cable Ltd. of Toronto, to supply and install the fiber optics cable and DC power subsystem for a 50-kilometer telephone communications link being furnished by Harris for Alberta Government Telephones in Alberta, Canada.

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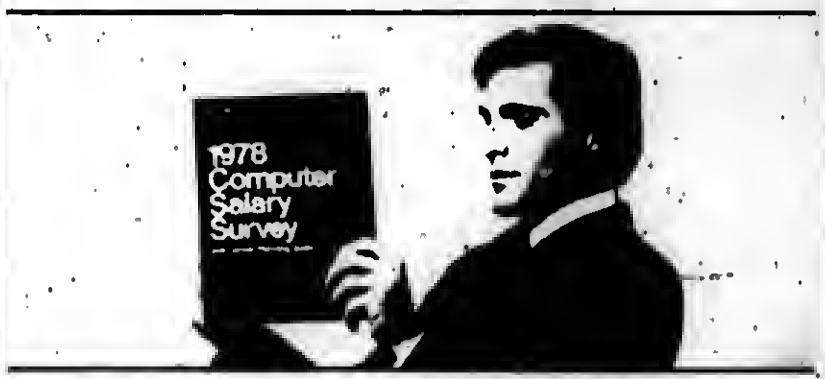

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Our vice presidents personally hire each programmer/analyst (over 100 will be in 1978) because they know that a professional service firm's FUTURE IS YOU.

Immediate openings including Miami, Houston, Washing, D.C., Baltimore and Philadelphia areas. Call collect or send resume with current salary requirements to:

Mrs. Donna Kotarba
Data Technology
6611 Kenilworth Ave., Suite 413
Riverdale, Maryland 20840
(800) 638-0911

EDP WITH NCB

We are Ohio's largest national bank. Our Data Processing division has more than doubled in size to over 150 people in five years. We are OS with four large IBM 370 systems.

Systems, Banking and Customer demands in the areas of Electronic Funds Transfer, Branch On-Line systems, Integrated Financial Services and EDP Auditing have created openings in both Banking and Financial applications for:

SYSTEMS ANALYSTS

(Project coordination and design of large on-line systems)

PROGRAMMER ANALYSTS

(OS, BAL or COBOL programming and design)

EDP AUDITORS

Analysis and design of security controls for new and extant systems)

All candidates must have a minimum of 2 years EDP experience in a large computer environment and any of the following qualifications: BAL, COBOL, OS/VS1-VS2, TP or CICS. Individuality and creativity is recognized and rewarded.

We offer excellent working conditions in a large, modern data center in the suburbs, but close to the Interstate, public transportation and shopping - market adjusted, realistic salaries and excellent benefits including profit sharing.

Join a stable, growing, profitable industry.

Send resume in confidence to:

Professional Employment Division
NATIONAL CITY BANK
4100 West 150th Street
Cleveland, Ohio 44135

We are an Equal Opportunity Employer; M/F

BURROUGHS PROFESSIONALS

Currently seeking programmers and analysts to fill immediate openings. If you are interested in exploring new opportunities, send your resume in confidence to:

SEARCH E.D.P., INC.
P.O. Box 8032
Cincinnati, OH 45208

SYSTEMS ANALYST

Progressive health care facilities seeks individual with at least 4 years systems experience. Experience in on-line development preferably utilizing CICS a plus. Ideal candidate will be responsible for original design of direct health care oriented system with time being distributed 85% systems and 15% programming. Our hospital operates a 370/138, DOS/VS, CICS VS system.

PROGRAMMER ANALYST

This challenging position involves heavy participation in original system design and all aspects of financial reporting. Minimum of 1 year programming experience installing package software and DOS/VS helpful. COBOL is a must.

Both positions offer a competitive salary and liberal benefits. In addition, time and one-half is paid for overtime.

Contact Personnel:
(312) 797-3229
MACNEAL MEMORIAL HOSPITAL
3249 South Oak Park Ave,
Berwyn, Ill.
Equal Opportunity Employer

Manager Systems and Programming

$32,000 Range

Large Scale Mainframe User

For Confidential Consideration Forward Resume With Present Salery.

BRUCE A. MONTVILLE
MANAGING PARTNER
(603) 926-6712

Exeter Associates, Inc.
EXECUTIVE RECRUITING CONSULTANTS
BOX 623 COMPUTER PARK HAMPTON N.H. 03842

DATA PROCESSING

Major financial institution offers immediate openings for Senior Programmer Analysts, Programmer Analysts, and Programmers.

We utilize COBOL and Assembler languages in both conventional and IMS-based systems. Our operating environment consists of IBM 158's under BS.

We will consider individuals who are self-motivated, result-oriented professionals with proven records of accomplishment. We offer competitive salaries, benefits package and excellent advancement opportunities. Please send resume indicating position of interest, current salary and salary requirements to:

CHUCK DOWEL
UNION BANK
1000 So. Hope St.
Los Angeles, CA 90015
Equal Opportunity Employer

HOW TO STAY

Florida Software Services didn't become the leader in the financial software field by hiring second rate people. We like winners. We like creative thinkers. And, we take care of them — with top salaries, the best benefits and a great Central Florida location.

Our business is providing application packages and data services for over 1000 banks worldwide. In addition, we operate seven computer centers serving the health care industry. Our rapid growth rate keeps us constantly on the lookout for sharp people in: Operations • Sales • Technical Writing • Product Marketing • Systems Analysis.

If you have the qualifications and the desire to be with the leader, let's get together. Send a resume in strictest confidence to our Personnel Director.

FLORIDA SOFTWARE SERVICES INC
P.O. Box 2269, Orlando, Florida 32802
The standard in financial software programs.

SYSTEMS PROGRAMMERS

We have been retained by a prominent international organization to recruit 8 high calibre software professionals for their new Advanced Systems Development Group. These individuals will be part of a top notch team involved in state-of-the-art development work for their world-wide computer network using IBM's most advanced hardware and software.

A sample of current projects include:

- **Interactive Software Development**
- **Modification & Enhancement to IBM Operating Systems Software**
- **Systems Generation, Maintenance & In-Depth De-Bugging**
- **Modification & Development of Network Configuration Software**

Our client offers an exceptional opportunity for long term career growth in a stable but rapidly expanding environment. Management is both responsive and technically capable. They offer highly competitive compensation ($20,000-$35,000) with solid future earnings potential and clearly developed career paths in both the technical and managerial areas. They are situated in a pleasant suburban location near a major city and varied recreational areas.

Exceptional individuals at all levels are invited to explore these opportunities in complete confidence. All responses will be answered promptly. Please call us collect or write:

PAUL-TITTLE ASSOCIATES, INC.
8720 Georgia Avenue, Suite 900
Silver Spring, Md. 20910 (Agcy)
(301)-585-7600
Representing an Equal Opportunity Employer

Software Professionals

"...the next 20 years will see nearly $1 trillion invested in telecommunications"...

[illegible]

To further enhance our position in this market, and to continue to meet domestic and international demands for our products, we have responded to this unmistakable surge in the telecommunication industry by creating a totally new organization: Solely dedicated to address the exploitation of technological breakthroughs in digital transmission systems, digital switching systems, and integrated voice-data systems, our course is clear — and the first order of business is to augment our organization by attracting the very best software professionals.

Our initial thrust is in the direction of designing and developing software for Toll and Central Office Exchanges, PABX's, the automation of Centralized Maintenance Centers, and Network Management concepts.

Given the opportunity to be one of the first to join this group, your potential personal growth is limitless. The teams are being formed now. The challenges are tremendous and the rewards are fulfilling. As a member of our software staff, you will utilize all the latest techniques for software development, including top-down analysis and structured programming, code walk-throughs, and the use of automated software development tools.

You will need a BS degree (MS preferred), at least two years of real-time programming experience and familiarity with languages such as PL-1, Assembly, ALGOL, or PASCAL..

If you have the talent, and a sincere desire for a once in a lifetime breakthrough in your professional career, send your resume and salary requirements to:

F.C. Brown
Sylvania Technical Systems - Atlantic Operations
140 First Avenue, Waltham, MA 02154

We are an equal opportunity employer, M/F.

GTE SYLVANIA

LOS ANGELES

Our clients in Southern California are seeking qualified candidates to fill a wide variety of excellent positions within their Data Processing departments. Starting salaries vary depending upon experience and specialty. Why not combine your vacation to our area with a few selective interviews? Please forward your resume well in advance of your trip. Please call Duncan White for a review of current openings.

(213) 386-6805

ROBERT HALF PERSONNEL AGENCIES

3600 Wilshire Blvd. #1914
Los Angeles, Calif. 90010

Analyst/Programmer Management Consulting

Our firm, one of the world's largest international management consulting organizations, is expanding its U.S. operations and requires an analyst/programmer to design and develop engineering type applications for client companies.

Candidates must have 3-5 years experience in systems analysis and COBOL programming. Knowledge of COBOL programming for Data Base applications would be an advantage.

The successful candidate will have demonstrated the ability to work independently. This is an excellent growth opportunity with potential for professional career advancement.

Send chronological resume and salary history to

K. McCullough
Vice President
PA International
Management Consultants
200 Park Ave.
New York, N.Y. 10017

PA

Australasia/Europe/U.K./Japan/S.E. Asia/U.S.A.

MANUFACTURING CONSULTANTS

East Coast computer manufacturer is actively seeking two individuals to join a group of professionals in a planning function chartered to define computer hardware and application software requirements to meet the future needs to its customers in the manufacturing community. Worldwide.

COMPUTER AIDED DESIGN & MANUFACTURING CONSULTANT

This individual should possess the following background:

- Practical manufacturing experience, e.g.
  Production control manger
  Material manager
- Manufacturing application software, e.g.
  PICS/IPICS
  BOMP/DBOMP
  UNIS
- CAD/CAM exposure, e.g.
  APT
  Engineering graphics
  Graphic terminals
- Specification development, e.g.
  Manual systems
  Hardware systems
  Application software systems
- Managerial experience, e.g.
  Projects
  Budgets
  Data base orientation
  Marketing exposure

SENIOR MANUFACTURING CONSULTANT

This individual should possess the following background:

- Practical manufacturing experience, e.g.
  Production control
  Material management
- Manufacturing application software, e.g.
  PICS/IPICS
  BOMP/DBOMP
  UNIS
- CAD/CAM exposure, e.g.
  APT
  Engineering graphics
- Specification development, e.g.
  Manual systems
  Hardware systems
  Applications software systems
- Data base orientation
- Marketing exposure

Qualified individuals are invited to submit resume of education, experience and salary requirements, in the strictest confidence to:

CW Box 1562
797 Washington St.
Newton, Mass. 02160

An equal opportunity employer M/F

Look to tomorrow and find...

WANG
LABORATORIES, INC.

Software Technical Writers

WANG is looking for software technical writers to document our new state-of-the-art 2200VS computer system. We need people with the technical ability to understand the various facets of a modern computer system and the writing ability to explain them clearly and coherently to others. We offer plenty of growth potential and the opportunity to work in a creative, challenging environment where individual achievement is recognized and rewarded. Our requirements are:

- Knowledge of at least one high level language, preferably COBOL, BASIC, or RPG II. (Knowledge of an Assembler language would be a plus.)
- Familiarity with a major computer operating system
- 1-3 years experience documenting or working with system software (programmers with a flair for writing are invited to apply)
- The initiative and creativity to follow a project through from initial research to final copy.

If you meet these requirements, we'd like to talk with you.

Senior Customer Training Specialist - Computer Systems

A career opportunity exists for a person who enjoys the challenge of educating customers and internal marketing people on the utilization of computer hardware and operating system features. You will have the opportunity to be creative and apply your knowledge in the development of new courses as well as modification of existing programs. This position requires a person:

- Who is creative and self-starting
- Who has at least 3 years experience in the following areas:
  - — Instructional experience in hardware and/or Operating Systems to Customers. Prefer Virtual Storage Systems
  - — Knowledge of interactive and time sharing systems
  - — Field Experience as a Systems Analyst/Programmer with applications knowledge
  - — Excellent programming experience in RPG II and COBOL.
- Who has excellent communications skills.

If you have the experience and are interested in this growth position, we want to speak with you.

Sales Training Specialist - Computer Systems

The Education Center has a rewarding and challenging opportunity for a person who has been successful in sales and has the ability to train salespeople in product and skills. This is a highly visible position which requires a person to have:

- A minimum of 3 years of computer sales experience, preferably with knowledge of transaction and interactive computer systems
- The knowledge and ability to relate hardware and operating system features to the sales force
- Successful sales skills knowledge
- The ability to communicate well with all levels of management
- Excellent writing skills.

Additional requirements: College degree and training experience preferred.

Excellent salaries and earning potential plus superior company benefits. Please send resume including academic background and salary history and requirements to:

Linda G. O'Connor
Career Opportunities
(617) 851-4111

WANG
LABORATORIES, INC.

One Industrial Avenue
Lowell, Massachusetts 01851

We are an equal opportunity/
affirmative action employer.

PROGRAMMERS
Process Control

Increased business, plus the opening of our Systems Center in suburban Philadelphia has created a need for individuals with 2 to 5 years real time programming experience. The majority of our programs are written in assembly language and applicants should be familiar with interrupt structure, operating systems and data based concepts.

Duties involve the design and application of software for censor based computer controlled systems for use in waste water treatement, electrical power generation and a wide variety of industrial processes.

If you qualify and are interested in joining an established leader in a growing industry . . . please send your resume, complete with salary history, to Mr. T.J Haines, FISCHER & PORTER COMPANY, East County Line Road, Warminster, Pa. 18974.

FISCHER & PORTER

An Equal Opportunity Employer, M/F

EDP AUDITOR

Prominent Boston financial services org. seeks sherp EDP Auditor for internal staff. Requirements include lge. COBOL business systems exp. & excellent customer interface skills. No travel. Excellent oppty. with an unlimited career path. Salary to $25,000. Contact Gerry Battista (Fee Paid)

ROBERT HALF
PERSONNEL AGENCIES

140 Federal St.
Boston, Mass. 02110
(617) 423-6440

DATA COMMUNICATIONS SYSTEMS ANALYSTS

Newly created key openings et various locations throughout the U.S. for Senior Systems Analysts with 3 or more years experience in date communicetions end BSC. Further experience with BTAM, TCAM, VTAM, or equivalent access methods helpful.

Salery, benefits and working conditions are excellent. Pleese cell or send resume to:

PCC
CMC DIVISION

PERTEC
COMPUTER
CORPORATION

Don Hutchison
(213) 882-0030
Ext. 254 or 354
9601 Lurline Ave.
Chatsworth, CA 91311

Equal Opportunity Employer M/F

Senior Software Specialists

Our Systems Division has senior positions for experienced applicants in the following areas:.

- N.C., Tool Design, Process Planning
- System Architecture, Data Base Managemant
- 3D Geometric Modeling
- Distributed Processing, Communications
- Graphics Applications

Gerber Scientific, long a leader in interactive graphics, has recently established a Systems Division to focus on tha continued success and growth of this activity. These are key positions in the division offering excellent remuneration and fringe benefits.

Please send resume in confidenca to:
Watson Peterson, Jr., Director of Personnel

Gerber Sciantific Instrument Company
Systems Division
83 Garber Rd.
South Windsor, Conn. 06074

An equal opportunity employer. M/F

COMPUTER PROFESSIONALS

Interactive Graphics

Duties include design and development (hardware and software) of interactive graphic systems including data management techniques and minicomputer systems. Emphasis will be to enhance the man-machine interface. Minimum three years experience with M.S. in Computer Science or Electrical Engineering desired.

Data Base Management

Duties include development of data management techniques emphasizing distributed data bases and interactive techniques for data analysis on minicomputer systems. Minimum three years experience with Ph.D. in Computer Science desired.

Systems Software for Minicomputers

Duties include design and development of innovative systems software from both a high level system concept viewpoint to detailed device handler implementation. Large scale PDP-11 IAS/RSX experience desired. Minimum of three years experience with M.S. in Computer Science or IEEE.

Opportunity for professional advancement is excellent for those having good communication and leadership skills. The positions offer challenging work in a diversified research laboratory environment. Send confidential resume stating specific position in which you are interested in confidence to E.P. Galbraith

An Equal Opportunity Employer M/F

Battelle
Pacific Northwest Laboratories
[illegible]
[illegible]

SYSTEMS OPPORTUNITIES

Growth of Dixico Incorporated, a Dallas based, diversified, international manufacturing company, enjoying a 30% growth rate, is resulting in major expansion of its management systems group.

Excellent growth opportunities, utilizing distributed data processing, are available in Dallas, Los Angeles and Connecticut in design development and administration of multiple, geographically dispersed computer-based systems.

You must have experience in design and project management related to manufacturing, financial and general business systems with data communications, and interactive processing in a distributed environment.

Explore this opportunity by sending your resume, including accomplishments and salary history to

Dick Atkins
DIXICO Inc.
P.O. Box 225116
Dallas, Texas 75265
Equal Opportunity Employer

DIRECTOR, DATA PROCESSING

Toledo, Ohio Financial Institution seeks experienced management to direct Data Processing Department. Company about to undertake major hardware/software/application expansion. Current environment includes 370/138 DOS/VS, CICS, DL/1. Preference given to candidates with:

- IBM 370 Management Experience
- Strong Management Skills
- College Degree or Equivalent
- Prior Insurance or Financial EDP Experience
- Excellent Communications and Human Relations Skills
- Knowledge of Long-Range Planning Techniques

This is a growth position. Excellent Fringe Benefits. Salary commensurate with abilities. Send Resume and salary history to Personnel Department, P.O. Box 943, Toledo, OH 43656. Equal Employment Opportunity and Affirmative Action Employer.

COMPUTER CENTER MANAGER

Masters degree in computer science, data systems or related area and significant experience in management of administrative and instructional computer support services required. Salery commensurate with candidate's educational background end experiance. Submit letter of application, resume and nominations by July 10, 1978 to: Dr. Robert C. Cloud, President, Lee College, P.O. Box 818, Baytown, Texas 77520. (713) 427-5611. An Equal Opportunity Employer.

PROGRAMMER/ANALYSTS

Accepting the challenge is your job... Providing the challenge is ours.

Challenging opportunities are available for professional programmer/analysts with at least six months experiance . . . we're growing to make room for you.

Send resume to

Informatics Inc

1121 San Antonio Road
Palo Alto, CA 94303
Equal opportunity employer

SYSTEMS SOFTWARE PROGRAMMER

Expanding technical support staff in a San Francisco Peninsula location needs a self-motivated individual w/the following qualifications: SYSGEN exp. in MVS or MVT in a single or multiple CPU environment. MVS or MVT maint. experience 3-6 yrs, Systems Programming experience includ. 2 yrs TSO exp. knowledge or MVS internals helpful. Willing to accept MVT experience and retrain. Excellent benefits. Salary range from $21K to $29K. Send your resume and salary requirements to this paper ad: CW Box 1560, 797 Washington St., Newton, Mass. 02160. An Equal Opportunity Employer, M/F/H.

FACULTY POSITION

Instructor or assistant professor teaching data processing, business information systems, COBOL, and RPG beginning August 21, 1978. Masters degree necessary. Send resume, transcripts and three letters of recommendation immediately to Dr. Robert A. Dager, Head, Division of Business, Northeast Missouri State University, Kirksville, Missouri 63501. An equal opportunity/affirmative action employer.

DP MANAGER

Position reports directly to Controller of med. size div. of major Central NYS mfr. Resp. will include project mgmt. from inception to implementation. Sophisticated Sys. 3 disk equipt. Oppty. for diversification into mfg. & financial mgmt. PICS & MRP sys. a plus. $22,000. Contact P Siegal. (Fee Paid)

ROBERT HALF
PERSONNEL AGENCIES
1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202
(716) 842-0801

COMPUTER & MANAGEMENT SYSTEMS SPECIALIST

Prominent Washington-based natl. trade assn. requires leader to conduct member activities in mgt. science and manufacturing control areas. Must be degreed. Min. 5 yrs. computer applications exper.; RPG II exper. helpful. Writing and documentation abilities a must. Should be aware of and able to convey significance of developments in computer field. Exciting work in a growing, enthusiastic environment. Salary upper $20's. Send resume and salary desired in confidence to: Graphic Communications Computer Assn./PIA, 1730 N. Lynn St., Arlington, VA 22209.

DATA PROCESSING OPPORTUNITIES

To keep pace with Mobay's rapid growth, our Information Systems Department is aggressively seeking talented professionals with the following qualifications:

Systems Analysts

A degree end previous experience in the development of large scale financial end manufecturing systems. Dete Base or CRT orineted background is desireble.

Programmers

Minimum two (2) years background utilizing ANS Cobol in IBM OS/VS environment. Knowledge of IMS, structured and on-line programming is helpful. A degree is desireble.

These positions are available et our Headquarters Facility, located neer Pittsburgh, Pennsylvenia and offer ample opportunity for career growth in a state-of-the-art environment.

Our compensation package which includes company paid benefits with relocation assistance reflact Mobay's position as en industry leader.

Please forward resumes with salary history to: Personnel Department.

Mobay Chemical Corporation
Penn Lincoln Parkway West
Pittsburgh, PA 15205

We are an Equal Opportunity Employer
M/F/Handicapped

Data Processing Manager

We are a large CPA firm seeking a Data Processing Manager for one of our clients, a small, independent sporting goods manufacturers in Northern New Jersey.

This newly created position is necessitated by the rapid growth of our client and presents an unusual growth opportunity. Plans are for greatly expanded computer capacity to be brought in-house.

The position will entail conversion responsibility and subsequent system operation and maintenance. Extensive programming will be required, therefore COBOL and RPG experience is a must.

Send resume and salary requirements, in strictest confidence to: P.O. Box 277, Department CW, FDR Station, New York, N.Y. 10022.

DIRECTOR OF DATA PROCESSING

A major company located in an ideal Southwest city has an immediate need for a Director of Data Processing. The successful candidate will have a minimum of 4 years experience at tha manager or director level. Strong organizational ability combined with proven communication skills at all levels of management including user staff personnel are qualities needed to be successful. Staff consists of 18 people, including 9 professionals.

Starting salary and benafits are axcellent, but are secondary to tha levels of respect, reward and achievement open to you in this select environment. Send your resuma specifying current salary level and requirements to:

CWBox 1599
797 Washington St.
Newton, Ma. 02160
Equal Opportunity Employer M/F

TEBOL PROGRAMMER

MAJOR INTERNATIONAL PETROLEUM COMPANY, located in midtown Manhattan, offers challenging position at corporate headquarters for an experienced TEBOL programmer. An excellent opportunity for creativa utilization of State of the Art techniques.

Applicant must be aggressive, self-motivated and have ability to communicate effectivaly. Requirements include a bachelors degree and 2-5 years data processing experience with a minimum of 1 year programming using TEBOL and OS JCL.

We offer excellent growth potential, competitive salary and comprehensive benefits. Please forward detailed resume, in strict confidence, including salary history to:

CW Box 1561
797 Washington St.
Newton, MA 02160
An Equal Opportunity Employer M/F

Design & Development Engineers

General Electric has opportunities in the

Roanoke Valley... of Virginia.

Software Development Engineers

Join us and you'll be involved in developing software systems for on-line real-time applications in an industrial process control environment. Responsibilities will span system conception, systems design and diagnostic tests, system architecture, and hardware/software trade-off.

Senior and project leader positions available.

Requirements: A BS/MS in EE or Computer Science or equivalent.

Circuit Design Engineer

Develop advanced electronic circuits, both analog and digital, signal or power. Will design small subsystem modules including microprocessors, input/output electronics and data busses. Requires BS/MSEE with experience in related development and design work.

We'll provide fully commensurate salaries and comprehensive GE benefits including relocation assistance.

Few areas of the country can rival the scenic beauty and comfortable lifestyle of the Roanoke Valley.

Find out more by sending your resume and salary history to: Mr. Thor Troisen,
General Electric Company,
1501 Roanoke Blvd.,
Salem, Virginia 24153.

GENERAL ELECTRIC

An equal opportunity employer, m/f

Sales Engineer

Microprocessor Development Systems

Openings in Boston & Philadelphia.

Experience as a design engineer, applications engineer or sales engineer working with minicomputers, minicomputer systems or microprocessor systems will provide you the opportunity to join the Tektronix sales team.

We need professionals with hardware, software and microprocessor experience. Product and sales training will be provided for you.

Applicants should have a current knowledge of digital hardware systems and assembly language programming experience. In addition, a strong interest and aptitude in customer oriented sales is necessary. BSEE or equivalent is desirable.

Competitive salary program includes incentive compensation. Benefits programs include a substantial retirement plan.

Call George Evans toll free at 800 638-4052, or send complete resume to TEKTRONIX, INC., 2 Research Court, Rockville, Maryland 20850.

An Equal Opportunity Employer M/F/H.

Tektronix
COMMITTED TO EXCELLENCE

BUSINESS SYSTEMS ANALYSTS

Telemed Corporation, a leader in the fast growing automated health care industry, has immediate openings for talented, committed professionals to serve as analysts within the Information Systems group. These analysts must have a strong applications background and be able to take a project from start to finish, including definition, design, programming and implementation. Knowledge of COBOL is essential; background in data base systems and experience with the DEC System 10 would be an added plus.

Telemed provides a challenging and stimulating environment for professional growth, with the latest in computer technology and information systems. Business applications development is done on an in-house DEC KL-10 Timesharing system, with your own CRT for on-line program development. These positions offer an opportunity to interface with top corporate management and propose solutions to real problems. Salary will be commensurate with your background, experience and potential contribution to the company.

Send your resume or a letter detailing your experience, in complete confidence to:

Software & Professional Recruitment Center

TELEMED
CORPORATION

2345 PEMBROKE AVENUE
HOFFMAN ESTATES
ILLINOIS 6019

An equal opportunity employer

CUSTOMER ENGINEER

UNIVERSITY OF WYOMING

Candidate must have 2 years Microdata experience, 3 years general computer maintenance plus some knowledge of communication and peripheral equipment. Travel is required to junior college sites throughout the State of Wyoming. Reply by July 1, 1978 to Personnel Office, Box 3422 University Station, Laramie, Wyoming 82071. The University of Wyoming is an affirmative action, equal opportunity employer.

Programmers, Analysts, Software Specialists

We are Specialists Too!

We can put you in touch with openings from coast to coast regardless of geographic preference. Contact the nearest NPA affiliate listed below for confidential service. All fees employer paid.

CAREER SPECIALISTS, INC.
4600 El Camino Real, Ste. 206
Los Altos, CA 94022
(415) 941-3200

COMPUTER CAREERS INC.
Specialists-OP
4720 Montgomery Ln. #503
Bethesda, MD 20014
(301) 654-9225

D. BROWN & ASSOCIATES
Dorothy Spiegel
OP Specialist
610 S.W. Alder, Suite 711
Portland, OR 97205
(503) 224-6860

SUPERIOR RESOURCES
16400 Ventura Blvd.
Encino (L.A.), CA 91436
(213) 986-4400

EXECUTIVE SALES PERSONNEL, INC.
Bill Ingersoll
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LEEDS & NORTHRUP

The Careers:

PROGRAMMERS AND SOFTWARE MANAGEMENT

The Experience:

FORTRAN
ASSEMBLY
MINICOMPUTERS
MICROPROCESSORS

The Opportunities:

DEVELOPMENT
APPLICATIONS
SYSTEM DESIGN
MAN/MACHINE INTERFACE
COMMUNICATIONS
SUPPORT PROGRAMS

The Company:

LEEDS & NORTHRUP

An international leader in energy management computer systems.

To investigate your career with an established growth company call anytime 24 hours a day including Saturday and Sunday (215) 643-2000, Ext. 8762 or send your resume to: Jim Henderson, Manager of Professional Employment, Systems Group. Dept. C-26

LEEDS & NORTHRUP
Dickerson Road—North Wales, Pa. 19454
Equal Opportunity Employer, M/F/H

SYSTEMS PROGRAMMER

New position with full responsibility for all systems programming including DOS/VS, interactive programming and system tuning on our IBM 370/135 system. Salary starting at 15K with 21 days vacation and other excellent fringes. Applications received by June 30, 1978 guaranteed consideration. Contact Personnel Office, Moraine Valley Community College, 10900 S. 88th Ave., Palos Hills, IL 60465 (312) 974-4300. Equal Opportunity, Affirmative Action, Title IX Employer.

PROGRAMMER

Expanding facilities for new on-line applications creates this position, requires COBOL and some CICS applications. Equipment is 370-125.

Kingsbury is the leader in special purpose machine tools. Excellent location, pay, and benefits including flexible working hours.

Send job and salary history to:

Roger W. Hetherman

KINGSBURY MACHINE TOOL CORP.

90 Laurel St.
Keene, NH 03431

PROGRAMMERS

MIDWEST

Current openings for programmers with 1-2 years in Cobol in IBM environment, CICS or IMS a plus. Salary 15-19K. Send resume in confidence to:

SEARCH E.D.P., INC.
P.O. Box 8032
Cin., OH 45208

Systems Analysts Programmers

If responsibility, career advancement and personal recognition are your objectives...

WE COULD EXCEED
YOUR EXPECTATIONS

We are an international public accounting firm expanding our computer auditing research and development staff. Excellent career opportunities are available for data processing professionals who desire challenging and diverse assignments.

Positions are currently available at our New York City headquarters for bright, ambitious, highly motivated individuals with the following skills:

- **COBOL**
  Minimum of 4 years programming and systems analysis experience. At least 2 years of COBOL programming.
- **MINICOMPUTERS**
  Minimum of 4 years programming and systems analysis experience. At least 2 years experience on business applications involving minicomputers (e.g., DEC, Data General, Varian). Additional experience on small business computers (e.g., IBM System/3) is a plus. Working knowledge of RPG. Working knowledge of COBOL.

A successful candidate will have a college degree, plus the ability to interact and communicate effectively.

Please submit your resume, including qualifications and salary history, in confidence to:

Mr. Lawrence N. Fein, Dept. 626CW (19th Floor)
277 Park Avenue, New York, N.Y. 10017

An Equal Opportunity Employer M/F

DIRECTOR OF DATA PROCESSING CENTER

(Anticipated) Master's in BDP or related discipline. Three years' experience in management/administration. Minimum two years' experience in programming and systems analyst. $19,500 - 24,500. Effective August 1.

BUSINESS DATA PROCESSING ASSISTANT PROFESSOR

(Anticipated) Master's in BDP or related discipline; 3 years' BDP teaching and/or BDP industrial work experience. Effective August 28, 1978.

Send resume by July 12 to Jane C. Frank, Affirmative Action Officer, Berkshire Community College, Pittsfield, MA 01201

Equal Opportunity Employer

PACIFIC NORTHWEST

Our client, a leading manufacturer, is seeking several **SYSTEMS PROJECT LEADERS** - who will design, implement and modify business systems needed for essential operations in rapidly expanding reorganization. We are seeking strong professionals with on-line systems experience primarily in manufacturing, financial or distribution applications.

TECHNICAL SUPPORT - seeking expertise in the following: IBM 370/DS/VS-1/MVS; TSO or VM/CMS; IMS;DL-1 and CICS. Individual selected will support new IBM installation.

Compensation and benefits are excellent. We also have career opportunities for analysts and programmers for manufacturing, banking and retail applications.

Call in confidence or send resume including salary history to Al Friedman, (206) 455-8300, Executive Resources, Inc., 310 108th Ave. NE, Bellevue, WA 98004.

DIRECTOR of INFORMATION SYSTEMS

The Director will have overall responsibility for the planning, administration and control of the Information Systems group. With a staff consisting of thirty people, this group designs, develops and maintains automated university administrative systems.

Minimum qualifications include a Bachelor's Degree plus ten years of data processing experience; five years of management or administrative experience in a major data processing center, preferably at an institution of higher education; extensive experience at a working level in systems analysis and programming.

Salary level depends on qualifications, but minimum salary will be $26,000.

Letters of application are requested by July 15, 1978, and should be sent to: William E. Walden, Associate VP for Computer Services and Information Systems, 2701 Campus Blvd., N.E., University of New Mexico, Albuquerque, NM 87131. An Equal Opportunity, Affirmative Action Employer.

Univer. of N.M.-June 26

PROGRAMMER ANALYST

WORK IN SUNNY SOUTH FLORIDA!

Cendidates must have minimum 4 years experience as Programmer Analyst. Must be proficient in COBOL and BAL. Degree preferred.

This position immediately available on Florida's beautiful east coest. Year 'round fishing, boating, swimming end golfing. Excellent pay and fringe benefits. Send resume in strict confidence to:

Employment Supervisor

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Immediate opening in e date bese systems support group working with DMS-1100 and QLP-1100 instelled on a UNIVAC 1100-42 stete computer center system. Position requires degree plus 2-4 yeers experience. Additional experience can substitute for college education. EXEC 8 and DMS-1100 experience highly desireble.

Send resumes to: Bobbie Hughes

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Richmond, VA 23219
EOE/M-F

SYSTEMS PROG

Major firm offers growth oppty to indvl with CICS Assembler bkgd from lg 370 shop $22K+DOE

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You will coordinate lg teleprocess network if you have IBM Assembler TCAM bkgd $26,000

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Salary Area $27,000

Our client, whose revenues have tripled in the last four years, has decided to convert to fully on-line systems. This position will report directly to top financial officers and will be responsible for tripling the size of the present data processing staff. The company is headquartered in an attractive suburban Houston location and has unusual growth prospects.

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403 Houston Nat. Gas Bldg.
1200 Travis St.
Houston, TX 77002

Software Engineers

Opportunities For Engineers, Systems Analysts With SEL RTM O.S. Experience In North Suburban Pittsburgh

We have immediate openings for individuals with SEL 32 (SEL 86) RTM knowledge and skills. The responsibilities of the positions include providing RTM support, enhencement, end extensions for Westinghouse SEL 32 real time process control systems.

Positions require 3-7 years experience end operating system skills. An Engineering degree is recommended.

As a member of the Software Development group, you will be working with epplication engineers, providing consultation on RTM capabilities and producing RTM extensions needed for process control systems dealing with energy manegement, industrial processes and manufacturing systems. Openings are also available in these application departments for qualified individuels with RTM experience.

These are outstanding career positions offering an excellent income commensurate with your experience, a generous company-paid benefits peckage and outstanding opportunities for professionel achievement and personal growth.

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Industry Systems, Division, Dept. CW, 200 Beta Drive, O'Hare Township, Pittsburgh, PA 15238.

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Westinghouse

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Requirements include a degree — MBA preferred — at least 8-10 years of systems programming experience in a large-scale operation including at least 4 years in a managerial capacity.

We'll provide a salary commensurate with education and experience plus excellent benefits. You'll also have the opportunity to continue growing within an organization where the contributions of talented systems professionals are valued. Find out more by sending your resume and salary history to:

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Suite 700, One Cherry Hill Mall
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(609) 667-4488

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RSVP SERVICES
Employment Agency for Computer Professionals

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Colorado

Hewlett-Packard in Loveland, Colorado has an opening for an experienced Senior Programmer Analyst. Specifically, we desire someone to help implement software systems on the H-P 3000 Series computer in a high technologically integrated circuit area. The position will involve both programming and system analysis. Qualifications include COBOL/Data Base knowledge, plus 5 years experience and BS in computer science (or equivalent) and an ability to get the job done.

Hewlett-Packard offers excellent working conditions and fringe benefits, including profit sharing, flexible work hours, etc.

For confidential consideration, please send your resume to: Ms. Kathi Kline, Personnel Department, Hewlett-Packard Company, P.O. Box 301-B, Loveland, Colorado 80537.

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Prerequisites include a degree in Computer Science or related field, and 2-5 years experience in commercial applications programming using COBOL in a 370/OS-VS or MVS environment. Good working knowledge of IBM JCL and experience with IMS, TSO, and VSAM a definite advantage.

Salaries will be commensurate with education and experience. Qualified applicants are invited to submit their resumes including salary history to:

Gulf

Mr. J.P. Haney
GULF SCIENCE & TECHNOLOGY CO.
Drawer I-71
P.O. Box 36506
Houston, TX 77036

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Data Processing Professionals

San Francisco Bay Area

Firemen's Fund, a leader in the Insurance Industry, is seeking talented EDP professionals to join us in our modern Computer Center where the latest state-of-the-art facilities exist (including our advanced three 370/168's MP MVS systems). Openings are available in the following areas:

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Positions require 3 years' Systems Programming experience, strong ALC skills, and a good understanding of MVS and systems 370 concepts. Experience in MVS internals, SMP, measurement and tuning, dump analysis, design and implementation of system software highly desirable.

Sr. Programmer/Analysts -Advanced Systems

STANDARD DEVELOPMENT - positions require 2-6 years' total EDP experience with meaningful background in two or more of the following:

(1) Systems development methodology
(2) Automated documentation operators
(3) TDDD & IPT's
(4) Internal consulting (with user & technical personnel)
(5) Data-base inquiry facilities
(6) Regression testing methodology
(7) Software evaluations
(8) EDP Standards and systems assurance

These positions are in a creative, innovative atmosphere and require the following - excellent communication skills, COBOL (shop language), PL/1, and/or MK-IV, TSO and/or Superwylbur.

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2-4 years' recent COBOL programming experience required. IBM OS preferred, but not required. Responsibilities include design and programming of various financial and insurance-related systems. Both new programming and enhancements.

If you are interested in pursuing a career in a progressive environment where your talents will be recognized and utilized, please call collect (415) 485-6096 weekdays, 8 AM to 5 PM Pacific Daylight Time, or send your application and salary requirements to Dave Norris, Employment Representative, Dept. CW-1, 1600 Los Gamos Drive, San Rafael, California 94911. We offer excellent benefits and a generous relocation policy.

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CONTROL DATA CORPORATION
2401 North Fairview Avenue
Roseville, MN 55113

CONTROL DATA CORPORATION

COMPUTER PROFESSIONALS

The Reuben H. Donnelley Corporation, a Dunn and Bradstreet Company, is seeking dynamic leaders for participation in the continued development of a highly mechanized publishing system. This system will be utilized in the marketing, publishing, and distribution of telephone directories within the Illinois/Cincinnati area from the Regional Data Processing facility located in Terre Haute, Indiana. The continued growth and achievement of Data Processing has created three immediate opportunities for experienced individuals. Reuben H. Donnelley offers outstanding opportunities for further professional achievement and personal growth within our entire organization. An excellent fringe benefit program is available including profit participation. Degree desired but not essential. Salary commensurate with experience. Positions available include:

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DATA BASE/DATA COMMUNICATIONS MANAGER - Opportunity for individual with practical experience in data base systems design in a communications oriented environment.

ANALYST/PROGRAMMER - Opportunity for the individual with previous systems analysis and programming experience.

For immediate attention, please submit your resume with salary history in confidence to:

R.A. Slover
Area Personnel Manager
THE REUBEN H. OONELLEY CORPORATION
66 South First St., P.O. Box 720
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Nationwide steel distributor has opening for individual with proven track record in teleprocessing. We operate in a DOS/VS 148 environment, running BTAM and CICS.

Require candidates with systems programming and remote 3270 experience, and a thorough understanding of protocalls and data network structures.

Successful applicant will have technical, PLUS oral and written communications skills to interface with vendors and contribute toward MIS Department long-range growth goals.

Excellent fringe benefits and salary commensurate with experience. Send resume, including current salary, to:

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Prominent Washington-based natl. trade assn. requires leader to conduct member activities in mgt. science and manufacturing control areas. Must be degreed. Min. 5 yrs. computer applications exper.; RPG II exper. helpful. Writing and documentation abilities a must. Should be aware of and able to convey significance of developments in computer field. Exciting work in a growing, enthusiastic environment. Salary upper $20's. Send resume and salary desired in confidence to: Graphic Communications Computer Assn./PIA, 1730 N. Lynn St., Arlington, VA 22209.

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PROJECT LEADER SYSTEMS PROGRAMMER

Looking for a great career opportunity in sunny Miami Florida? Southeast Data Processing, Inc., an affiliate of Southeast Banking Corporation is seeking ambitious individuals to grow with an expanding company. If you have experience leading conversion from 2 158 UP's using OS/VS1 to MVS/MP 158's, then our excellent benefits, and career growth opportunities are for you. We would appreciate no agency correspondence. Send your resume and salary requirements to:

Ms. Deborah Kellermann
1001 N.W. 7 St., Miami, FL 33136
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Supervise programming of University data base management system. Sr. Analyst experience required. Data base experience desired. Excellent benefits.

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DATA PROCESSING OPPORTUNITIES

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Whittaker Corporation, a leader in international health care services, has an immediate need for experienced data processing professionals in the following positions:

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There are two project team leader positions available:

(1) Material Management Information Systems

Requires a broad background in design and implementation of computer based systems for:
- Supplies catalogues
- Purchasing
- Inventory control and management
- Property control

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Requires a broad background in design and implementation of computer based systems for:
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- Budgeting/general ledger
- Cost accounting
- Payroll and personnel

These positions require the ability to interface effectively with the user organizations and to implement the manual systems for data preparation, flow and control.

SYSTEMS ANALYST

There are two positions available
- 2 years experience as systems analyst plus 2 years as a computer programmer is required
- Material or financial systems design experience is desirable

COMPUTER PROGRAMMER

There are two positions available:
- 3 years experience using RPG II in an IBM environment is required

For all the positions listed above:

Experience with a multiple-facility health care systems would be advantageous.

Experience with IBM 370 hardware and software capabilities is required including:
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- RPG II

Benefits for these two year contract assignments include a competitive salary, medical and life insurance, exciting travel opportunity as well as furnished living accommodations.

For further information & confidential consideration, please forward your current resume with salary history to:

TEMPLE CANNON, Sr. Recruiter
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10880 Wilshire Blvd., Suite 604
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Rush your resume including salary history to: TED A. LEHR, EDP Specialist-DUNHILL EDP, 22 E. Mitchell Dr., Phoenix, AZ 85012 . . . or call (602) 264-1166 . . . Company inquiries are also invited . . . 100% EMPLOYER RETAINED . . . Member of DPMA and ASM.

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To plan, organize and direct the increasing activities of technical staff of a repidly-growing, non-profit library services organization.

Activities include:

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Qualifications include:

1) 8-10 years of solid data processing experience in medium to large scale computer environment; 2) demonstrated management capability of development of large data base oriented, online applications system; 3) personal communications ability for frequent interaction with leaders in international library and information services community.

This southeastern membership organization offers competitive salary; comprehensive benefits, relocation assistance, interesting and challenging environment and outstanding living and recreational opportunities.

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COBOL

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Systems Analysts

COBOL

Seeking experience in computer-oriented systems design, including flow charts, files, data bases, on-line systems design, telecommunication support and file structuring. A college degree with solid systems design experience will qualify you.

Qualified candietes will be offered the opportunity for career growth and advancement within a technically dynamic EDP environment, as well as excellent compensation, benefits, and modern working conditions at our new Chicago Loop offices. For prompt, confidentiel consideration, submit resume or write letter, outlining your background and salary history, or call (collect):

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DTSS Incorporated
requires

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Duties include client visits and sales presentations as well as installation and support for new systems. This is an exciting opportunity to develop a career while living in a rural area. Job includes moderate travel in the US and abroad.

Required qualifications ara experience with major computing languages and excellent oral/written communication skills. Familiarity with DTSS is a big plus, as is familiarity with other major computer systems. Bachelor's degree preferred. Salary commensurate with experience.

Send resume to:

Michael R. Vitale, Director of Marketing
DTSS INCORPORATED
P.O. Box 799, Hanover, N.H. 03755

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If you are looking for e plece to work where each day presents new challenges end there is no limit to your ebility to leern end earn, consider American Management Systems.

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We need systems professionals who have experience in using:

- MVS, MVT, VSI
- JES2, HASP
- CICS, IMS, WYLBUR, TSO
- VM, CMS

We ere especially interested in funding two senior systems programmers: one who can take charge of plenning and carrying out e conversion from OS to MVS; and the other who can plan end carry out the installation of IMS OB/OC. These two positions ere in the AMS Computer Center in Arlington, Virginia which is in the Washington, O.C. metropolitan area.

SYSTEMS SOFTWARE/ TELECOMMUNICATIONS EXPERTS

To work in the design and development of very large scale systems on IBM computers. Work will include selection of software packages; data base design, development of systems standards; analysis of databese security restart/recovery, hardwara/software performance, and telecommunications networks. We are especially interested in finding senior date bese design experts - some with experience using IMS OB/OC end, others with experience using ADABAS and CICS. These positions for senior experienced professionals are available in our Washington, O.C., New York, Chicago and Oetroit offices.

American Management Systems is e management consulting, software products and computer services firm founded in 1970. In 1977 our sales were $21 million, in 1978 we will reach $30 million. We have sustained this growth by ettracting end keeping highly motivated people who are good et what they do end thrive in an atmosphere that rewards a commitmant to axcellenca.

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Department A

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Exceptional opportunities to participate in the development of a new corporate data center utilizing an IBM 370/3031 (OS-VS 1)

World leader in sophisticated piping products and systems with current business in excess of $500 million, ITT Grinnell looks confidently forward to continued business success. To keep pace with the company's demonstratad vitelity, we're expending our EOP systems and facilities. In a climata of positive change and growth, we seek specialists qualified for the following positions.

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To install and maintain existing applications on a 3031 systam and to develop softwara capabilities for future OP needs. Will establish standards for use of software system and evaluate system efficiency and productivity. Requires minimum 6 years experience including 3 years systems programming in an OS-VS 1 or MVS environment. Should be familiar with communicetion systems.

Systems Analyst

To analyze information for developing and modifying systems applications. Must be able to work closely with company personnel to gather information, solve problems and define systems objectives. Designs applications and guides their instellation. Requires 6 years OP experience including 3 years COBOL/OS programming/analysis experience.

Programmer Analysts

To design and test program logic, code programs and prepare tham for computer operation. Assist in esteblishing file requirements and processing specifications and prepare documentation of completed programs. Opportunity to advanca into systems programming. Requires 3 years COBOL progremming experience.

Positions based at our Providence, R.I, headquarters. Salaries and benefits excellent. Raply fully steting salary history and indicating position of interest, in confidence to: Sherry Bearse, ITT Grinnell Co., 260 West Exchange Street, Providence, R.I. 02901.

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BAL, COBOL, or PL/1 experience necessary

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No Commuting... Informal Atmosphere

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IBM 158 AP/3033, OS/MVS/TSO, RAMIS mini-computers, interactive systems, optical scanning, large scale file maintenance. Experience in market research, direct mail, subscription fulfillment, statistical analysis, or name and address processing desirable, but not required.

Starting salary from $12,000 - $18,000, depending on qualifications and relevant experience. Relocation expenses paid. For further information, please call:

800-525-2246 (toll free)
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SYSTEMS PROGRAMMERS

Transamerica Information Services, a major state of the art data processing organization located in Los Angeles has career opportunities available for highly qualified professionals.

MVS SYSTEM PROGRAMMER

Primary duties will include SCP maintenance, PUT and SU installations, SYSGEN, IBM PSR interface, and problem determination & resolution. Position requires comprehensive system programming & operating experience with large processors, MVS, JES 2, TSO, SMP service aids, debugging & VSAM. Knowledge of 168MP, end of subsystems designs and conventions helpful.

SR. SYSTEMS PROGRAMMER

Senior level Systems Programmer required with CICS or other large teleprocessing monitor experience and a working knowledge of MVS, JES 2 and TSO. Expertise with EP VTAM/NCPnd TCAM helpful. Responsibilities will include debugging and tuning CICS, generating and maintaining JES 2, performing TSO support activities, and conducting associated evaluations and recommendations. Will assume project leadership responsibilities.

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Equal Opportunity Employer

PROGRAMMER/ANALYST

$25,000

GO WITH THE BEST...

SYSTEMS & COMPUTER TECHNOLOGY AT THE UNIVERSITY OF ALASKA

We're SCT, a recognized expert in providing EDP systems and computer center management to colleges, universities and local government throughout the USA. Opportunities for career growth and advancement are very strong within the company. Right now an excellent opportunity is available at the University of Alaska Computer Network (UACN) to participate in the development, expansion, and enhancement of a variety of applications systems.

This position requires a degree and 2 years of systems development experience using COBOL. Additional specific experience in the following is desirable: University Systems, Financial Systems, Honeywell (GCOS) and on-line applications.

In addition to an excellent salary in the mid-twenties (including cost-of-living adjustment), we offer a complete benefit package which includes company paid vacation. CALL COLLECT:

Manager Administrative Systems
907/479-7665
Monday-Friday, 12Noon-9pm (CDT)

Or send resume to:

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION

P.O. Box 95101
Fairbanks, Alaska 99701

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Illinois Board of Higher Education

Data Base Manager

FUNCTION: The Data Base Manager is responsible for file structures, data dictionary, access controls, performance and maintenance of the Illinois Board of Higher Education data base.
SALARY: Upper Teens to Lower Twenties, depending upon experience and qualifications.
BACKGROUND: Working experience with IMS Data Base Management System required. Programming experience in COBOL is preferred; experiences with OS/JCL and report generators (e.g. EASYTRIEVE), would be helpful.
AVAILABILITY: This position is available immediately; applications should apply before July 7, 1978 to:

Dr. James J. McGovern
Illinois Board of Higher Education
4 West Old Capitol Sq.
500 Reisch Bldg.
Springfield, IL 62701
(217) 782-2551
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Equal Opportunity Employer

DIRECTOR - MIS

Our client is a manufacturing organization in need of director who has worked his way up through programming and analysis and has experience in running computer operations and establishing controls. The successful candidate comes from a high volume OEM type product company. His is a manager first, end bottom line oriented. The position is at corporate in Chicago with a starting salary up to 35K and profit sharing and 10% bonus. Call (305) 358-9280 or send resume to Michael Rottblatt, Ott, Hertner & Assoc., 1401 Bricknell Ave., Suite 603, Miami, FL 33131.

HOUSTON

The fishing is great, the water skiing is great, etc., but all of that is immaterial. The important thing is that Houston's data processing market is great. This includes programmers, analysts, managers, scientific people, etc. Test the water by calling Jim Fleming COLLECT at (713) 961-3271 or send your resume to:

ROBERT HALF
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Houston, Texas 77056

PROGRAMMER ANALYSTS

Join our centralized MIS function working with advanced hardware & software in our conveniently located central N.J. headquarters. Exp ranges from 2-5+ yrs. COBOL exp on IBM 370, OS/VS 1 & background in financial systems preferred. Degree in computer science or related degree an added plus.

We offer an attractive salary, a comprehensive package of fringe benefits, liberal relocation allowances & most importantly a high visibility position with exceptional opportunity for career advancement. Interviews can be arranged at your convenience. Forward a resume & current earnings to David Alal, Corporate Employment Manager. Agency replies accepted.

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An Affirmative Action and Equal Opportunity Employer

Illinois Board of Higher Education

Programmer-Analyst
(Research Associate)

FUNCTION: Aid in the analysis of data for the Board of Higher Education by writing computer programs to summarize and integrate data files.
SALARY: Mid to Upper Teens, depending upon experience and qualifications.
BACKGROUND: Applicants should have knowledge of OS/JCL and COBOL. Experience with IMS and EASYTRIEVE is helpful.
AVAILABILITY: This position is available immediately; applicants should apply before July 7, 1978.

Dr. James J. McGovern
Illinois Board of Higher Education
4 W. Old Capitol Square
500 Reisch Bldg.
Springfield, IL 62701
(217) 782-2551
An Affirmative Action/
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COMPUTER PROFESSIONALS

Computer Management with Sunmark Industries

Sunmark Industries, a subsidiary of Sun Company, Inc., is involved in the marketing of wholesale and retail petroleum and automotive products, in the eastern United States. Presently, our Finance and Systems Department, located in center city Philadelphia, has need of two high level, ambitious computer professionals.

DIRECTOR

Information & Computer Systems

Will be recognized as the primary source of computer expertise and budgetary control. Will be responsible for the overall coordination and consolidation of separate systems and data processing efforts being conducted by Sunmark. The successful applicant will have major impact on the development of short and long range system plans, the maintenance and improvement of existing systems for financial control and decision-making needs.

To qualify, the candidate must have top level experience in managing EDP systems organizations and their key functions, plus a proven distinguished background in administrative and technical supervision. Must be able to deal with top level management. Salary to $40,000.

MANAGER

Systems Operations

This position will have overall responsibility for the management, control, maintenance and data base administration of Sunmark's hardware, software, vendor contracts, security, training and user consulting. In addition, the position requires establishing system standards and auditing compliance; designing modifications for present systems to improve efficiency and satisfy infomration needs and conducting supervision of an Analyst Staff and some outside vendors.

Position qualifications will include a proven background in systems management with an emphasis on up-grading systems efficiency and cost savings for employer, the ability to balance and satisfy user needs, integrate systems and set priorities. Salary to low $30,000.

As a subsidiary of Sun Company, Inc., Sunmark can provide excellent opportunities for career development and professional satisfaction plus excellent corporate benefits. Interested applicants should send their resumes, ncluding salary requirements, in confidence, to: Z-95, P.O. Box 2069, Philadelphia, PA 19103.

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DIRECTOR OF TECHNICAL SERVICES

Indiana University Purdue University at Indianapolis

The 22,000 student IUPUI campus in Indianapolis, serving both Indiana and Purdue Universities - is looking for a highly qualified data processing manager to assume responsibility for the direction of its Technical Services Department.

Technical Services has full responsibility for all systems software on the three academic mainframes at the Indianapolis Campus: DEC 1090 with 512 K words of memory and 800 MMBytes of disk storage, IBM 370/125, and 360/44. All three systems are used for instructional and research computing, with some administrative applications. The 370/125 is used for operating systems instruction and, as such, runs DOS/VS, OS/VS1, and VM/370. Technical Services includes groups specializing in statistical and mathematical programming, operating systems, telecommunications, consulting, and software systems, with a staff numbering about twenty.

The Indianapolis computers are part of the Indiana University Computing Network and are connected to a 370/158 AP running MVS and a CDC 6600/CYBER 172 multimainframe complex, as well as to a large number of small computers.

The Director of Technical Services plays a vital role in coordinating computing activities throughout the campus and in consulting on computing needs for research projects. To meet the challenge of this position, the Director should have at least six years of experience in increasingly responsible positions, including three years in a supervisory position. He or she should be a strong manager with strong communications skills, and an excellent background in systems programming. This is a high visibility position within the University, and requires heavy interaction with faculty and administrators. Academic experience and an advanced degree are highly desirable.

This postion offers considerable challenge and potential for success. Fringe benefits are excellent, including four weeks vacation and eleven paid holidays, with starting salary to $26,000 for a qualified individual.

Please submit resumes to:

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1100 West Michigan Street
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Applicant should be familiar with Assembler, FORTRAN, COBOL, OS-JCL, and utilities, and should have performed a SYSGEN. You will also be working with CINCOM's "TOTAL", Speakeasy, TCAM/TSO, and graphics applications.

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Applicant must be a U.S. citizen and be able to obtain a security clearance.

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Director of Personnel
Code- SP
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Meet our technical representatives in these cities. To arrange a convenient interview in advance, call George Rice (collect) at **(714) 485-2153.**

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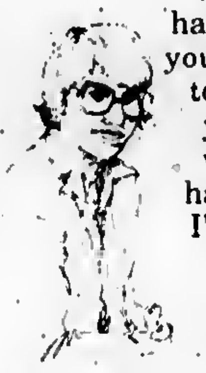

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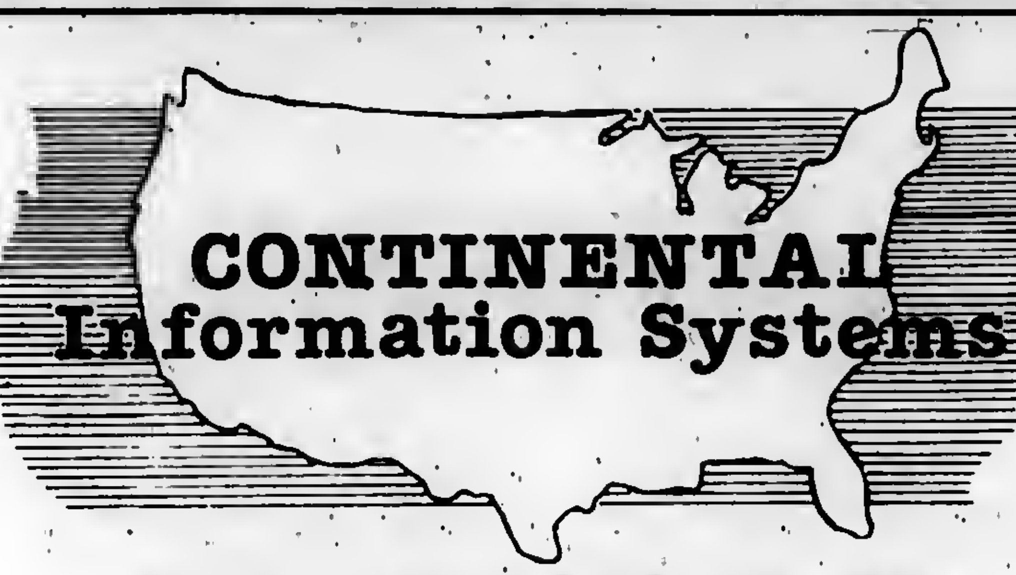

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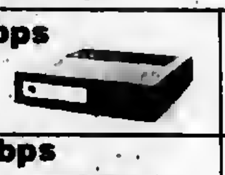
2400 bps 	**MODEM 2200/24** Half or full duplex operation over dial or dedicated facilities.	$1780 $60/mo.*	**$725** **$29/mo.***
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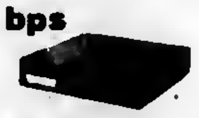
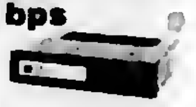
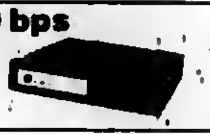
4800 bps 	**MODEM 4400/48** For point-to-point synchronous operation. Operates full duplex or simplex over typical unconditioned lines.	$4800 $70/mo.*	**$995** **$40/mo.***
7200 bps 	**MODEM 4800/72** Dedicated line with optional multiport operation for up to three 2400 bps channels.	$6900 $165/mo.*	**$1995** **$80/mo.***
9600 bps 	**MODEM 5500/96** Dedicated line with optional multiport operation for up to four 2400 bps channels.	$7990 $185/mo.*	**$2995** **$120/mo.***

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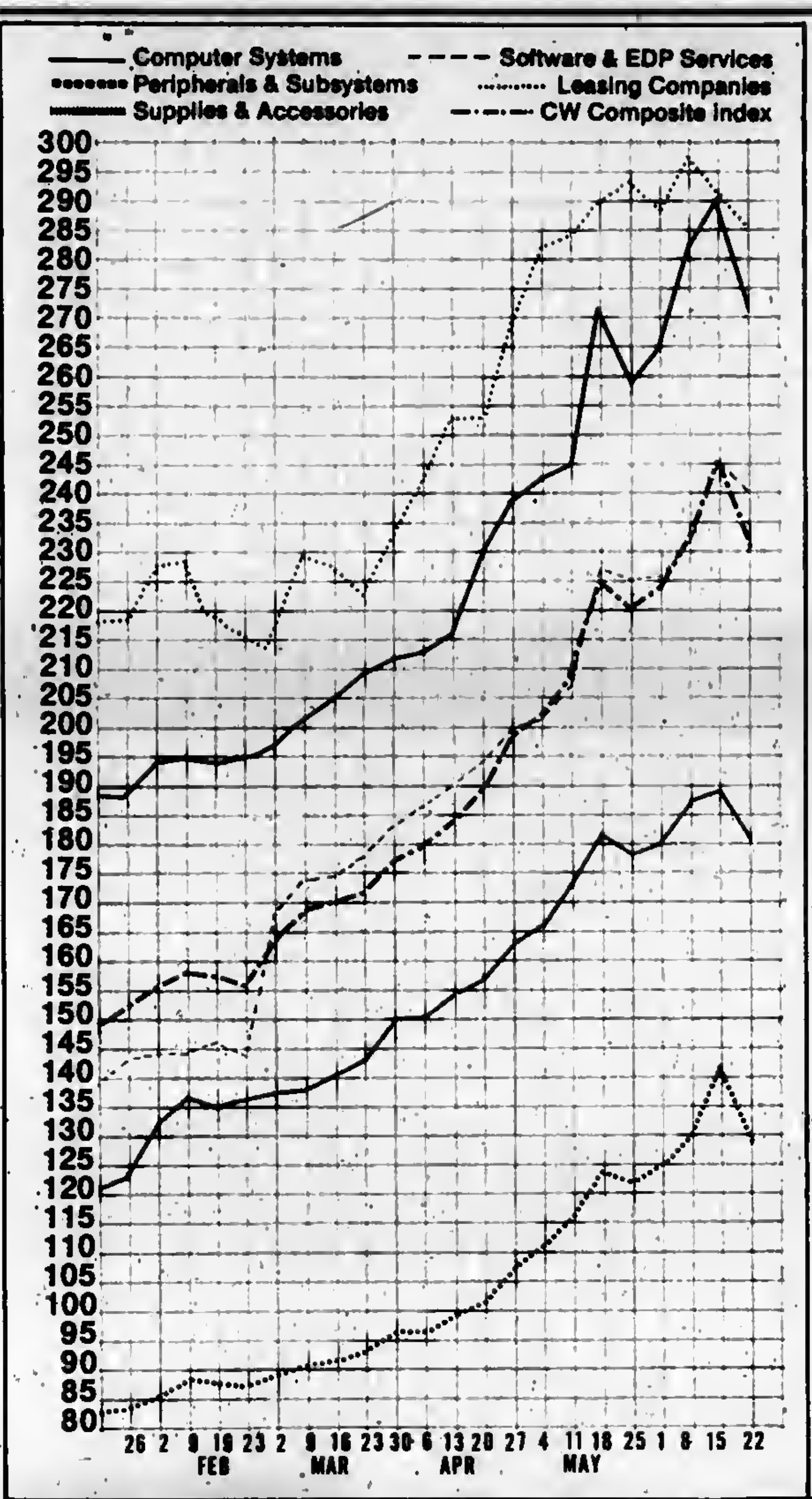

Earnings Reports

DATA DIMENSIONS
Year Ended Dec. 31

	1976	1877
Shr Ernd	$.24	$.82
Revenue	11,870,400	T,888,500
Earnings	183,400	479,900

ELECTRONIC OATA SYSTEMS
Three Months Ended March 31

	1978	197T
Shr Ernd	$.39	$.35
Revenue	56,984,000	43,352,000
Eernings	4,936,000	4,436,000
9 Mo Shr	1.10	.94
Revenue	158,063,000	115,502,000
Earnings	13,992,000	11,772,000

GENERAL DATACOMM INDUSTRIES
Three Months Ended March 31

	19T8	197T
Shr Ernd	$.34	$.18
Revenue	7,509,000	4,728,000
Earnings	531,000	260,000
8 Mo Shr	.64	.32
Revenue	14,008,000	9,007,000
Earnings	992,000	470,000

MODULAR COMPUTER SYSTEMS
Three Months Ended March 31

	1978	a18TT
Shr Ernd	$.32	$.11
Revenue	14,109,000	12,231,000
Oisc Op Loss	......	25,000
Earnings	1,139,000	343,000

e-Restated to reflect discontinued operations.

PERTEC COMPUTER
Year Ended March 31

	1878	a1977
Shr Ernd	$1.1T	$.78
Revenue	131,802,000	100,664,000
Earnings	7,183,000	4,857,000
3 Mo Shr	.38	.25
Revenue	35,972,000	26,984,000
Earnings	2,182,000	1,514,000

a-Restated.

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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JUNE 21, 1978

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridga, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 19TT-78 RANGE (1)	CLOSE JUN 21 1978	WEEK NET CHNGE	WEEK RCT CHNGE
A	APOAHL COPP	22- 39	36 1/2	-2 1/4	-5.8
M	BUPROUGHS CORP	55- 91	73 1/4	-3 3/4	-4.8
C	COMPUTER AUTONATION	18- 38	33	-4 1/2	-12.0
N	CONTPOL DATA CORR	20- 36	32 7/8	-2 5/8	-7.3
C	CRAY PESEARCH INC	15- 46	3T 1/4	-1 1/4	-3.2
N	OATA GENERAL CORP	35- 61	55 7/8	-4 3/8	-7.2
N	OATAPOINI CORR	18- 64	58 1/2	-5 3/4	-8.9
N	OIGITAL EOUIRNENT	37- 53	47 3/4	-4 1/2	-8.6
N	ELECTRONIC ASSOC.	2- 8	6 3/4	- 5/8	-8.4
A	ELECTRONIC ENGINEER.	8- 19	18 3/8	- 3/4	-3.9
O	FOUR-RHASE SYSTEMS	13- 32	29	-2 7/8	-9.0
N	FOXBORO	28- 54	36 1/2	-2 1/8	-5.5
O	GENERAL AUTONATION	6- 19	1T 5/8	- T/8	-4.7
O	GRI COMPUTER CORR	1- 1	1 5/8	0	0.0
N	HEWLETT-RACKARO CO	62- 87	79 1/4	-4 1/2	-5.3
N	HONEYWELL INC	43- 59	56 3/4	-1	-1.7
N	IBM	236-286	268	-3 1/8	-1.1
O	MANAGEMENT ASSIST	5- 18	14 1/4	-1 T/8	-11.6
O	MICROOATA CORP	7- 18	17 1/8	+ 3/8	+2.2
O	MINI-COMPUTER SYST	5- 12	5 1/4	- 1/2	-8.6
O	MCOULAR COMPUTER SYS	5- 15	12 3/4	-1 3/8	-9.T
N	NCR	32- 58	54	-2 5/8	-4.6
O	RRIME COMRUTER INC	12- 32	28 1/4	-3	-9.5
N	PERKIN-ELMER	1T- 26	23 3/8	-1 5/8	-6.5
N	PAYTHEON CO	16- 50	44	-5 3/8	-10.8
N	SPEPRY RAND	30- 45	42	-1 5/8	-3.7
O	SYCOR INC	8- 24	23 1/2	- 1/8	-0.5
A	SYSTEMS ENG. LABS	5- 21	18 1/8	-2 1/8	-10.4
A	WANG LABS.	10- 26	22 5/8	-3 1/2	-13.3

LEASING COMPANIES

EXCH		PRICE 19TT-78 RANGE (1)	CLOSE JUN 21 1978	WEEK NET CHNGE	WEEK RCT CHNGE
O	ALANTHUS CORP	3- 6	5	- 1/8	-2.4
C	BOOTHE COURIER CORP	8- 18	15 1/8	-1 3/8	-8.3
O	COMDISCO INC	9- 20	16 1/2	-2	-10.8
A	COMMERCE GROUP CORP	1- 3	5/8	0	0.0
A	COMPUTER INVSTRS GRP	1- 2	1 1/8	0	0.0
P	OATRONIC RENTAL	0- 2	1 1/2	- 1/8	-T.6
A	OCL INC	1- 4	3 1/4	- 1/4	-7.1
N	DPF INC	6- 13	10 3/4	-1 5/8	-13.1
N	ITEL	13- 27	24 3/8	-1 5/8	-6.2
N	LEASCO CORP	19- 35	30	-1	-3.2
O	LEASRAC CORP	1- 2	2 3/8	+ 5/8	+35.7
A	RIONEER TEX CORP	5- 11	6 3/8	- 1/4	-3.7
N	U.S. LEASING	10- 16	14 5/8	- 3/8	-2.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIOWEST; O=OVER-THE-COUNTER
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SOFTWARE & EOP SERVICES

EXCH		PRICE 1977-T8 PANGE (1)	CLOSE JUN 21 1978	WEEK NET CHNGE	WEEK PCT CHNGE
O	AOVANCEO COMP TECH	0- 2	1 1/4	- 1/8	-9.0
O	ANACOMP INC	7- 18	17 3/8	+1 3/8	+8.5
A	ARPLIEO DATA RES.	5- 16	14 1/2	-1 3/8	-8.6
N	AUTOMATIC DATA RROC	23- 34	31 1/2	-1 1/2	-4.5
O	COLEMAN AMERICAN COS	1- 2	1 T/8	+ 1/8	+7.1
O	COMRU-SERV NETWORK	T- 15	10	+1	+11.1
O	COMR ELECTION SYSTMS	6- 10	9 1/4	+ 1/4	+2.7
O	COMRUTER HORIZONS	1- 4	4	0	0.0
O	COMPUTER NETWORK	6- 12	11 3/8	- 1/4	-2.1
N	COMRUTER SCIENCES	7- 13	10 3/4	-1 3/4	-14.0
O	CONRUTER TASK GROUR	1- 4	3 1/4	0	0.0
O	COMPUTER USAGE	1- 4	2 5/8	- 1/4	-8.6
O	COMSHARE	5- 1T	14 1/4	-1 3/4	-10.9
O	DATA OINENSIONS INC	3- 7	6 1/4	- 1/4	-3.8
O	DATATAB	1- 2	1	0	0.0
N	ELECTRONIC DATA SYS.	14- 23	18 3/4	-1 3/4	-8.5
O	INSYTE CORP	2- 3	2 1/8	+ 3/4	+54.5
O	IPS COMPUTER MARKET.	1- 2	2 3/8	0	0.0
O	KEANE ASSOCIATES	3- 6	5 1/2	- 1/2	-8.3
O	KEYOATA CORP	1- 3	2 1/2	+ 1/4	+11.1
A	LOGICON	7- 1T	12 1/4	- 1/2	-3.9
A	MANAGEMENT OATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	10- 28	24	-4	-14.2
O	NATIONAL DATA CORR	4- 12	10 5/8	- 3/4	-6.5
A	ON LINE SYSTEMS INC	16- 26	22 5/8	-1 3/4	-T.1
M	PLANNING RESEARCH	3- 8	T 3/8	- 5/8	-7.8
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RARIOATA INC	2- 6	5	- 7/8	-14.8
O	REYNOLDS & REYNOLO	17- 28	25 1/2	-1 3/4	-6.4
O	SCIENTIFIC COMPUTERS	1- 6	5 1/8	- 1/4	-4.6
O	TYMSHARE INC	14- 27	24 1/4	-1 1/2	-5.8
A	URS SYSTEMS	4- 7	6 7/8	+ 1/8	+1.8
N	WYLY CORP	1- 5	3 7/8	- 1/4	-6.0

PERIPHERALS & SUBSYSTEMS

EXCH		PRICE 1977-T8 PANGE (1)	CLOSE JUN 21 1978	WEEK NET CHNGE	WEEK PCT CHNGE
N	AODRESSOGRAPH-MULT	10- 25	23 5/8	- 5/8	-2.5
O	AOVANCEO MEMORY SYS	7- 14	12 5/8	-1	-7.3
N	AMPEX CORP	8- 17	14 3/8	-1 1/2	-9.4
O	AMOERSON JACOBSON	3- 9	7 1/8	- 5/8	-8.0
N	ARRLIEO OIG OATA SYS	10- 20	16	-1 1/2	-8.5
O	BEEHIVE INT'L	4- 12	4 1/4	-2 1/2	-37.0
A	BOLT BERANEK & NEW	6- 11	9 1/4	- 3/4	-7.5
N	BUNKER-RAND	8- 18	16	-2 1/8	-11.T
A	CALCOMR	3- 9	7 3/8	- 5/8	-7.8
O	CAMBRIOGE MEMORIES	1- 8	5 5/8	-1	-15.0
N	CENTRONICS OATA COMP	16- 30	27 3/8	- 7/8	-3.0
O	COGNITRONICS	1- 4	3	-1 3/8	-31.4
O	COMPUTER COMMUN.	5- 10	9	- 3/8	-4.0
O	COMPUTER CONSOLES	4- 9	8 1/4	- 1/2	-5.7
A	COMPUTER EOUIRMENT	2- 6	4 3/4	- 1/4	-5.0
O	COMPUTER TRANSCEIVER	1- 1	1 5/8	0	0.0
O	COMTEN	9- 28	22 3/4	-4 1/4	-15.7
N	CONRAC CORP	19- 28	21 5/8	-1 3/4	-7.4

EXCH		PRICE 19TT-78 RANGE (1)	CLOSE JUN 21 1978	WEEK NET CHNGE	WEEK RCT CHNGE
O	OATA ACCESS SYSTEMS	4- 5	5 3/4	+ 1/2	+9.5
O	DATA 100	6- 17	15	- 1/4	-1.6
A	OATA RROOUCTS CORR	9- 24	20 3/8	-2 7/8	-12.3
O	OATA TECHNOLOGY	3- 4	4 1/8	+ 1/8	+3.1
O	OATUM INC	1- 4	3 3/4	- 1/4	-6.2
O	OECISION DATA COMPUT	2- 4	3 5/8	- 5/8	-14.7
O	OELTA OATA SYSTENS	1- 1	5/8	0	0.0
A	OCCUMATION INC.	6- 24	21 1/4	-1	-4.4
O	OATARAM CORP	2- 24	18	-3 3/4	-17.2
N	ELECTRONIC M & N	4- 7	6 1/4	- 5/8	-9.0
O	FABRI-TEK	1- 2	1 5/8	+	+3.8
O	GENERAL COMPUTER SYS	0- 2	1 1/2	- 1/4	-14.2
N	HAZELTINE CORP	8- 16	14 1/4	-1 1/4	-8.0
N	HARRIS CORP	28- 61	54 1/8	-5 1/8	-8.6
O	INFOREX INC	4- 10	8 5/8	-1	-10.3
O	INFORNATION INTL INC	8- 14	9 1/4	0	0.0
O	INTEL CORP	38- 62	5T	-3	-5.0
A	LUNOY ELECTRONICS	3- 6	3 1/2	+ 1/2	+16.6
O	MSI DATA CORP	6- 19	16 3/4	-1 1/4	-6.9
N	MEMOREX	23- 49	41 1/8	-4 5/8	-10.1
N	MOHAWK DATA SCI	5- 12	10	-1 1/8	-10.1
O	PENRIL CORP	2- 12	9 3/4	-2 1/2	-20.4
M	PERTEC CORP	T- 14	11	- 7/8	-T.3
A	ROTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	2	0	0.0
O	OUANTOR CORP	2- 5	2 3/8	- 1/2	-17.3
O	RECOGNITION EQUIR	6- 12	11 1/8	-1	-8.2
O	SCAN DATA	1- 4	3 1/8	- 1/8	-3.8
N	STORAGE TECHNOLOGY	10- 46	21 1/4	-25	-54.0
O	T BAR INC	7- 19	17	- 1/2	-2.8
O	TALLY CORP.	4- 9	7 5/8	- 7/8	-10.2
A	TEC INC	6- 10	9 1/4	- 7/8	-8.6
N	TEKTRONIX INC	29- 45	41 1/2	-2 1/4	-5.1
N	TELEX	2- 7	5 1/4	-1	-16.0
O	TESOATA SYSTEMS CP	13- 20	17	-1 3/4	-9.3
O	WILTEK INC	1- 1	1 1/4	- 1/8	-9.0

SUPPLIES & ACCESSORIES

EXCH		PRICE 19TT-78 RANGE (1)	CLOSE JUN 21 1978	WEEK NET CHNGE	WEEK RCT CHNGE
A	AMERICAN BUS PROOS	6- 9	8 1/4	- 3/4	-8.3
O	BALTIMORE BUS FORMS	1- 5	4 1/2	0	0.0
A	BARRY WRIGHT	10- 28	22	-4 1/8	-15.7
O	CYBERMATICS INC	1- 1	1 1/8	- 1/8	-10.0
O	DUPLEX PRODUCTS INC	14- 27	25 1/4	- 7/8	-3.3
N	ENNIS BUS. FORMS	6- 17	14 3/8	-1 1/2	-9.4
N	3M COMPANY	43- 57	54 7/8	-1 1/2	-2.6
O	MOORE CORR LTD	24- 37	33 1/4	+ 1/2	+1.5
N	NASHUA CORP	16- 31	26 1/2	-2 1/2	-8.6
O	STANOARO REGISTER	18- 26	21	-1 1/4	-5.6
A	TAB PRODUCTS CO	5- 13	13 1/8	+1 3/4	+15.3
M	UARCO	18- 27	24 3/4	- 1/4	-1.0
A	WABASH MAGNETICS	10- 15	13	- 7/8	-6.3
N	WALLACE BUS FORMS	17- 25	24	- 3/4	-3.0

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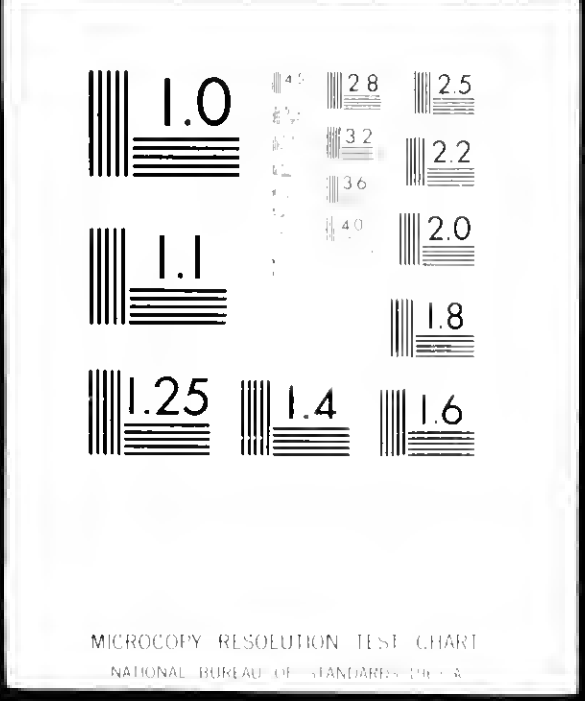
RESOLUTION CHART


1.0
4.5
2.8
2.5
5.0
3.2
2.2
5.6
3.6
6.3
4.0
2.0
7.1
8.0
1.1
1.8
1.25
1.4
1.6
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

100 MILLIMETERS

INSTRUCTIONS Resolution is expressed in terms of the lines per millimeter recorded by a particular film under specified conditions. Numerals in chart indicate the number of lines per millimeter in adjacent "T-shaped" groupings.

In microfilming, it is necessary to determine the reduction ratio and multiply the number of lines in the chart by this value to find the number of lines recorded by the film. As an aid in determining the reduction ratio, the line above is 100 millimeters in length. Measuring this line in the film image and dividing the length into 100 gives the reduction ratio. Example: the line is 20 mm. long in the film image, and 100 20 5.

Examine "T-shaped" line groupings in the film with microscope, and note the number adjacent to finest lines recorded sharply and distinctly. Multiply this number by the reduction factor to obtain resolving power in lines per millimeter. Example: 7.9 group of lines is clearly recorded while lines in the 10.0 group are not distinctly separated. Reduction ratio is 5, and 7.9 x 5 39.5 lines per millimeter recorded satisfactorily. 10.0 x 5 50 lines per millimeter which are not recorded satisfactorily. Under the particular conditions, maximum resolution is between 39.5 and 50 lines per millimeter.

Resolution, as measured on the film, is a test of the entire photographic system, including lens, exposure, processing, and other factors. These rarely utilize maximum resolution of the film. Vibrations during exposure, lack of critical focus, and exposures yielding very dense negatives are to be avoided.